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MILITARY STANDARD

SOFTWARE DEVELOPMENT AND DOCUMENTATION

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FOREWORD

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to SPAWAR 10-12, 2451 Crystal Drive (CPK-5), Arlington, VA 22245-5200. The comments may be submitted by letter or by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document.

3. This standard merges DOD-STD-2167A and DOD-STD-7935A to define a set of activities and documentation suitable for the development of both weapon systems and Automated Information Systems. A conversion guide from these standards to MIL-STD-498 is provided in Appendix I. Other changes include improved compatibility with incremental and evolutionary development models; improved compatibility with non-hierarchical design methods; improved compatibility with computer-aided software engineering (CASE) tools; alternatives to, and more flexibility in, preparing documents; clearer requirements for incorporating reusable software; introduction of software management indicators; added emphasis on software supportability; and improved links to systems engineering. This standard supersedes DOD-STD-2167A, DOD-STD-7935A, and DOD-STD-1703 (NS).

4. This standard can be applied in any phase of the system life cycle. It can be applied to contractors, subcontractors, or Government in-house agencies performing software development. For uniformity, the term "acquirer" is used for the organization requiring the technical effort, the term "developer" for the organization performing the technical effort, and the term "contract" for the agreement between them. The term "software development" is used as an inclusive term encompassing new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products.

5. This standard is not intended to specify or discourage the use of any particular software development method. The developer is responsible for selecting software development methods that support the achievement of contract requirements.

6. This standard implements the development and documentation processes of ISO/IEC DIS 12207. It interprets all applicable clauses in MIL-Q-9858A (Quality Program Requirements) and ISO 9001 (Quality Systems) for software.

7. This standard includes all activities pertaining to software development. It invokes no other standards. It can be applied on its own or supplemented with other standards, such as those identified in Section 6. If other standards are applied, the acquirer is responsible for resolving any conflicts that arise.

8. Data Item Descriptions (DIDs) applicable to this standard are listed in Section 6. These DIDs describe the information required by this standard.

9. This standard and its Data Item Descriptions (DIDs) are meant to be tailored by the acquirer to ensure that only necessary and cost-effective requirements are imposed on software development efforts. General tailoring guidance can be found in Section 6 and in DOD-HDBK-248. Tailoring guidance specific to this standard can be found in Appendixes G and H and in guidebooks and handbooks planned for this standard.

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1. SCOPE

1.1 Purpose. The purpose of this standard is to establish uniform requirements for software development and documentation.

1.2 Application. MIL-STD-498 is intended to be applied as follows.

1.2.1 Organizations and agreements. This standard can be applied to contractors, subcontractors, or Government in-house agencies performing software development. For uniformity, the term "acquirer" is used for the organization requiring the technical effort, "developer" for the organization performing the technical effort, "contract" for the agreement between these parties, "Statement of Work" (SOW) for the list of tasks to be performed by the developer, "Contract Data Requirements List" (CDRL) for the list of deliverable software products, and "subcontractor" for any organization tasked by the developer to perform part of the required effort. "Software development" is used as an inclusive term encompassing new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products.

1.2.2 Contract-specific application. This standard is invoked by citing it on a contract. It applies to each software product and to each type of software covered by the contract, regardless of storage medium, to the extent specified in the contract. Examples of types of software include deliverable versus non-deliverable, software designed to meet user needs versus software in the engineering and test environments, and software designed to meet one user need versus software designed to meet another. The acquirer is expected to specify the types of software to which the standard applies and to tailor the standard appropriately for each type of software. If the standard is invoked without such a statement of selective application, it will be understood to apply in its entirety to all deliverable software, with requirements concerning the software development environment applicable to the software development environment for the deliverable software. While this standard is written in terms of Computer Software Configuration Items (CSCIs), it may be applied to software not designated as a CSCI, with the term "CSCI" interpreted appropriately. Software installed in firmware is subject to all of the aforementioned provisions. This standard does not apply to the hardware element of firmware.

1.2.3 Tailoring. This standard and its Data Item Descriptions (DIDs) are meant to be tailored for each type of software to which they are applied. While tailoring is the responsibility of the acquirer, suggested tailoring may be provided by prospective and selected developers. General tailoring guidance can be found in Section 6 and in DOD-HDBK-248. Tailoring guidance specific to this standard can be found in Appendixes G and H and in guidebooks and handbooks planned for this standard.

1.2.4 Interpretation of selected terms. The following terms have a special interpretation as used in this standard.

1.2.4.1 Interpretation of "system". The following interpretations apply:

a. The term "system," as used in this standard, may mean: (1) a hardware-software system (for example, a radar system) for which this standard covers only the software portion, or (2) a software system (for example, a payroll system) for which this standard governs overall development.

b. If a system consists of subsystems, all requirements in this standard concerning systems apply to the subsystems as well. If a contract is based on alternatives to systems and subsystems, such as complex items, the requirements in this standard concerning the system and its specification apply to these alternatives and their specifications.

1.2.4.2 Interpretation of "participate" in system development. The term "participate" in paragraphs regarding system-level activities is to be interpreted as follows: If the software covered by this standard is part of a hardware-software system for which this standard covers only the software portion, the term "participate" is to be interpreted as "take part in, as described in the software development plan." If the software (possibly with its computers) is considered to constitute a system, the term "participate" is to be interpreted as "be responsible for."

1.2.4.3 Interpretation of "develop," "define," etc. Throughout this standard, requirements to "develop," "define," "establish," or "identify" information are to be interpreted to include new development, modification, reuse, reengineering, maintenance, or any other activity or combination of activities resulting in software products.

1.2.4.4 Interpretation of "record". Throughout this standard, requirements to "record" information are to be interpreted to mean "set down in a manner that can be retrieved and viewed." The result may take many forms, including, but not limited to, hand-written notes, hard-copy or electronic documents, and data recorded in computer-aided software engineering (CASE) and project management tools.

1.3 Order of precedence. In the event of conflict between the requirements of this standard and other applicable standardization documents, the acquirer is responsible for resolving the conflicts.

2. REFERENCED DOCUMENTS

This section does not apply to this standard, since no documents are referenced in Sections 3, 4, or 5. Section 6 contains a list of standardization documents that may be used with this standard.

3. DEFINITIONS

Note: In addition to the definitions provided here, Section 1 describes MIL-STD-498's interpretation or special usage of the following terms: acquirer, contract, Contract Data Requirements List, define, develop, developer, establish, identify, participate, record, software development, Statement of Work, subcontractor, subsystem, and system.

3.1 Acceptance. An action by an authorized representative of the acquirer by which the acquirer assumes ownership of software products as partial or complete performance of a contract.

3.2 Acquirer. An organization that procures software products for itself or another organization.

3.3 Approval. Written notification by an authorized representative of the acquirer that a developer's plans, design, or other aspects of the project appear to be sound and can be used as the basis for further work. Such approval does not shift responsibility from the developer to meet contractual requirements.

3.4 Architecture. The organizational structure of a system or CSCI, identifying its components, their interfaces, and a concept of execution among them.

3.5 Associate developer. An organization that is neither prime contractor nor subcontractor to the developer, but who has a development role on the same or related system or project.

3.6 Behavioral design. The design of how an overall system or CSCI will behave, from a user's point of view, in meeting its requirements, ignoring the internal implementation of the system or CSCI. This design contrasts with architectural design, which identifies the internal components of the system or CSCI, and with the detailed design of those components.

3.7 Build. (1) A version of software that meets a specified subset of the requirements that the completed software will meet. (2) The period of time during which such a version is developed. Note: The relationship of the terms "build" and "version" is up to the developer; for example, it may take several versions to reach a build, a build may be released in several parallel versions (such as to different sites), or the terms may be used as synonyms.

3.8 Computer database. See database.

3.9 Computer hardware. Devices capable of accepting and storing computer data, executing a systematic sequence of operations on computer data, or producing control outputs. Such devices can perform substantial interpretation, computation, communication, control, or other logical functions.

3.10 Computer program. A combination of computer instructions and data definitions that enable computer hardware to perform computational or control functions.

3.11 Computer software. See software.

3.12 Computer Software Configuration Item (CSCI). An aggregation of software that satisfies an end use function and is designated for separate configuration management by the acquirer. CSCIs are selected based on tradeoffs among software function, size, host or target computers, developer, support concept, plans for reuse, criticality, interface considerations, need to be separately documented and controlled, and other factors.

3.13 Configuration Item. An aggregation of hardware, software, or both that satisfies an end use function and is designated for separate configuration management by the acquirer.

3.14 Database. A collection of related data stored in one or more computerized files in a manner that can be accessed by users or computer programs via a database management system.

3.15 Database management system. An integrated set of computer programs that provide the capabilities needed to establish, modify, make available, and maintain the integrity of a database.

3.16 Deliverable software product. A software product that is required by the contract to be delivered to the acquirer or other designated recipient.

3.17 Design. Those characteristics of a system or CSCI that are selected by the developer in response to the requirements. Some will match the requirements; others will be elaborations of requirements, such as definitions of all error messages in response to a requirement to display error messages; others will be implementation related, such as decisions about what software units and logic to use to satisfy the requirements.

3.18 Developer. An organization that develops software products ("develops" may include new development, modification, reuse, reengineering, maintenance, or any other activity that results in software products). The developer may be a contractor or a Government agency.

3.19 Document/documentation. A collection of data, regardless of the medium on which it is recorded, that generally has permanence and can be read by humans or machines.

3.20 Evaluation. The process of determining whether an item or activity meets specified criteria.

3.21 Firmware. The combination of a hardware device and computer instructions and/or computer data that reside as read-only software on the hardware device.

3.22 Hardware Configuration Item (HWCI). An aggregation of hardware that satisfies an end use function and is designated for separate configuration management by the acquirer.

3.23 Independent verification and validation (IV&V). Systematic evaluation of software products and activities by an agency that is not responsible for developing the product or performing the activity being evaluated. IV&V is not within the scope of this standard.

3.24 Interface. In software development, a relationship among two or more entities (such as CSCI-CSCI, CSCI-HWCI, CSCI-user, or software unit-software unit) in which the entities share, provide, or exchange data. An interface is not a CSCI, software unit, or other system component; it is a relationship among them.

3.25 Joint review. A process or meeting involving representatives of both the acquirer and the developer, during which project status, software products, and/or project issues are examined and discussed.

3.26 Non-deliverable software product. A software product that is not required by the contract to be delivered to the acquirer or other designated recipient.

3.27 Process. An organized set of activities performed for a given purpose; for example, the software development process.

3.28 Qualification testing. Testing performed to demonstrate to the acquirer that a CSCI or a system meets its specified requirements.

3.29 Reengineering. The process of examining and altering an existing system to reconstitute it in a new form. May include reverse engineering (analyzing a system and producing a representation at a higher level of abstraction, such as design from code), restructuring (transforming a system from one representation to another at the same level of abstraction), redocumentation (analyzing a system and producing user or support documentation), forward engineering (using software products derived from an existing system, together with new requirements, to produce a new system), retargeting (transforming a system to install it on a different target system), and translation (transforming source code from one language to another or from one version of a language to another).

3.30 Requirement. (1) A characteristic that a system or CSCI must possess in order to be acceptable to the acquirer. (2) A mandatory statement in this standard or another portion of the contract.

3.31 Reusable software product. A software product developed for one use but having other uses, or one developed specifically to be usable on multiple projects or in multiple roles on one project. Examples include, but are not limited to, commercial off-the-shelf software products, acquirer-furnished software products, software products in reuse libraries, and pre-existing developer software products. Each use may include all or part of the software product and may involve its modification. This term can be applied to any software product (for example, requirements, architectures, etc.), not just to software itself.

3.32 Software. Computer programs and computer databases. Note: Although some definitions of software include documentation, MIL-STD-498 limits the definition to computer programs and computer databases in accordance with Defense Federal Acquisition Regulation Supplement 227.401.

3.33 Software development. A set of activities that results in software products. Software development may include new development, modification, reuse, reengineering, maintenance, or any other activities that result in software products.

3.34 Software development file (SDF). A repository for material pertinent to the development of a particular body of software. Contents typically include (either directly or by reference) considerations, rationale, and constraints related to requirements analysis, design, and implementation; developer-internal test information; and schedule and status information.

3.35 Software development library (SDL). A controlled collection of software, documentation, other intermediate and final software products, and associated tools and procedures used to facilitate the orderly development and subsequent support of software.

3.36 Software development process. An organized set of activities performed to translate user needs into software products.

3.37 Software engineering. In general usage, a synonym for software development. As used in this standard, a subset of software development consisting of all activities except qualification testing. The standard makes this distinction for the sole purpose of giving separate names to the software engineering and software test environments.

3.38 Software engineering environment. The facilities, hardware, software, firmware, procedures, and documentation needed to perform software engineering. Elements may include but are not limited to computer-aided software engineering (CASE) tools, compilers, assemblers, linkers, loaders, operating systems, debuggers, simulators, emulators, documentation tools, and database management systems.

3.39 Software product. Software or associated information created, modified, or incorporated to satisfy a contract. Examples include plans, requirements, design, code, databases, test information, and manuals.

3.40 Software quality. The ability of software to satisfy its specified requirements.

3.41 Software support. The set of activities that takes place to ensure that software installed for operational use continues to perform as intended and fulfill its intended role in system operation. Software support includes software maintenance, aid to users, and related activities.

3.42 Software system. A system consisting solely of software and possibly the computer equipment on which the software operates.

3.43 Software test environment. The facilities, hardware, software, firmware, procedures, and documentation needed to perform qualification, and possibly other, testing of software. Elements may include but are not limited to simulators, code analyzers, test case generators, and path analyzers, and may also include elements used in the software engineering environment.

3.44 Software transition. The set of activities that enables responsibility for software development to pass from one organization, usually the organization that performs initial software development, to another, usually the organization that will perform software support.

3.45 Software unit. An element in the design of a CSCI; for example, a major subdivision of a CSCI, a component of that subdivision, a class, object, module, function, routine, or database. Software units may occur at different levels of a hierarchy and may consist of other software units. Software units in the design may or may not have a one-to-one relationship with the code and data entities (routines, procedures, databases, data files, etc.) that implement them or with the computer files containing those entities.

3.46 Support (of software). See software support.

3.47 Transition (of software). See software transition.

3.48 Definitions of acronyms used in this standard. See Appendix A.

4. GENERAL REQUIREMENTS

4.1 Software development process. The developer shall establish a software development process consistent with contract requirements. The software development process shall include the following major activities, which may overlap, may be applied iteratively, may be applied differently to different elements of software, and need not be performed in the order listed below. Appendix G provides examples. The developer's software development process shall be described in the software development plan.

a. Project planning and oversight (section 5.1)
b. Establishing a software development environment (5.2)
c. System requirements analysis (5.3)
d. System design (5.4)
e. Software requirements analysis (5.5)
f. Software design (5.6)
g. Software implementation and unit testing (5.7)
h. Unit integration and testing (5.8)
i. CSCI qualification testing (5.9)
j. CSCI/HWCI integration and testing (5.10)
k. System qualification testing (5.11)
l. Preparing for software use (5.12)
m. Preparing for software transition (5.13)
n. Integral processes:
    1) Software configuration management (5.14)
    2) Software product evaluation (5.15)
    3) Software quality assurance (5.16)
    4) Corrective action (5.17)
    5) Joint technical and management reviews (5.18)
    6) Other activities (5.19)

4.2 General requirements for software development. The developer shall meet the following general requirements in carrying out the detailed requirements in section 5 of this standard.

4.2.1 Software development methods. The developer shall use systematic, documented methods for all software development activities. These methods shall be described in, or referenced from, the software development plan.

4.2.2 Standards for software products. The developer shall develop and apply standards for representing requirements, design, code, test cases, test procedures, and test results. These standards shall be described in, or referenced from, the software development plan.

4.2.3 Reusable software products. The developer shall meet the following requirements.

4.2.3.1 Incorporating reusable software products. The developer shall identify and evaluate reusable software products for use in fulfilling the requirements of the contract. The scope of the search and the criteria to be used for evaluation shall be as described in the software development plan. Reusable software products that meet the criteria shall be used where practical. Appendix B provides required and candidate criteria and interprets this standard for incorporation of reusable software products. Incorporated software products shall meet the data rights requirements in the contract.

4.2.3.2 Developing reusable software products. During the course of the contract, the developer shall identify opportunities for developing software products for reuse and shall evaluate the benefits and costs of these opportunities. Opportunities that provide cost benefits and are compatible with program objectives shall be identified to the acquirer.

Note: In addition, the developer may be required by the contract to develop software products specifically for reuse.

4.2.4 Handling of critical requirements. The developer shall meet the following requirements.

4.2.4.1 Safety assurance. The developer shall identify as safety-critical those CSCIs or portions thereof whose failure could lead to a hazardous system state (one that could result in unintended death, injury, loss of property, or environmental harm). If there is such software, the developer shall develop a safety assurance strategy, including both tests and analyses, to assure that the requirements, design, implementation, and operating procedures for the identified software minimize or eliminate the potential for hazardous conditions. The strategy shall include a software safety program, which shall be integrated with the system safety program if one exists. The developer shall record the strategy in the software development plan, implement the strategy, and produce evidence, as part of required software products, that the safety assurance strategy has been carried out.

4.2.4.2 Security assurance. The developer shall identify as security-critical those CSCIs or portions thereof whose failure could lead to a breach of system security. If there is such software, the developer shall develop a security assurance strategy to assure that the requirements, design, implementation, and operating procedures for the identified software minimize or eliminate the potential for breaches of system security. The developer shall record the strategy in the software development plan, implement the strategy, and produce evidence, as part of required software products, that the security assurance strategy has been carried out.

4.2.4.3 Privacy assurance. The developer shall identify as privacy-critical those CSCIs or portions thereof whose failure could lead to a breach of system privacy. If there is such software, the developer shall develop a privacy assurance strategy to assure that the requirements, design, implementation, and operating procedures for the identified software minimize or eliminate the potential for breaches of system privacy. The developer shall record the strategy in the software development plan, implement the strategy, and produce evidence, as part of required software products, that the privacy assurance strategy has been carried out.

4.2.4.4 Assurance of other critical requirements. If a system relies on software to satisfy other requirements deemed critical by the contract or by system specifications, the developer shall identify those CSCIs or portions thereof whose failure could lead to violation of those critical requirements; develop a strategy to assure that the requirements, design, implementation, and operating procedures for the identified software minimize or eliminate the potential for such violations; record the strategy in the software development plan; implement the strategy; and produce evidence, as part of required software products, that the assurance strategy has been carried out.

4.2.5 Computer hardware resource utilization. The developer shall analyze contract requirements concerning computer hardware resource utilization (such as maximum allowable use of processor capacity, memory capacity, input/output device capacity, auxiliary storage device capacity, and communications/network equipment capacity). The developer shall allocate computer hardware resources among the CSCIs, monitor the utilization of these resources for the duration of the contract, and reallocate or identify the need for additional resources as necessary to meet contract requirements.

4.2.6 Recording rationale. The developer shall record rationale that will be useful to the support agency for key decisions made in specifying, designing, implementing, and testing the software. The rationale shall include trade-offs considered, analysis methods, and criteria used to make the decisions. The rationale shall be recorded in documents, code comments, or other media that will transition to the support agency. The meaning of "key decisions" and the approach for providing the rationale shall be described in the software development plan.

4.2.7 Access for acquirer review. The developer shall provide the acquirer or its authorized representative access to developer and subcontractor facilities, including the software engineering and test environments, for review of software products and activities required by the contract.

5. DETAILED REQUIREMENTS

The order of the requirements in this section is not intended to specify the order in which they must be carried out. Many of the activities may be ongoing at one time; different software products may proceed at different paces; and activities specified in early subsections may depend on input from activities in later subsections. If the software is developed in multiple builds, some activities may be performed in every build, others may be performed only in selected builds, and activities and software products may not be complete until several or all builds are accomplished. Figure 1 provides an example of how each activity may be applied in one or more builds. Non-mandatory notes throughout section 5 tell how to interpret each activity on a project involving multiple builds. A project involving a single build will accomplish all required activities in that build. Appendix G provides guidance for planning builds, determining which activities apply to each build, and scheduling these activities.

Activity	Builds			
	Build 1	Build 2	Build 3	Build 4
5.1 Project planning and oversight	x	x	x	x
5.2 Establishing a software development environment	x	x	x	x
5.3 System requirements analysis	x	x		
5.4 System design	x	x	x	
5.5 Software requirements analysis	x	x	x	x
5.6 Software design	x	x	x	x
5.7 Software implementation and unit testing	x	x	x	x
5.8 Unit integration and testing	x	x	x	x
5.9 CSCI qualification testing		x	x	x
5.10 CSCI/HWCI integration and testing		x	x	x
5.11 System qualification testing			x	x
5.12 Preparing for software use	x	x	x	x
5.13 Preparing for software transition				x
Integral processes:				
5.14 Software configuration management	x	x	x	x
5.15 Software product evaluation	x	x	x	x
5.16 Software quality assurance	x	x	x	x
5.17 Corrective action	x	x	x	x
5.18 Joint technical and management reviews	x	x	x	x
5.19 Other activities	x	x	x	x

FIGURE 1. One possible mapping of MIL-STD-498 activities to multiple builds.

5.1 Project planning and oversight. The developer shall perform project planning and oversight in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, planning for each build should be interpreted to include: a) overall planning for the contract, b) detailed planning for the current build, and c) planning for future builds covered under the contract to a level of detail compatible with the information available.

5.1.1 Software development planning. The developer shall develop and record plans for conducting the activities required by this standard and by other software-related requirements in the contract. This planning shall be consistent with system-level planning and shall include all applicable items in the Software Development Plan (SDP) DID (see 6.2).

Note 1: The wording here and throughout MIL-STD-498 is designed to: 1) Emphasize that the development and recording of planning and engineering information is an intrinsic part of the software development process, to be performed regardless of whether a deliverable is required; 2) Use the DID as a checklist of items to be covered in the planning or engineering activity; and 3) Permit representations other than traditional documents for recording the information (e.g., computer-aided software engineering (CASE) tools).

Note 2: If the CDRL specifies delivery of the information generated by this or any other paragraph, the developer is required to format, assemble, mark, copy, and distribute the deliverable in accordance with the CDRL. This task is recognized to be separate from the task of generating and recording the required information and to require additional time and effort on the part of the developer.

Note 3: The software development plan covers all activities required by this standard. Portions of the plan may be bound or maintained separately if this approach enhances the usability of the information. Examples include separate plans for software quality assurance and software configuration management.

5.1.2 CSCI test planning. The developer shall develop and record plans for conducting CSCI qualification testing. This planning shall include all applicable items in the Software Test Plan (STP) DID (see 6.2).

5.1.3 System test planning. The developer shall participate in developing and recording plans for conducting system qualification testing. For software systems, this planning shall include all applicable items in the Software Test Plan (STP) DID (see 6.2). (The intent for software systems is a single software test plan covering both CSCI and system qualification testing.)

5.1.4 Software installation planning. The developer shall develop and record plans for performing software installation and training at the user sites specified in the contract. This planning shall include all applicable items in the Software Installation Plan (SIP) DID (see 6.2).

5.1.5 Software transition planning. The developer shall identify all software development resources that will be needed by the support agency to fulfill the support concept specified in the contract. The developer shall develop and record plans identifying these resources and describing the approach to be followed for transitioning deliverable items to the support agency. This planning shall include all applicable items in the Software Transition Plan (STrP) DID (see 6.2).

5.1.6 Following and updating plans. Following acquirer approval of any of the plans in this section, the developer shall conduct the relevant activities in accordance with the plan. The developer's management shall review the software development process at intervals specified in the software development plan to assure that the process complies with the contract and adheres to the plans. With the exception of developer-internal scheduling and related staffing information, updates to plans shall be subject to acquirer approval.

5.2 Establishing a software development environment. The developer shall establish a software development environment in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, establishing the software development environment in each build should be interpreted to mean establishing the environment needed to complete that build.

5.2.1 Software engineering environment. The developer shall establish, control, and maintain a software engineering environment to perform the software engineering effort. The developer shall ensure that each element of the environment performs its intended functions.

5.2.2 Software test environment. The developer shall establish, control, and maintain a software test environment to perform qualification, and possibly other, testing of software. The developer shall ensure that each element of the environment performs its intended functions.

5.2.3 Software development library. The developer shall establish, control, and maintain a software development library (SDL) to facilitate the orderly development and subsequent support of software. The SDL may be an integral part of the software engineering and test environments. The developer shall maintain the SDL for the duration of the contract.

5.2.4 Software development files. The developer shall establish, control, and maintain a software development file (SDF) for each software unit or logically related group of software units, for each CSCI, and, as applicable, for logical groups of CSCIs, for subsystems, and for the overall system. The developer shall record information about the development of the software in appropriate SDFs and shall maintain the SDFs for the duration of the contract.

5.2.5 Non-deliverable software. The developer may use non-deliverable software in the development of deliverable software as long as the operation and support of the deliverable software after delivery to the acquirer do not depend on the non-deliverable software or provision is made to ensure that the acquirer has or can obtain the same software. The developer shall ensure that all non-deliverable software used on the project performs its intended functions.

5.3 System requirements analysis. The developer shall participate in system requirements analysis in accordance with the following requirements.

Note: If a system is developed in multiple builds, its requirements may not be fully defined until the final build. The developer's planning should identify the subset of system requirements to be defined in each build and the subset to be implemented in each build. System requirements analysis for a given build should be interpreted to mean defining the system requirements so identified for that build.

5.3.1 Analysis of user input. The developer shall participate in analyzing user input provided by the acquirer to gain an understanding of user needs. This input may take the form of need statements, surveys, problem/change reports, feedback on prototypes, interviews, or other user input or feedback.

5.3.2 Operational concept. The developer shall participate in defining and recording the operational concept for the system. The result shall include all applicable items in the Operational Concept Description (OCD) DID (see 6.2).

5.3.3 System requirements. The developer shall participate in defining and recording the requirements to be met by the system and the methods to be used to ensure that each requirement has been met. The result shall include all applicable items in the System/Subsystem Specification (SSS) DID (see 6.2). Depending on CDRL provisions, requirements concerning system interfaces may be included in the SSS or in interface requirements specifications (IRSs).

Note: If a system consists of subsystems, the activity in 5.3.3 is intended to be performed iteratively with the activities in 5.4 (System design) to define system requirements, design the system and identify its subsystems, define the requirements for those subsystems, design the subsystems and identify their components, and so on.

5.4 System design. The developer shall participate in system design in accordance with the following requirements.

Note: If a system is developed in multiple builds, its design may not be fully defined until the final build. The developer's planning should identify the portion of the system design to be defined in each build. System design for a given build should be interpreted to mean defining the portion of the system design identified for that build.

5.4.1 System-wide design decisions. The developer shall participate in defining and recording system-wide design decisions (that is, decisions about the system's behavioral design and other decisions affecting the selection and design of system components). The result shall include all applicable items in the system-wide design section of the System/Subsystem Design Description (SSDD) DID (see 6.2). Depending on CDRL provisions, design pertaining to interfaces may be included in the SSDD or in interface design descriptions (IDDs) and design pertaining to databases may be included in the SSDD or in database design descriptions (DBDDs).

Note: Design decisions remain at the discretion of the developer unless formally converted to requirements through contractual processes. The developer is responsible for fulfilling all requirements and demonstrating this fulfillment through qualification testing (see 5.9, 5.11). Design decisions act as developer-internal "requirements," to be implemented, imposed on subcontractors, if applicable, and confirmed by developer-internal testing, but their fulfillment need not be demonstrated to the acquirer.

5.4.2 System architectural design. The developer shall participate in defining and recording the architectural design of the system (identifying the components of the system, their interfaces, and a concept of execution among them) and the traceability between the system components and system requirements. The result shall include all applicable items in the architectural design and traceability sections of the System/Subsystem Design Description (SSDD) DID (see 6.2). Depending on CDRL provisions, design pertaining to interfaces may be included in the SSDD or in interface design descriptions (IDDs).

5.5 Software requirements analysis. The developer shall define and record the software requirements to be met by each CSCI, the methods to be used to ensure that each requirement has been met, and the traceability between the CSCI requirements and system requirements. The result shall include all applicable items in the Software Requirements Specification (SRS) DID (see 6.2). Depending on CDRL provisions, requirements concerning CSCI interfaces may be included in SRSs or in interface requirements specifications (IRSs).

Note: If a CSCI is developed in multiple builds, its requirements may not be fully defined until the final build. The developer's planning should identify the subset of each CSCI's requirements to be defined in each build and the subset to be implemented in each build. Software requirements analysis for a given build should be interpreted to mean defining the CSCI requirements so identified for that build.

5.6 Software design. The developer shall perform software design in accordance with the following requirements.

Note: If a CSCI is developed in multiple builds, its design may not be fully defined until the final build. Software design in each build should be interpreted to mean the design necessary to meet the CSCI requirements to be implemented in that build.

5.6.1 CSCI-wide design decisions. The developer shall define and record CSCI-wide design decisions (that is, decisions about the CSCI's behavioral design and other decisions affecting the selection and design of the software units comprising the CSCI). The result shall include all applicable items in the CSCI-wide design section of the Software Design Description (SDD) DID (see 6.2). Depending on CDRL provisions, design pertaining to interfaces may be included in SDDs or in interface design descriptions (IDDs) and design pertaining to databases may be included in SDDs or in database design descriptions (DBDDs).

5.6.2 CSCI architectural design. The developer shall define and record the architectural design of each CSCI (identifying the software units comprising the CSCI, their interfaces, and a concept of execution among them) and the traceability between the software units and the CSCI requirements. The result shall include all applicable items in the architectural design and traceability sections of the Software Design Description (SDD) DID (see 6.2). Depending on CDRL provisions, design pertaining to interfaces may be included in SDDs or in interface design descriptions (IDDs).

Note: Software units may be made up of other software units and may be organized into as many levels as are needed to represent the CSCI architecture. For example, a CSCI may be divided into three software units, each of which is divided into additional software units, and so on.

5.6.3 CSCI detailed design. The developer shall develop and record a description of each software unit. The result shall include all applicable items in the detailed design section of the Software Design Description (SDD) DID (see 6.2). Depending on CDRL provisions, design pertaining to interfaces may be included in SDDs or in interface design descriptions (IDDs) and design of software units that are databases or that access or manipulate databases may be included in SDDs or in database design descriptions (DBDDs).

5.7 Software implementation and unit testing. The developer shall perform software implementation and unit testing in accordance with the following requirements.

Note: The term "software" includes both computer programs and computer databases. The term "implementation" means converting software design into computer programs and computer databases. If a CSCI is developed in multiple builds, software implementation and unit testing of that CSCI will not be completed until the final build. Software implementation and unit testing in each build should be interpreted to include those units, or parts of units, needed to meet the CSCI requirements to be implemented in that build.

5.7.1 Software implementation. The developer shall develop and record software corresponding to each software unit in the CSCI design. This activity shall include, as applicable, coding computer instructions and data definitions, building databases, populating databases and other data files with data values, and other activities needed to implement the design. For deliverable software, the developer shall obtain acquirer approval to use any programming language not specified in the contract.

Note: Software units in the design may or may not have a one-to-one relationship with the code and data entities (routines, procedures, databases, data files, etc.) that implement them or with the computer files containing those entities.

5.7.2 Preparing for unit testing. The developer shall establish test cases (in terms of inputs, expected results, and evaluation criteria), test procedures, and test data for testing the software corresponding to each software unit. The test cases shall cover all aspects of the unit's detailed design. The developer shall record this information in the appropriate software development files (SDFs).

5.7.3 Performing unit testing. The developer shall test the software corresponding to each software unit. The testing shall be in accordance with the unit test cases and procedures.

5.7.4 Revision and retesting. The developer shall make all necessary revisions to the software, perform all necessary retesting, and update the software development files (SDFs) and other software products as needed, based on the results of unit testing.

5.7.5 Analyzing and recording unit test results. The developer shall analyze the results of unit testing and shall record the test and analysis results in appropriate software development files (SDFs).

5.8 Unit integration and testing. The developer shall perform unit integration and testing in accordance with the following requirements.

Note 1: Unit integration and testing means integrating the software corresponding to two or more software units, testing the resulting software to ensure that it works together as intended, and continuing this process until all software in each CSCI is integrated and tested. The last stage of this testing is developer-internal CSCI testing. Since units may consist of other units, some unit integration and testing may take place during unit testing. The requirements in this section are not meant to duplicate those activities.

Note 2: If a CSCI is developed in multiple builds, unit integration and testing of that CSCI will not be completed until the final build. Unit integration and testing in each build should be interpreted to mean integrating software developed in the current build with other software developed in that and previous builds, and testing the results.

5.8.1 Preparing for unit integration and testing. The developer shall establish test cases (in terms of inputs, expected results, and evaluation criteria), test procedures, and test data for conducting unit integration and testing. The test cases shall cover all aspects of the CSCI-wide and CSCI architectural design. The developer shall record this information in the appropriate software development files (SDFs).

5.8.2 Performing unit integration and testing. The developer shall perform unit integration and testing. The testing shall be in accordance with the unit integration test cases and procedures.

5.8.3 Revision and retesting. The developer shall make all necessary revisions to the software, perform all necessary retesting, and update the software development files (SDFs) and other software products as needed, based on the results of unit integration and testing.

5.8.4 Analyzing and recording unit integration and test results. The developer shall analyze the results of unit integration and testing and shall record the test and analysis results in appropriate software development files (SDFs).

5.9 CSCI qualification testing. The developer shall perform CSCI qualification testing in accordance with the following requirements.

Note 1: CSCI qualification testing is performed to demonstrate to the acquirer that CSCI requirements have been met. It covers the CSCI requirements in software requirements specifications (SRSs) and in associated interface requirements specifications (IRSs). This testing contrasts with developer-internal CSCI testing, performed as the final stage of unit integration and testing.

Note 2: If a CSCI is developed in multiple builds, its CSCI qualification testing will not be completed until the final build for that CSCI, or possibly until later builds involving items with which the CSCI is required to interface. CSCI qualification testing in each build should be interpreted to mean planning and performing tests of the current build of each CSCI to ensure that the CSCI requirements to be implemented in that build have been met.

5.9.1 Independence in CSCI qualification testing. The person(s) responsible for qualification testing of a given CSCI shall not be the persons who performed detailed design or implementation of that CSCI. This does not preclude persons who performed detailed design or implementation of the CSCI from contributing to the process, for example, by contributing test cases that rely on knowledge of the CSCI's internal implementation.

5.9.2 Testing on the target computer system. CSCI qualification testing shall include testing on the target computer system or an alternative system approved by the acquirer.

5.9.3 Preparing for CSCI qualification testing. The developer shall define and record the test preparations, test cases, and test procedures to be used for CSCI qualification testing and the traceability between the test cases and the CSCI requirements. The result shall include all applicable items in the Software Test Description (STD) DID (see 6.2). The developer shall prepare the test data needed to carry out the test cases and provide the acquirer advance notice of the time and location of CSCI qualification testing.

5.9.4 Dry run of CSCI qualification testing. If CSCI qualification testing is to be witnessed by the acquirer, the developer shall dry run the CSCI test cases and procedures to ensure that they are complete and accurate and that the software is ready for witnessed testing. The developer shall record the results of this activity in appropriate software development files (SDFs) and shall update the CSCI test cases and procedures as appropriate.

5.9.5 Performing CSCI qualification testing. The developer shall perform CSCI qualification testing of each CSCI. The testing shall be in accordance with the CSCI test cases and procedures.

5.9.6 Revision and retesting. The developer shall make necessary revisions to the software, provide the acquirer advance notice of retesting, conduct all necessary retesting, and update the software development files (SDFs) and other software products as needed, based on the results of CSCI qualification testing.

5.9.7 Analyzing and recording CSCI qualification test results. The developer shall analyze and record the results of CSCI qualification testing. The results shall include all applicable items in the Software Test Report (STR) DID (see 6.2).

5.10 CSCI/HWCI integration and testing. The developer shall participate in CSCI/HWCI integration and testing activities in accordance with the following requirements.

Note 1: CSCI/HWCI integration and testing means integrating CSCIs with interfacing HWCIs and CSCIs, testing the resulting groupings to determine whether they work together as intended, and continuing this process until all CSCIs and HWCIs in the system are integrated and tested. The last stage of this testing is developer-internal system testing.

Note 2: If a system or CSCI is developed in multiple builds, CSCI/HWCI integration and testing may not be complete until the final build. CSCI/HWCI integration and testing in each build should be interpreted to mean integrating the current build of each CSCI with the current build of other CSCIs and HWCIs and testing the results to ensure that the system requirements to be implemented in that build have been met.

5.10.1 Preparing for CSCI/HWCI integration and testing. The developer shall participate in developing and recording test cases (in terms of inputs, expected results, and evaluation criteria), test procedures, and test data for conducting CSCI/HWCI integration and testing. The test cases shall cover all aspects of the system-wide and system architectural design. The developer shall record software-related information in appropriate software development files (SDFs).

5.10.2 Performing CSCI/HWCI integration and testing. The developer shall participate in CSCI/HWCI integration and testing. The testing shall be in accordance with the CSCI/HWCI integration test cases and procedures.

5.10.3 Revision and retesting. The developer shall make necessary revisions to the software, participate in all necessary retesting, and update the appropriate software development files (SDFs) and other software products as needed, based on the results of CSCI/HWCI integration and testing.

5.10.4 Analyzing and recording CSCI/HWCI integration and test results. The developer shall participate in analyzing the results of CSCI/HWCI integration and testing. Software-related analysis and test results shall be recorded in appropriate software development files (SDFs).

5.11 System qualification testing. The developer shall participate in system qualification testing in accordance with the following requirements.

Note 1: System qualification testing is performed to demonstrate to the acquirer that system requirements have been met. It covers the system requirements in the system/subsystem specifications (SSSs) and in associated interface requirements specifications (IRSs). This testing contrasts with developer-internal system testing, performed as the final stage of CSCI/HWCI integration and testing.

Note 2: If a system is developed in multiple builds, qualification testing of the completed system will not occur until the final build. System qualification testing in each build should be interpreted to mean planning and performing tests of the current build of the system to ensure that the system requirements to be implemented in that build have been met.

5.11.1 Independence in system qualification testing. The person(s) responsible for fulfilling the requirements in this section shall not be the persons who performed detailed design or implementation of software in the system. This does not preclude persons who performed detailed design or implementation of software in the system from contributing to the process, for example, by contributing test cases that rely on knowledge of the system's internal implementation.

5.11.2 Testing on the target computer system. The developer's system qualification testing shall include testing on the target computer system or an alternative system approved by the acquirer.

5.11.3 Preparing for system qualification testing. The developer shall participate in developing and recording the test preparations, test cases, and test procedures to be used for system qualification testing and the traceability between the test cases and the system requirements. For software systems, the results shall include all applicable items in the Software Test Description (STD) DID (see 6.2). The developer shall participate in preparing the test data needed to carry out the test cases and in providing the acquirer advance notice of the time and location of system qualification testing.

5.11.4 Dry run of system qualification testing. If system qualification testing is to be witnessed by the acquirer, the developer shall participate in dry running the system test cases and procedures to ensure that they are complete and accurate and that the system is ready for witnessed testing. The developer shall record the software-related results of this activity in appropriate software development files (SDFs) and shall participate in updating the system test cases and procedures as appropriate.

5.11.5 Performing system qualification testing. The developer shall participate in system qualification testing. This participation shall be in accordance with the system test cases and procedures.

5.11.6 Revision and retesting. The developer shall make necessary revisions to the software, provide the acquirer advance notice of retesting, participate in all necessary retesting, and update the software development files (SDFs) and other software products as needed, based on the results of system qualification testing.

5.11.7 Analyzing and recording system qualification test results. The developer shall participate in analyzing and recording the results of system qualification testing. For software systems, the result shall include all applicable items in the Software Test Report (STR) DID (see 6.2).

5.12 Preparing for software use. The developer shall prepare for software use in accordance with the following requirements.

Note: If software is developed in multiple builds, the developer's planning should identify what software, if any, is to be fielded to users in each build and the extent of fielding (for example, full fielding or fielding to selected evaluators only). Preparing for software use in each build should be interpreted to include those activities necessary to carry out the fielding plans for that build.

5.12.1 Preparing the executable software. The developer shall prepare the executable software for each user site, including any batch files, command files, data files, or other software files needed to install and operate the software on its target computer(s). The result shall include all applicable items in the executable software section of the Software Product Specification (SPS) DID (see 6.2).

Note: To order only the executable software (delaying delivery of source files and associated support information to a later build), the acquirer can use the SPS DID, tailoring out all but the executable software section of that DID.

5.12.2 Preparing version descriptions for user sites. The developer shall identify and record the exact version of software prepared for each user site. The information shall include all applicable items in the Software Version Description (SVD) DID (see 6.2).

5.12.3 Preparing user manuals. The developer shall prepare user manuals in accordance with the following requirements.

Note: Few, if any, systems will need all of the manuals in this section. The intent is for the acquirer, with input from the developer, to determine which manuals are appropriate for a given system and to require the development of only those manuals. All DIDs permit substitution of commercial or other manuals that contain the required information. The manuals in this section are normally developed in parallel with software development, ready for use in CSCI testing.

5.12.3.1 Software user manuals. The developer shall identify and record information needed by hands-on users of the software (persons who will both operate the software and make use of its results). The information shall include all applicable items in the Software User Manual (SUM) DID (see 6.2).

5.12.3.2 Software input/output manuals. The developer shall identify and record information needed by persons who will submit inputs to, and receive outputs from, the software, relying on others to operate the software in a computer center or other centralized or networked software installation. The information shall include all applicable items in the Software Input/Output Manual (SIOM) DID (see 6.2).

5.12.3.3 Software center operator manuals. The developer shall identify and record information needed by persons who will operate the software in a computer center or other centralized or networked software installation, so that it can be used by others. The information shall include all applicable items in the Software Center Operator Manual (SCOM) DID (see 6.2).

5.12.3.4 Computer operation manuals. The developer shall identify and record information needed to operate the computers on which the software will run. The information shall include all applicable items in the Computer Operation Manual (COM) DID (see 6.2).

5.12.4 Installation at user sites. The developer shall:

a. Install and check out the executable software at the user sites specified in the contract.

b. Provide training to users as specified in the contract.

c. Provide other assistance to user sites as specified in the contract.

5.13 Preparing for software transition. The developer shall prepare for software transition in accordance with the following requirements.

Note: If software is developed in multiple builds, the developer's planning should identify what software, if any, is to be transitioned to the support agency in each build. Preparing for software transition in each build should be interpreted to include those activities necessary to carry out the transition plans for that build.

5.13.1 Preparing the executable software. The developer shall prepare the executable software to be transitioned to the support site, including any batch files, command files, data files, or other software files needed to install and operate the software on its target computer(s). The result shall include all applicable items in the executable software section of the Software Product Specification (SPS) DID (see 6.2).

5.13.2 Preparing source files. The developer shall prepare the source files to be transitioned to the support site, including any batch files, command files, data files, or other files needed to regenerate the executable software. The result shall include all applicable items in the source file section of the Software Product Specification (SPS) DID (see 6.2).

5.13.3 Preparing version descriptions for the support site. The developer shall identify and record the exact version of software prepared for the support site. The information shall include all applicable items in the Software Version Description (SVD) DID (see 6.2).

5.13.4 Preparing the "as built" CSCI design and related information. The developer shall update the design description of each CSCI to match the "as built" software and shall define and record: the methods to be used to verify copies of the software, the measured computer hardware resource utilization for the CSCI, other information needed to support the software, and traceability between the CSCI's source files and software units and between the computer hardware resource utilization measurements and the CSCI requirements concerning them. The result shall include all applicable items in the qualification, software support, and traceability sections of the Software Product Specification (SPS) DID (see 6.2).

Note: In hardware development, the final product is an approved design from which hardware items can be manufactured. This design is presented in the product specification. In software development, by contrast, the final product is the software, not its design, and "manufacturing" consists of electronically duplicating the software, not recreating it from the design. The "as built" design is included in the software product specification not as the product but as information that may help the support agency understand the software in order to modify, enhance, and otherwise support it.

5.13.5 Updating the system design description. The developer shall participate in updating the system design description to match the "as built" system. The result shall include all applicable items in the System/Subsystem Design Description (SSDD) DID (see 6.2).

5.13.6 Preparing support manuals. The developer shall prepare support manuals in accordance with the following requirements.

Note: Not all systems will need the manuals in this section. The intent is for the acquirer, with input from the developer, to determine which manuals are appropriate for a given system and to require the development of only those manuals. All DIDs permit substitution of commercial or other manuals that contain the required information. The manuals in this section supplement the system/subsystem design description (SSDD) and the software product specifications (SPSs), which serve as the primary sources of information for software support. The user manuals cited in 5.12.3 are also useful to support personnel.

5.13.6.1 Computer programming manuals. The developer shall identify and record information needed to program the computers on which the software was developed or on which it will run. The information shall include all applicable items in the Computer Programming Manual (CPM) DID (see 6.2).

5.13.6.2 Firmware support manuals. The developer shall identify and record information needed to program and reprogram any firmware devices in which the software will be installed. The information shall include all applicable items in the Firmware Support Manual (FSM) DID (see 6.2).

5.13.7 Transition to the designated support site. The developer shall:

a. Install and check out the deliverable software in the support environment designated in the contract.

b. Demonstrate to the acquirer that the deliverable software can be regenerated (compiled/linked/loaded into an executable product) and maintained using commercially available, acquirer-owned, or contractually deliverable software and hardware designated in the contract or approved by the acquirer.

c. Provide training to the support agency as specified in the contract.

d. Provide other assistance to the support agency as specified in the contract.

5.14 Software configuration management. The developer shall perform software configuration management in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, the software products of each build may be refinements of, or additions to, software products of previous builds. Software configuration management in each build should be understood to take place in the context of the software products and controls in place at the start of the build.

5.14.1 Configuration identification. The developer shall participate in selecting CSCIs, as performed under system architectural design in 5.4.2, shall identify the entities to be placed under configuration control, and shall assign a project-unique identifier to each CSCI and each additional entity to be placed under configuration control. These entities shall include the software products to be developed or used under the contract and the elements of the software development environment. The identification scheme shall be at the level at which entities will actually be controlled, for example, computer files, electronic media, documents, software units, configuration items. The identification scheme shall include the version/revision/release status of each entity.

5.14.2 Configuration control. The developer shall establish and implement procedures designating the levels of control each identified entity must pass through (for example, author control, project-level control, acquirer control); the persons or groups with authority to authorize changes and to make changes at each level (for example, the programmer/analyst, the software lead, the project manager, the acquirer); and the steps to be followed to request authorization for changes, process change requests, track changes, distribute changes, and maintain past versions. Changes that affect an entity already under acquirer control shall be proposed to the acquirer in accordance with contractually established forms and procedures, if any.

Note: A number of requirements in this standard refer to "project-level or higher configuration control." If "project-level" is not a level of control selected for the project, the software development plan should state how these requirements map to the selected levels.

5.14.3 Configuration status accounting. The developer shall prepare and maintain records of the configuration status of all entities that have been placed under project-level or higher configuration control. These records shall be maintained for the life of the contract. They shall include, as applicable, the current version/revision/release of each entity, a record of changes to the entity since being placed under project-level or higher configuration control, and the status of problem/change reports affecting the entity.

5.14.4 Configuration audits. The developer shall support acquirer-conducted configuration audits as specified in the contract.

Note: These configuration audits may be called Functional Configuration Audits and Physical Configuration Audits.

5.14.5 Packaging, storage, handling, and delivery. The developer shall establish and implement procedures for the packaging, storage, handling, and delivery of deliverable software products. The developer shall maintain master copies of delivered software products for the duration of the contract.

5.15 Software product evaluation. The developer shall perform software product evaluation in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, the software products of each build should be evaluated in the context of the objectives established for that build. A software product that meets those objectives can be considered satisfactory even though it is missing information designated for development in later builds.

5.15.1 In-process and final software product evaluations. The developer shall perform in-process evaluations of the software products generated in carrying out the requirements of this standard. In addition, the developer shall perform a final evaluation of each deliverable software product before its delivery. The software products to be evaluated, criteria to be used, and definitions for those criteria are given in Appendix D.

5.15.2 Software product evaluation records. The developer shall prepare and maintain records of each software product evaluation. These records shall be maintained for the life of the contract. Problems in software products under project-level or higher configuration control shall be handled as described in 5.17 (Corrective action).

5.15.3 Independence in software product evaluation. The persons responsible for evaluating a software product shall not be the persons who developed the product. This does not preclude the persons who developed the software product from taking part in the evaluation (for example, as participants in a walk-through of the product).

5.16 Software quality assurance. The developer shall perform software quality assurance in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, the activities and software products of each build should be evaluated in the context of the objectives established for that build. An activity or software product that meets those objectives can be considered satisfactory even though it is missing aspects designated for later builds. Planning for software quality assurance is included in software development planning (see 5.1.1).

5.16.1 Software quality assurance evaluations. The developer shall conduct on-going evaluations of software development activities and the resulting software products to:

a. Assure that each activity required by the contract or described in the software development plan is being performed in accordance with the contract and with the software development plan.

b. Assure that each software product required by this standard or by other contract provisions exists and has undergone software product evaluations, testing, and corrective action as required by this standard and by other contract provisions.

5.16.2 Software quality assurance records. The developer shall prepare and maintain records of each software quality assurance activity. These records shall be maintained for the life of the contract. Problems in software products under project-level or higher configuration control and problems in activities required by the contract or described in the software development plan shall be handled as described in 5.17 (Corrective action).

5.16.3 Independence in software quality assurance. The persons responsible for conducting software quality assurance evaluations shall not be the persons who developed the software product, performed the activity, or are responsible for the software product or activity. This does not preclude such persons from taking part in these evaluations. The persons responsible for assuring compliance with the contract shall have the resources, responsibility, authority, and organizational freedom to permit objective software quality assurance evaluations and to initiate and verify corrective actions.

5.17 Corrective action. The developer shall perform corrective action in accordance with the following requirements.

5.17.1 Problem/change reports. The developer shall prepare a problem/change report to describe each problem detected in software products under project-level or higher configuration control and each problem in activities required by the contract or described in the software development plan. The problem/change report shall describe the problem, the corrective action needed, and the actions taken to date. These reports shall serve as input to the corrective action system.

5.17.2 Corrective action system. The developer shall implement a corrective action system for handling each problem detected in software products under project-level or higher configuration control and each problem in activities required by the contract or described in the software development plan. The system shall meet the following requirements:

a. Inputs to the system shall consist of problem/change reports.

b. The system shall be closed-loop, ensuring that all detected problems are promptly reported and entered into the system, action is initiated on them, resolution is achieved, status is tracked, and records of the problems are maintained for the life of the contract.

c. Each problem shall be classified by category and priority, using the categories and priorities in Appendix C or approved alternatives.

d. Analysis shall be performed to detect trends in the problems reported.

e. Corrective actions shall be evaluated to determine whether problems have been resolved, adverse trends have been reversed, and changes have been correctly implemented without introducing additional problems.

5.18 Joint technical and management reviews. The developer shall plan and take part in joint (acquirer/developer) technical and management reviews in accordance with the following requirements.

Note: If a system or CSCI is developed in multiple builds, the types of joint reviews held and the criteria applied will depend on the objectives of each build. Software products that meet those objectives can be considered satisfactory even though they are missing information designated for development in later builds.

5.18.1 Joint technical reviews. The developer shall plan and take part in joint technical reviews at locations and dates proposed by the developer and approved by the acquirer. These reviews shall be attended by persons with technical knowledge of the software products to be reviewed. The reviews shall focus on in-process and final software products, rather than materials generated especially for the review. The reviews shall have the following objectives:

a. Review evolving software products, using as criteria the software product evaluation criteria in Appendix D; review and demonstrate proposed technical solutions; provide insight and obtain feedback on the technical effort; surface and resolve technical issues.

b. Review project status; surface near- and long-term risks regarding technical, cost, and schedule issues.

c. Arrive at agreed-upon mitigation strategies for identified risks, within the authority of those present.

d. Identify risks and issues to be raised at joint management reviews.

e. Ensure on-going communication between acquirer and developer technical personnel.

5.18.2 Joint management reviews. The developer shall plan and take part in joint management reviews at locations and dates proposed by the developer and approved by the acquirer. These reviews shall be attended by persons with authority to make cost and schedule decisions and shall have the following objectives. Examples of such reviews are identified in Appendix E.

a. Keep management informed about project status, directions being taken, technical agreements reached, and overall status of evolving software products.

b. Resolve issues that could not be resolved at joint technical reviews.

c. Arrive at agreed-upon mitigation strategies for near- and long-term risks that could not be resolved at joint technical reviews.

d. Identify and resolve management-level issues and risks not raised at joint technical reviews.

e. Obtain commitments and acquirer approvals needed for timely accomplishment of the project.

5.19 Other activities. The developer shall perform the following activities.

5.19.1 Risk management. The developer shall perform risk management throughout the software development process. The developer shall identify, analyze, and prioritize the areas of the software development project that involve potential technical, cost, or schedule risks; develop strategies for managing those risks; record the risks and strategies in the software development plan; and implement the strategies in accordance with the plan.

5.19.2 Software management indicators. The developer shall use software management indicators to aid in managing the software development process and communicating its status to the acquirer. The developer shall identify and define a set of software management indicators, including the data to be collected, the methods to be used to interpret and apply the data, and the planned reporting mechanism. The developer shall record this information in the software development plan and shall collect, interpret, apply, and report on those indicators as described in the plan. Candidate indicators are given in Appendix F.

5.19.3 Security and privacy. The developer shall meet the security and privacy requirements specified in the contract. These requirements may affect the software development effort, the resulting software products, or both.

5.19.4 Subcontractor management. If subcontractors are used, the developer shall include in subcontracts all contractual requirements necessary to ensure that software products are developed in accordance with prime contract requirements.

5.19.5 Interface with software IV&V agents. The developer shall interface with the software Independent Verification and Validation (IV&V) agent(s) as specified in the contract.

5.19.6 Coordination with associate developers. The developer shall coordinate with associate developers, working groups, and interface groups as specified in the contract.

5.19.7 Improvement of project processes. The developer shall periodically assess the processes used on the project to determine their suitability and effectiveness. Based on these assessments, the developer shall identify any necessary and beneficial improvements to the process, shall identify these improvements to the acquirer in the form of proposed updates to the software development plan and, if approved, shall implement the improvements on the project.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This standard contains requirements for the development and documentation of software. Its application is described in 1.2.

6.2 Data requirements. The following Data Item Descriptions (DIDs) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this standard is applied on a contract, in order to obtain the data, except where DOD FAR Supplement 227.405-70 exempts the requirement for a DD Form 1423.

Reference Para	DID Number	DID Title
5.1.1	DI-IPSC-81427	Software Development Plan (SDP)
5.1.2, 5.1.3	DI-IPSC-81438	Software Test Plan (STP)
5.1.4	DI-IPSC-81428	Software Installation Plan (SIP)
5.1.5	DI-IPSC-81429	Software Transition Plan (STrP)
5.3.2	DI-IPSC-81430	Operational Concept Description (OCD)
5.3.3	DI-IPSC-81431	System/Subsystem Specification (SSS)
5.3.3, 5.5	DI-IPSC-81434	Interface Requirements Specification (IRS)
5.4.1, 5.4.2, 5.13.5	DI-IPSC-81432	System/Subsystem Design Description (SSDD)
5.4.1, 5.4.2, 5.6.1, 5.6.2, 5.6.3	DI-IPSC-81436	Interface Design Description (IDD)
5.5	DI-IPSC-81433	Software Requirements Specification (SRS)
5.6.1, 5.6.2, 5.6.3	DI-IPSC-81435	Software Design Description (SDD)
5.4.1, 5.6.1, 5.6.3	DI-IPSC-81437	Database Design Description (DBDD)
5.9.3, 5.11.3	DI-IPSC-81439	Software Test Description (STD)
5.9.7, 5.11.7	DI-IPSC-81440	Software Test Report (STR)
5.12.1, 5.13.1, 5.13.2, 5.13.4	DI-IPSC-81441	Software Product Specification (SPS)
5.12.2, 5.13.3	DI-IPSC-81442	Software Version Description (SVD)
5.12.3.1	DI-IPSC-81443	Software User Manual (SUM)
5.12.3.2	DI-IPSC-81445	Software Input/Output Manual (SIOM)
5.12.3.3	DI-IPSC-81444	Software Center Operator Manual (SCOM)
5.12.3.4	DI-IPSC-81446	Computer Operation Manual (COM)
5.13.6.1	DI-IPSC-81447	Computer Programming Manual (CPM)
5.13.6.2	DI-IPSC-81448	Firmware Support Manual (FSM)

The above DIDs were those cleared as of the date of this standard. The current issue of DOD 5010.12, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the Form 1423.

6.3 Relationship between standard and CDRL. If the CDRL calls for a DID different from the one named in corresponding paragraph(s) of this standard, all references to the DID in the standard should be interpreted to mean the one in the CDRL.

6.4 Delivery of tool contents. Depending on contract provisions, the developer may be permitted to satisfy CDRL requirements by delivering: 1) a repository or database containing the information specified in the cited DID; 2) a means of accessing that repository or database, such as a CASE tool, if not already available to the recipients designated on the CDRL; and 3) a hard-copy or electronically stored table of contents, specifying how and where to access the information required in each paragraph of the DID.

6.5 Tailoring guidance. This standard and its Data Item Descriptions (DIDs) are applied at the discretion of the acquirer. In each application, the standard and DIDs should be tailored to the specific requirements of a particular program, program phase, or contractual structure. Care should be taken to eliminate tasks that add unnecessary costs and data that do not add value to the process or the product. Tailoring for the standard takes the form of deletion of activities, alteration of activities to more explicitly reflect the application to a particular effort, or addition of activities to satisfy program requirements. This tailoring is specified in the Statement of Work. Tailoring for the DIDs consists of deleting requirements for unneeded information and making other changes, such as combining two documents under one cover, that do not increase the required workload. DID tailoring for deliverables is specified in Block 16 of the CDRL.

6.6 Cost/schedule reporting. Developer cost/schedule reports should be prepared at the CSCI level. The cost reports should indicate budgeted versus actual expenditures and should conform to the Work Breakdown Structure (WBS) applicable to the development effort. These reports should also indicate to the acquirer planned, actual, and predicted progress.

6.7 Related standardization documents. Figure 2 identifies a set of standardization documents related to software development. These and other standardization documents may be imposed or quoted in the Statement of Work to supplement the requirements in MIL-STD-498. MIL-STD-498 does not invoke these documents. The acquirer should use caution to ensure that supplemental standards are appropriate to the project and that any conflicts among these standards or with MIL-STD-498 are identified and resolved.

6.8 Subject term (key word) listing. The following list of key words may be used to catalog or characterize key topics in this standard.

Builds/incremental development
Computer software configuration item
Database
Joint technical/management reviews
Operational concept
Reusable software
Risk management
Security/privacy
Software
Software configuration management
Software development
Software documentation
Software implementation
Software management indicators
Software product evaluation
Software quality assurance
Software requirements analysis
Software safety
Software support
Software testing
Software unit
Tailoring

Topic and MIL-STD-498 Paragraph	Related Standardization Documents (Determine latest version before use)
Behavioral design (5.4.1, 5.6.1)	MIL-STD-1801, User Computer Interface MIL-HDBK-761, Human Engineering Guidelines for Management Information Systems
Computer security (4.2.4.2)	DOD-5200.28 STD, DoD Trusted Computer System Evaluation Criteria
Configuration management (5.14)	ANSI/IEEE Std 828, Standard for Software Configuration Management Plans ANSI/IEEE Std 1042, Guide to Software Configuration Management MIL-STD-973, Configuration Management MIL-HDBK-61 Guidelines for Configuration Management
Continuous acquisition and life-cycle support (CALS)	MIL-STD-1840, Automated Interchange of Technical Information MIL-STD-1556, Government-Industry Data Exchange Program MIL-HDBK-59, Continuous Acquisition and Life-Cycle Support Program Implementation Guide MIL-HDBK-800, Documentation Streamlining MIL-D-28000, Digital Representation for Communication of Product Data: IGES Application Subset and IGES Application Protocols MIL-M-28001, Markup Requirements and Generic Style Specification for Electronic Printed Output and Exchange of Text MIL-R-28002, Requirements for Raster Graphics Representation in Binary Format MIL-D-28003, Digital Representation for Communication of Illustration Data: CGM Application Profile
Joint technical and management reviews (5.18, App. E)	ANSI/IEEE Std 1028, Standard for Software Reviews and Audits MIL-STD-499, Engineering Management MIL-STD-1521, Technical Reviews and Audits for Systems, Equipments, and Computer Software (audit portion superseded by MIL-STD-973)
Programming languages (5.7.1)	FIPS-PUB-119, Ada (Also issued as ANSI/ISO/IEC 8652; formerly ANSI/MIL-STD-1815, Ada Programming Language)
Software design (5.4, 5.6)	ANSI/IEEE Std 1016, Recommended Practice for Software Design Descriptions IEEE Std 1016.1, Guide for Software Design Descriptions IEEE/ANSI Std 990, Recommended Practice for Ada as a Program Design Language
Software development environment (5.2)	IEEE Std 1209, Recommended Practice for the Evaluation and Selection of CASE Tools DOD-STD-1467 (AR), Software Support Environment MIL-HDBK-782 (AR), Software Support Environment Acquisition
Software development planning (5.1.1)	ANSI/IEEE Std 1058.1, Standard for Software Project Management Plans
Software development process (4.1, App. G)	ISO/IEC 12207 (when issued), Software Life-Cycle Processes ANSI/IEEE Std 1074, Standard for Developing Software Life Cycle Processes MIL-STD-1803 (USAF), Software Development Integrity Program Guidebook on MIL-STD-498 (when issued) MIL-HDBK-498 (when issued)

Note: MIL-STD-498 does not invoke any of these documents.

FIGURE 2. Related standardization documents.

Topic and MIL-STD-498 Paragraph	Related Standardization Documents (Determine latest version before use)
Software management indicators (5.19.2, App. F)	ISO/IEC 9126, Quality Characteristics and Guidelines for Their Use ANSI/IEEE Std 982.2, Guide: Use of Standard Measures to Produce Reliable Software IEEE Std 1045, Standard for Software Productivity Metrics IEEE Std 1061, Standard for Software Quality Metrics Methodology
Software problem categories/priorities (Appendix C)	IEEE Std 1044, Standard Classification for Software Anomalies
Software product evaluation (5.15)	ANSI/IEEE Std 1012, Standard for Software Verification and Validation Plans IEEE Std 1059, Guide for Verification and Validation Plans
Software quality assurance (5.16)	ISO 9001, Quality System - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing ISO 9000-3, Guidelines for the Application of ISO 9001 to the Development, Supply, and Maintenance of Software ANSI/IEEE Std 730, Standard for Software Quality Assurance Plans IEEE Std 1298/A3563.1, Software Quality Management System DOD-STD-2168, Defense System Software Quality Program MIL-HDBK-286, A Guide for DOD-STD-2168
Software requirements (5.3.3, 5.5)	ANSI/IEEE Std 830, Recommended Practice for Software Requirements Specifications MIL-STD-490, Specification Practices
Software safety (4.2.4.1)	MIL-STD-882, System Safety Program Requirements MIL-HDBK-272, Safety Design and Evaluation Criteria for Nuclear Weapons Systems IEEE Std 1228, Standard for Software Safety Plans
Software support (all paragraphs)	IEEE Std 1219, Standard for Software Maintenance MIL-HDBK-347, Mission-Critical Computer Resources Software Support
Software testing (5.1.2, 5.1.3, 5.7 - 5.11)	ANSI/IEEE Std 829, Standard for Software Test Documentation ANSI/IEEE Std 1008, Standard for Software Unit Testing ANSI/IEEE Std 1012, Standard for Software Verification and Validation Plans IEEE Std 1059, Guide for Verification and Validation Plans
Software user documentation (5.12.3)	ANSI/IEEE Std 1063, Standard for Software User Documentation
Systems engineering (5.1.3, 5.3, 5.4, 5.10, 5.11)	MIL-STD-499, Engineering Management MIL-HDBK-805, Microcomputer Software and Hardware Guidelines
Tailoring (1.2.3, 6.5, App. G, H	DOD-HDBK-248, Guide for Application and Tailoring of Requirements for Defense Materiel Acquisitions MIL-HDBK-498 (when issued)
Training (5.12.4, 5.13.7)	MIL-STD-1379, Military Training Programs
Work breakdown structure (6.6)	MIL-STD-881, Work Breakdown Structures for Defense Materiel Items

Note: MIL-STD-498 does not invoke any of these documents.

FIGURE 2. Related standardization documents - continued.

APPENDIX A

LIST OF ACRONYMS

A.1 Scope. This appendix provides a list of acronyms used in this standard, with their associated meanings. This appendix is not a mandatory part of the standard. The information provided is intended for guidance only.

A.2 Applicable documents. This section is not applicable to this appendix.

A.3 Acronyms.

CASE	Computer-Aided Software Engineering
CDRL	Contract Data Requirements List
COM	Computer Operation Manual
CPM	Computer Programming Manual
CSCI	Computer Software Configuration Item
DBDD	Database Design Description
DID	Data Item Description
DoD	Department of Defense
FSM	Firmware Support Manual
HWCI	Hardware Configuration Item
IDD	Interface Design Description
IRS	Interface Requirements Specification
IV&V	Independent Verification and Validation
OCD	Operational Concept Description
SCOM	Software Center Operator Manual
SDD	Software Design Description
SDF	Software Development File
SDL	Software Development Library
SDP	Software Development Plan
SIOM	Software Input/Output Manual
SIP	Software Installation Plan
SOW	Statement of Work
SPS	Software Product Specification
SRS	Software Requirements Specification
SSDD	System/Subsystem Design Description
SSS	System/Subsystem Specification
STD	Software Test Description
STP	Software Test Plan
STR	Software Test Report
STrP	Software Transition Plan
SUM	Software User Manual
SVD	Software Version Description
SW	Software
WBS	Work Breakdown Structure

APPENDIX B

INTERPRETING MIL-STD-498 FOR INCORPORATION OF REUSABLE SOFTWARE PRODUCTS

B.1 Scope. This appendix interprets MIL-STD-498 when applied to the incorporation of reusable software products. This appendix is a mandatory part of this standard, subject to tailoring by the acquirer.

B.2 Applicable documents. This section is not applicable to this appendix.

B.3 Evaluating reusable software products. The developer shall specify in the software development plan the criteria to be used for evaluating reusable software products for use in fulfilling the requirements of the contract. General criteria shall be the software product's ability to meet specified requirements and to be cost-effective over the life of the system. Non-mandatory examples of specific criteria include, but are not limited to:

a. Ability to provide required capabilities and meet required constraints
b. Ability to provide required safety, security, and privacy
c. Reliability/maturity, as evidenced by established track record
d. Testability
e. Interoperability with other system and system-external elements
f. Fielding issues, including:
   1) Restrictions on copying/distributing the software or documentation
   2) License or other fees applicable to each copy
g. Maintainability, including:
   1) Likelihood the software product will need to be changed
   2) Feasibility of accomplishing that change
   3) Availability and quality of documentation and source files
   4) Likelihood that the current version will continue to be supported by the supplier
   5) Impact on the system if the current version is not supported
   6) The acquirer's data rights to the software product
   7) Warranties available
h. Short- and long-term cost impacts of using the software product
i. Technical, cost, and schedule risks and tradeoffs in using the software product

B.4 Interpreting MIL-STD-498 activities for reusable software products. The following rules apply in interpreting this standard:

a. Any requirement that calls for development of a software product may be met by a reusable software product that fulfills the requirement and meets the criteria established in the software development plan. The reusable software product may be used as-is or modified and may be used to satisfy part or all of the requirement. For example, a requirement may be met by using an existing plan, specification, or design.

b. When the reusable software product to be incorporated is the software itself, some of the requirements in this standard require special interpretation. Figure 3 provides this interpretation. Key issues are whether the software will be modified, whether unmodified software constitutes an entire CSCI or only one or more software units, and whether unmodified software has a positive performance record (no firm criteria exist for making this determination). The figure is presented in a conditional manner: If an activity in the left column is required for a given type of software, the figure tells how to interpret the activity for reusable software of that type.

If this MIL-STD-498 activity is required:	Interpret the activity as follows for each type of existing, reusable software:				
	For CSCIs to be used unmodified		For software units to be used unmodified		For software units being modified for/ during project
	Positive performance record	No or poor performance record	Positive performance record	No or poor performance record	
5.1 Project planning and oversight	Include the activities in this figure in project plans				
5.2 Establishing software devel environment	Establish and apply a software test environment, software development library, and software development files as appropriate to perform the activities in this figure				Apply full requirements
5.3 System requirements analysis	Consider software's capabilities in defining the operational concept & system requirements				
	Use test/ performance records to confirm ability to meet needs	Test to confirm ability to meet needs	Use test/ performance records to confirm ability to meet needs	Test to confirm ability to meet needs	Use tests or records to determine potential to meet needs
5.4.1 System-wide design	Consider the software's capabilities and characteristics in designing system behavior and in making other system-wide design decisions				
5.4.2 System architectural design	Include the CSCI in the system architecture; allocate system requirements to it		Consider the unit's capabilities and characteristics in designating CSCIs and allocating system requirements to them		
5.5 Software requirements analysis	Specify the project-specific requirements the CSCI must meet; verify via records or retest that the CSCI can meet them		Consider the unit's capabilities and characteristics in specifying the requirements for the CSCI of which it is a part		
5.6.1 CSCI-wide design	No requirement: the CSCI-wide design decisions have already been made (recording the "as built" design is under 5.13)		Consider the unit's capabilities and characteristics in designing CSCI behavior and making other CSCI-wide design decisions		
5.6.2 CSCI architectural design	No requirement: the CSCI's architecture is already defined (recording the "as built" design is under 5.13)		Include the unit in the CSCI architecture and allocate CSCI requirements to it		
5.6.3 CSCI detailed design	No requirement: the CSCI's detailed design is already defined (recording the "as built" design is under 5.13)		No requirement: the unit is already designed (recording the "as built" design is under 5.13)		Modify the unit's design as needed
5.7.1 Software implementation	No requirement: the software for the CSCI's units is already implemented		No requirement: the software for the unit is already implemented		Modify the software for the unit
5.7.2-5.7.5 Unit testing	No requirement: the CSCI's units are already tested	Perform selectively if in question and units are accessible	No requirement: the unit is already tested	Perform this testing	

FIGURE 3. Interpreting MIL-STD-498 for incorporation of reusable software.

If this MIL-STD-498 activity is required:	Interpret the activity as follows for each type of existing, reusable software:				
	For CSCIs to be used unmodified		For software units to be used unmodified		For software units being modified for/ during project
	Positive performance record	No or poor performance record	Positive performance record	No or poor performance record	
5.8 Unit integration and testing	No requirement: the CSCI's units are already integrated	Perform selectively if in question and units are accessible	Perform except where integration is already tested/proven	Perform this testing	
5.9 CSCI qualification testing	No requirement: CSCI is already tested & proven	Perform this testing	Include the unit in CSCI qualification testing		
5.10 CSCI/HWCI integration and testing	Perform, except where integration is already tested/proven	Include the CSCI in CSCI/HWCI integration and testing	Include the unit in CSCI/HWCI integration and testing		
5.11 System qualification testing	Include the CSCI in system qualification testing		Include the unit in system qualification testing		
5.12 Preparing for software use	Include the software for the CSCI or unit in the executable software; include in version descriptions; handle any license issues; cover use of the CSCI or unit, as appropriate, via existing, new, or revised user/operator manuals; install the CSCI or unit as part of the overall system; include its use, as appropriate, in the training offered				
5.13 Preparing for software transition	Include the software for the CSCI or unit in the executable software; prepare source files for the CSCI or unit, if available; include in version descriptions; handle any license issues; prepare or provide "as built" design descriptions for software whose design is known; install the CSCI or unit at the support site; demonstrate regenerability if source is available; include in the training offered				
5.14 Software configuration management	Apply to all software products prepared, modified, or used in incorporating this software				
5.15 Software product evaluation	Apply to all software products prepared or modified in incorporating this software; for software products used unchanged, apply unless a positive performance record or evidence of past evaluations indicates that such an evaluation would be duplicative				
5.16 Software quality assurance	Apply to all activities performed and all software products prepared, modified, or used in incorporating this software				
5.17 Corrective action	Apply to all activities performed and all software products prepared or modified in incorporating this software				
5.18 Joint reviews	Cover the software products prepared or modified in incorporating this software				
5.19 Other activities	Apply the full requirements of this section				

FIGURE 3. Interpreting MIL-STD-498 for incorporation of reusable software - continued.

APPENDIX C

CATEGORY AND PRIORITY CLASSIFICATIONS FOR PROBLEM REPORTING

C.1 Scope. This appendix contains requirements for a category and priority classification scheme to be applied to each problem submitted to the corrective action system. This appendix is a mandatory part of the standard, subject to the following conditions: 1) these requirements may be tailored by the acquirer, and 2) the developer may use alternate category and priority schemes if approved by the acquirer.

C.2 Applicable documents. This section is not applicable to this appendix.

C.3 Classification by category. The developer shall:

a. Assign each problem in software products to one or more of the categories in Figure 4.

b. Assign each problem in activities to one or more of the categories in Figure 1 (shown at the start of Section 5).

C.4 Classification by priority. The developer shall assign each problem in software products or activities to one of the priorities in Figure 5.

Category	Applies to problems in:
a. Plans	One of the plans developed for the project
b. Concept	The operational concept
c. Requirements	The system or software requirements
d. Design	The design of the system or software
e. Code	The software code
f. Database/data file	A database or data file
g. Test information	Test plans, test descriptions, or test reports
h. Manuals	The user, operator, or support manuals
i. Other	Other software products

FIGURE 4. Categories to be used for classifying problems in software products.

Priority	Applies if a problem could:
1	a. Prevent the accomplishment of an operational or mission essential capability b. Jeopardize safety, security, or other requirement designated "critical"
2	a. Adversely affect the accomplishment of an operational or mission essential capability and no work-around solution is known b. Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, and no work-around solution is known
3	a. Adversely affect the accomplishment of an operational or mission essential capability but a work-around solution is known b. Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, but a work-around solution is known
4	a. Result in user/operator inconvenience or annoyance but does not affect a required operational or mission essential capability b. Result in inconvenience or annoyance for development or support personnel, but does not prevent the accomplishment of those responsibilities
5	Any other effect

FIGURE 5. Priorities to be used for classifying problems.

APPENDIX D

SOFTWARE PRODUCT EVALUATIONS

D.1 Scope. This appendix identifies the software products that are to undergo software product evaluations, identifies the criteria to be used for each evaluation, and contains a default set of definitions for the evaluation criteria. This appendix is a mandatory part of the standard, subject to the following conditions: 1) these requirements may be tailored by the acquirer, 2) the developer may use alternate criteria or definitions if approved by the acquirer, and 3) if the development of a given software product has been tailored out of the standard, the requirement to evaluate that product does not apply.

D.2 Applicable documents. This section is not applicable to this appendix.

D.3 Required evaluations. Figure 6 identifies the software products that are to undergo software product evaluations and states the criteria to be applied to each one. Each software product and criterion is labelled for purposes of identification and tailoring. For convenience, they may be treated as subparagraphs of this paragraph (referring to the first criterion, for example, as D.3.1.a). The software products are expressed in lower case letters to convey generic products, not necessarily in the form of hard-copy documents. Evaluations of system-level products are to be interpreted as participation in these evaluations. Some of the criteria are subjective. Because of this, there is no requirement to prove that the criteria have been met; the requirement is to perform the evaluations using these criteria and to identify possible problems for discussion and resolution.

D.4 Criteria definitions. The following paragraphs provide definitions for the criteria in Figure 6 that may not be self-explanatory. The criteria are listed in alphabetical order, matching as closely as possible the wording used in Figure 6.

D.4.1 Accurately describes (an item). This criterion, applied to user/operator/programmer instructions and to the "as built" design and version descriptions, means that the instructions or descriptions are correct depictions of the software or other item described.

D.4.2 Adequate test cases, procedures, data, results. Test cases are adequate if they cover all applicable requirements or design decisions and specify the inputs to be used, the expected results, and the criteria to be used for evaluating those results. Test procedures are adequate if they specify the steps to be followed in carrying out each test case. Test data are adequate if they enable the execution of the planned test cases and test procedures. Test or dry run results are adequate if they describe the results of all test cases and show that all criteria have been met, possibly after revision and retesting.

D.4.3 Consistent with indicated product(s). This criterion means that: (1) no statement or representation in one software product contradicts a statement or representation in the other software products, (2) a given term, acronym, or abbreviation means the same thing in all of the software products, and (3) a given item or concept is referred to by the same name or description in all of the software products.

D.4.4 Contains all applicable information in (a specified DID). This criterion uses the DIDs to specify the required content of software products, regardless of whether a deliverable document has been ordered. Allowances are to be made for the applicability of each DID topic. The formatting specified in the DID (required paragraphing and numbering) are not relevant to this evaluation.

Software Product	Evaluation Criteria						
	Contains all applic. info in:	Meets SOW, if applic.	Meets CDRL, if applic.	Under-stand-able	Intern. consis-tent	Follows SW dev plan	Additional Criteria
1. Software development plan (5.1.1)	a. SDP DID	b.	c.	d.	e.	f. (Up-dates)	g. Covers all activities/deliverables in SOW and CDRL h. Consistent with other project plans i. Presents a sound approach to the development
2. Software test plan (5.1.2, 5.1.3)	a. STP DID	b.	c.	d.	e.	f.	g. Covers all software-related qualification activities in the SOW h. Covers all requirements for the items under test i. Consistent with other project plans j. Presents a sound approach to the testing
3. Software installation plan (5.1.4)	a. SIP DID	b.	c.	d.	e.	f.	g. Covers all user site installation activities in the SOW h. Consistent with other project plans i. Presents a sound approach to the installation
4. Software transition plan (5.1.5)	a. STrP DID	b.	c.	d.	e.	f.	g. Covers all transition-related activities in the SOW h. Consistent with other project plans i. Presents a sound approach to the transition
5. Operational concept (5.3.2)	a. OCD DID	b.	c.	d.	e.	f.	g. Feasible
6. System requirements (5.3.3)	a. SSS, IRS DIDs	b.	c.	d.	e.	f.	g. Covers the operational concept h. Feasible i. Testable
7. System-wide design decisions (5.4.1)	a. SSDD, IDD, DBDD DIDs	b.	c.	d.	e.	f.	g. Consistent with system requirements h. Feasible
8. System architectural design (5.4.2)	a. SSDD, IDD DIDs	b.	c.	d.	e.	f.	g. Covers the system requirements h. Consistent with the system-wide design decisions i. Feasible
9. CSCI requirements (5.5)	a. SRS, IRS DIDs	b.	c.	d.	e.	f.	g. Covers system requirements allocated to the CSCI h. Feasible i. Testable

FIGURE 6. Software products and associated evaluation criteria.

Software Product	Evaluation Criteria						
	Contains all applic. info in:	Meets SOW, if applic.	Meets CDRL, if applic.	Under-stand-able	Intern. consis-tent	Follows SW dev plan	Additional Criteria
19. Software version descriptions (5.12.2, 5.13.3)	a. SVD DID	b.	c.	d.	e.	f.	g. Accurately identifies the version of each software component (file, unit, CSCI, etc.) delivered h. Accurately identifies the changes incorporated
20. Software user manuals (5.12.3.1)	a. SUM DID	b.	c.	d.	e.	f.	g. Accurately describes software installation and use to the intended audience of this manual
21. Software input/ output manuals (5.12.3.2)	a. SIOM DID	b.	c.	d.	e.	f.	g. Accurately describes software input/output to the intended audience of this manual
22. Software center operator manuals (5.12.3.3)	a. SCOM DID	b.	c.	d.	e.	f.	g. Accurately describes software installation and operation to the intended audience of this manual
23. Computer operation manuals (5.12.3.4)	a. COM DID	b.	c.	d.	e.	f.	g. Accurately describes the operational characteristics of the computer
24. Source files (5.13.2)	a. SPS DID	b.	c.	d.	e.	f.	g. Meets delivery requirements h. All required software is present i. Version exactly matches version that passed testing j. Deliverable media accurately labelled
25. "As built" CSCI design and related information (5.13.4)	a. SPS DID	b.	c.	d.	e.	f.	g. Accurately describes the "as built" design of the CSCI h. Accurately describes compilation/build procedures i. Accurately describes modification procedures j. Source files cover all units in the CSCI design k. Measured resource utilization meets CSCI requirements
26. "As built" system design (5.13.5)	a. SSDD DID	b.	c.	d.	e.	f.	g. Accurately describes the "as built" system design

FIGURE 6. Software products and associated evaluation criteria - continued.

D.4.5 Covers (a given set of items). A software product "covers" a given set of items if every item in the set has been dealt with in the software product. For example, a plan covers the SOW if every provision in the SOW is dealt with in the plan; a design covers a set of requirements if every requirement has been dealt with in the design; a test plan covers a set of requirements if every requirement is the subject of one or more tests. "Covers" corresponds to the downward traceability (for example, from requirements to design) in the requirement, design, and test planning/description DIDs.

D.4.6 Feasible. This criterion means that, in the knowledge and experience of the evaluator, a given concept, set of requirements, design, test, etc. violates no known principles or lessons learned that would render it impossible to carry out.

D.4.7 Follows software development plan. This criterion means that the software product shows evidence of having been developed in accordance with the approach described in the software development plan. Examples include following design and coding standards described in the plan. For the software development plan itself, this criterion applies to updates to the initial plan.

D.4.8 Internally consistent. This criterion means that: (1) no two statements or representations in a software product contradict one another, (2) a given term, acronym, or abbreviation means the same thing throughout the software product, and (3) a given item or concept is referred to by the same name or description throughout the software product.

D.4.9 Meets CDRL, if applicable. This criterion applies if the software product being evaluated is specified in the CDRL and has been formatted for delivery at the time of evaluation. It focuses on the format, markings, and other provisions specified in the CDRL, rather than on content, covered by other criteria.

D.4.10 Meets SOW, if applicable. This criterion means that the software product fulfills any Statement of Work provisions regarding it. For example, the Statement of Work may place constraints on the operational concept or the design.

D.4.11 Presents a sound approach. This criterion means that, based on the knowledge and experience of the evaluator, a given plan represents a reasonable way to carry out the required activities.

D.4.12 Shows evidence that (an item under test) meets its requirements. This criterion means that recorded test results show that the item under test either passed all tests the first time or was revised and retested until the tests were passed.

D.4.13 Testable. A requirement or set of requirements is considered to be testable if an objective and feasible test can be designed to determine whether each requirement has been met.

D.4.14 Understandable. This criterion means "understandable by the intended audience." For example, software products intended for programmer-to-programmer communication need not be understandable by non-programmers. A product that correctly identifies its audience (based on information in Block 3 of the corresponding DID) and is considered understandable to that audience meets this criterion.

APPENDIX E

CANDIDATE JOINT MANAGEMENT REVIEWS

E.1 Scope. This appendix describes a candidate set of joint management reviews that might be held during a software development project. This appendix is not a mandatory part of this standard. The information provided is intended for guidance only.

E.2 Applicable documents. This section is not applicable to this appendix.

E.3 Assumptions. This appendix makes the following assumptions:

a. The acquirer has reviewed the subject products in advance, and one or more joint technical reviews have been held to resolve issues, leaving the joint management review as a forum to resolve open issues and reach agreement as to the acceptability of each product.

b. Any of the reviews may be conducted incrementally, dealing at each review with a subset of the listed items or a subset of the system or CSCI(s) being reviewed.

E.4 Candidate reviews. Given below is a set of candidate joint management reviews that might be held during a software development project. There is no intent to require these reviews or to preclude alternatives or combinations of these reviews. The objectives supplement those given in 5.18.2.

E.4.1 Software plan reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The software development plan
b. The software test plan
c. The software installation plan
d. The software transition plan

E.4.2 Operational concept reviews. These reviews are held to resolve open issues regarding the operational concept for a software system.

E.4.3 System/subsystem requirements reviews. These reviews are held to resolve open issues regarding the specified requirements for a software system or subsystem.

E.4.4 System/subsystem design reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The system- or subsystem-wide design decisions
b. The architectural design of a software system or subsystem

E.4.5 Software requirements reviews. These reviews are held to resolve open issues regarding the specified requirements for a CSCI.

E.4.6 Software design reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The CSCI-wide design decisions
b. The architectural design of a CSCI
c. The detailed design of a CSCI or portion thereof (such as a database)

E.4.7 Test readiness reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The status of the software test environment
b. The test cases and test procedures to be used for CSCI qualification testing or system qualification testing
c. The status of the software to be tested

E.4.8 Test results reviews. These reviews are held to resolve open issues regarding the results of CSCI qualification testing or system qualification testing.

E.4.9 Software usability reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The readiness of the software for installation at user sites
b. The user and operator manuals
c. The software version descriptions
d. The status of installation preparations and activities

E.4.10 Software supportability reviews. These reviews are held to resolve open issues regarding one or more of the following:

a. The readiness of the software for transition to the support agency
b. The software product specifications
c. The software support manuals
d. The software version descriptions
e. The status of transition preparations and activities, including transition of the software development environment, if applicable

E.4.11 Critical requirement reviews. These reviews are held to resolve open issues regarding the handling of critical requirements, such as those for safety, security, and privacy.

APPENDIX F

CANDIDATE MANAGEMENT INDICATORS

F.1 Scope. This appendix identifies a set of management indicators that might be used on a software development project. This appendix is not a mandatory part of this standard. The information provided is intended for guidance only.

F.2 Applicable documents. This section is not applicable to this appendix.

F.3 Candidate indicators. Given below is a set of candidate management indicators that might be used on a software development project. There is no intent to impose these indicators or to preclude others.

a. Requirements volatility: total number of requirements and requirement changes over time.

b. Software size: planned and actual number of units, lines of code, or other size measurement over time.

c. Software staffing: planned and actual staffing levels over time.

d. Software complexity: complexity of each software unit.

e. Software progress: planned and actual number of software units designed, implemented, unit tested, and integrated over time.

f. Problem/change report status: total number, number closed, number opened in the current reporting period, age, priority.

g. Build release content: planned and actual number of software units released in each build.

h. Computer hardware resource utilization: planned and actual use of computer hardware resources (such as processor capacity, memory capacity, input/output device capacity, auxiliary storage device capacity, and communications/network equipment capacity) over time.

i. Milestone performance: planned and actual dates of key project milestones.

j. Scrap/rework: amount of resources expended to replace or revise software products after they are placed under project-level or higher configuration control.

k. Effect of reuse: a breakout of each of the indicators above for reused versus new software products.

APPENDIX G

GUIDANCE ON PROGRAM STRATEGIES, TAILORING, AND BUILD PLANNING

G.1 Scope. This appendix identifies three of the program strategies used by DoD and shows how MIL-STD-498 can be applied under each of these strategies and on a project involving reengineering. This appendix is not a mandatory part of the standard. The information provided is intended for guidance only.

G.2 Applicable documents. Documents cited in this appendix are as follows:

a. DODI 5000.2, Defense Acquisition Management Policies and Procedures

b. DODI 8120.2, Automated Information System Life-Cycle Management Process, Review, and Milestone Approval

G.3 Candidate program strategies. DODI 8120.2 describes three basic program strategies plus a generic strategy called "other," encompassing variations, combinations, and alternatives to the three. DODI 5000.2 identifies similar strategies, called acquisition strategies. The three basic strategies are summarized below and in Figure 7.

a. Grand design. The "grand design" strategy (not named in DODI 5000.2 but treated as one strategy) is essentially a "once-through, do-each-step-once" strategy. Simplistically: determine user needs, define requirements, design the system, implement the system, test, fix, and deliver.

b. Incremental. The "incremental" strategy (called "Preplanned Product Improvement" in DODI 5000.2) determines user needs and defines the system requirements, then performs the rest of the development in a sequence of builds. The first build incorporates part of the planned capabilities, the next build adds more capabilities, and so on, until the system is complete.

c. Evolutionary. The "evolutionary" strategy (called "evolutionary" in both DOD Instructions) also develops a system in builds, but differs from the incremental strategy in acknowledging that the user need is not fully understood and all requirements cannot be defined up front. In this strategy, user needs and system requirements are partially defined up front, then are refined in each succeeding build.

Program Strategy	Define All Requirements First?	Multiple Development Cycles?	Field Interim Software?
Grand Design	Yes	No	No
Incremental (Preplanned Product Improvement)	Yes	Yes	Maybe
Evolutionary	No	Yes	Yes

FIGURE 7. Key features of three DOD program strategies.

G.4 Selecting an appropriate program strategy. The program strategy is selected by the acquirer, but may be proposed by prospective or selected developers. Figure 8 illustrates a risk analysis approach for selecting an appropriate strategy. The approach consists of listing risk items (negatives) and opportunity items (positives) for each strategy; assigning each item a risk or opportunity level of High, Medium, or Low; and making a decision on which strategy to use based on a trade-off among the risks and opportunities. The fill-ins shown are sample considerations only. An actual analysis may use others. The "DECISION" entry on the bottom line shows which strategy was selected.

G.5 Relationship of MIL-STD-498 to program strategies. The program strategy usually applies to the overall system. The software within the system may be acquired under the same strategy or under a different one, such as requiring that all software be finalized in the first build of the system. Figures 9, 10, and 11 show how MIL-STD-498 might be applied under each of the program strategies identified in G.3. Figure 12 shows how MIL-STD-498 might be applied on a reengineering project. All four figures are, by necessity, simplified. For example, they show MIL-STD-498 activities in sequence when they might actually be ongoing, overlapping, or iterative; they show each software product as a single entity, without depicting early drafts or updates; and they represent each software product by the name of the corresponding DID, when the actual software product is the information called for by the DID, not necessarily in the form of a hard-copy document.

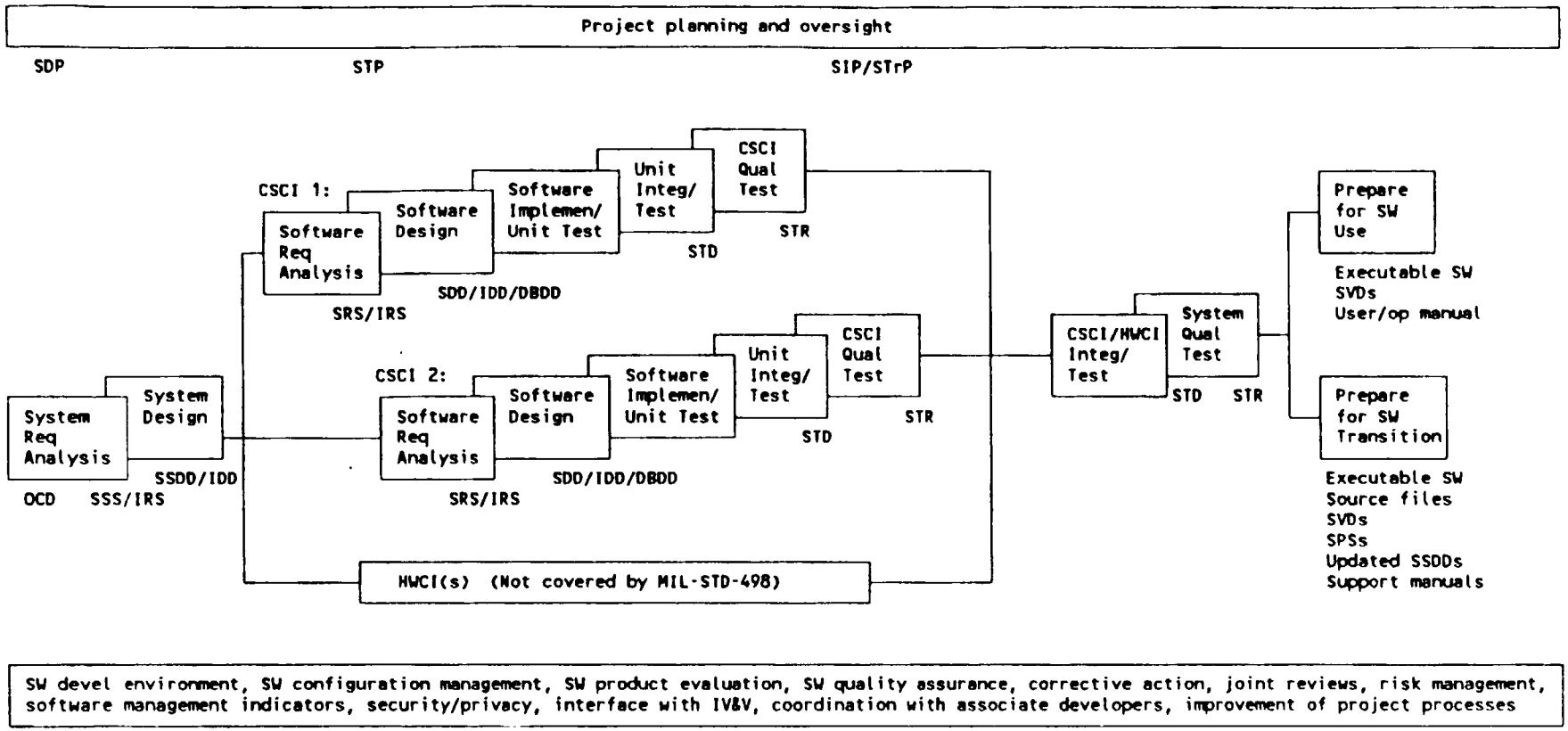
G.6 Planning software builds and tailoring MIL-STD-498. Planning the software builds on a project and tailoring MIL-STD-498 for each build may be accomplished in several ways. The acquirer might, for example, select an overall program strategy and tailor the standard for the overall contract, leaving it to the developer to lay out the software builds and propose the tailoring for each build. Alternatively, the acquirer might lay out the software builds and specify the tailoring for each as part of the contract. The approach selected will be project-dependent. The paragraphs below provide guidelines for planning the builds and tailoring the standard without attempting to divide these activities between the acquirer and developer.

G.6.1 Identifying builds and their objectives. The first step in software build planning is to lay out a series of one or more builds and to identify the objectives of each build. The top part of Figure 13 illustrates such planning. In the example, the system/subsystem specification (SSS) already exists and fulfillment of its requirements is divided into four builds, two of which will be prototypes delivered to a selected set of users, and two of which will actually be fielded. A further objective of Build 4 is transitioning the software to the designated support agency. An actual project would expand on these objectives.

G.6.2 Identifying the MIL-STD-498 activities to be performed in each build. The next step in build planning is identifying which MIL-STD-498 activities apply in each build and determining the extent to which they apply. The lower part of Figure 13 shows the start of such planning. Listed on the left are the paragraphs of MIL-STD-498. The worksheet entries indicate in which builds each activity is to be performed and include any notes regarding the nature of each activity in each build. For example, the figure shows that each build will include software development planning (5.1.1), but that the nature of that planning changes in each build. Some activities will not apply at all in a given build, some will apply identically in all builds, and some will apply differently in different builds. Since some aspects of the project, such as number and type of CSCIs, may not have been identified at the time the worksheet is being filled out, completion of the worksheet may itself be incremental. The following guidelines apply:

Grand Design		Incremental		Evolutionary	
Risk Item (Reasons against this strategy)	Risk Level	Risk Item (Reasons against this strategy)	Risk Level	Risk Item (Reasons against this strategy)	Risk Level
- Requirements are not well understood	H	- Requirements are not well understood	H		
- System too large to do all at once	M	- User prefers all capabilities at first delivery	M	- User prefers all capabilities at first delivery	M
- Rapid changes in mission technology anticipated--may change the requirements	H	- Rapid changes in mission technology are expected--may change the requirements	H		
- Limited staff or budget available now	M				
Opportunity Item (Reasons to use this strategy)	Opp. Level	Opportunity Item (Reasons to use this strategy)	Opp. Level	Opportunity Item (Reasons to use this strategy)	Opp. Level
- User prefers all capabilities at first delivery	M	- Early capability is needed	H	- Early capability is needed	H
- User prefers to phase out old system all at once	L	- System breaks naturally into increments	M	- System breaks naturally into increments	M
		- Funding/staffing will be incremental	H	- Funding/staffing will be incremental	H
				- User feedback and monitoring of technology changes is needed to understand full requirements	H
				DECISION: USE THIS STRATEGY	

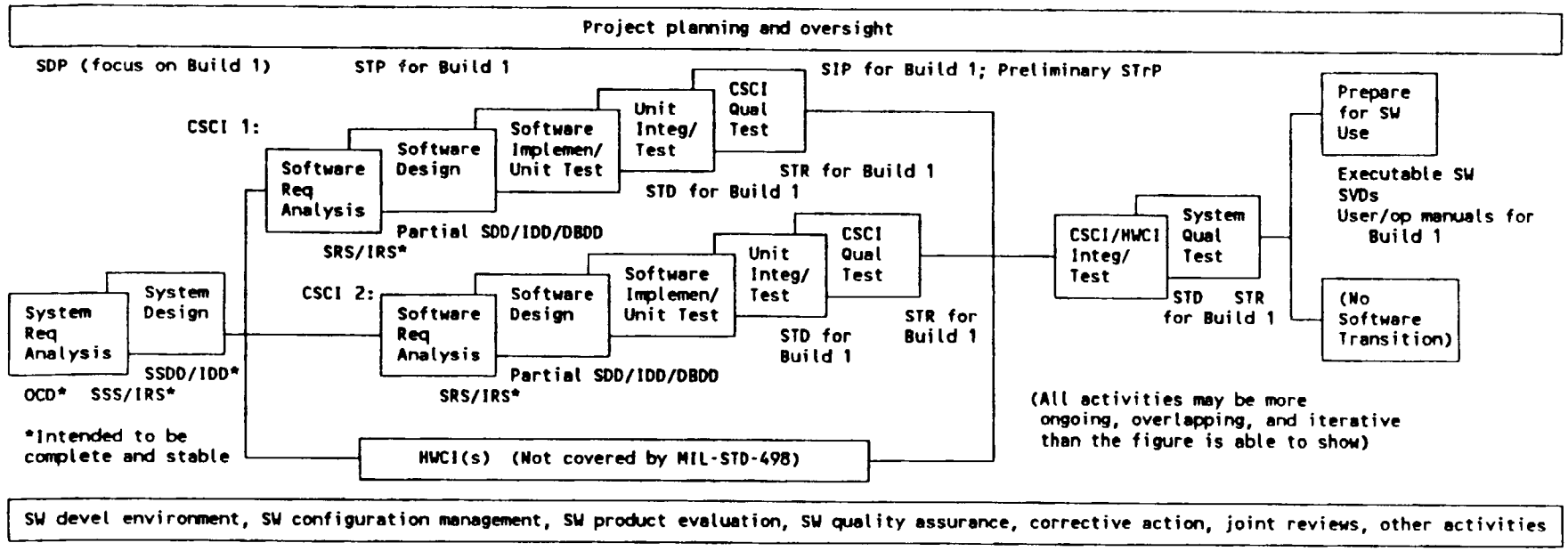
FIGURE 8. Sample risk analysis for determining the appropriate program strategy.



Note: All activities may be more ongoing, overlapping, and iterative than the figure is able to show.

FIGURE 9. One possible way of applying MIL-STD-498 to the Grand Design program strategy.

BUILD 1: Establish system and software requirements and install software implementing a subset of those requirements at user sites



BUILD 2: Install the completed software at user sites and transition the software to the software support agency

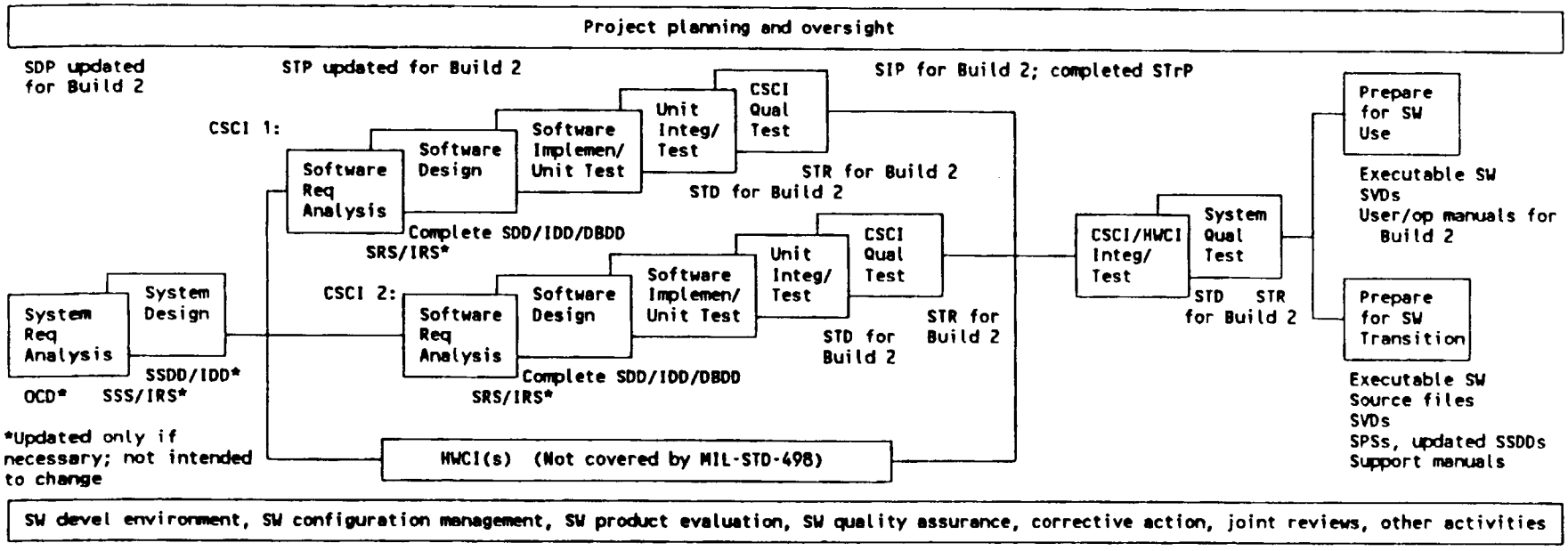


FIGURE 10. One possible way of applying MIL-STD-498 to the Incremental program strategy.

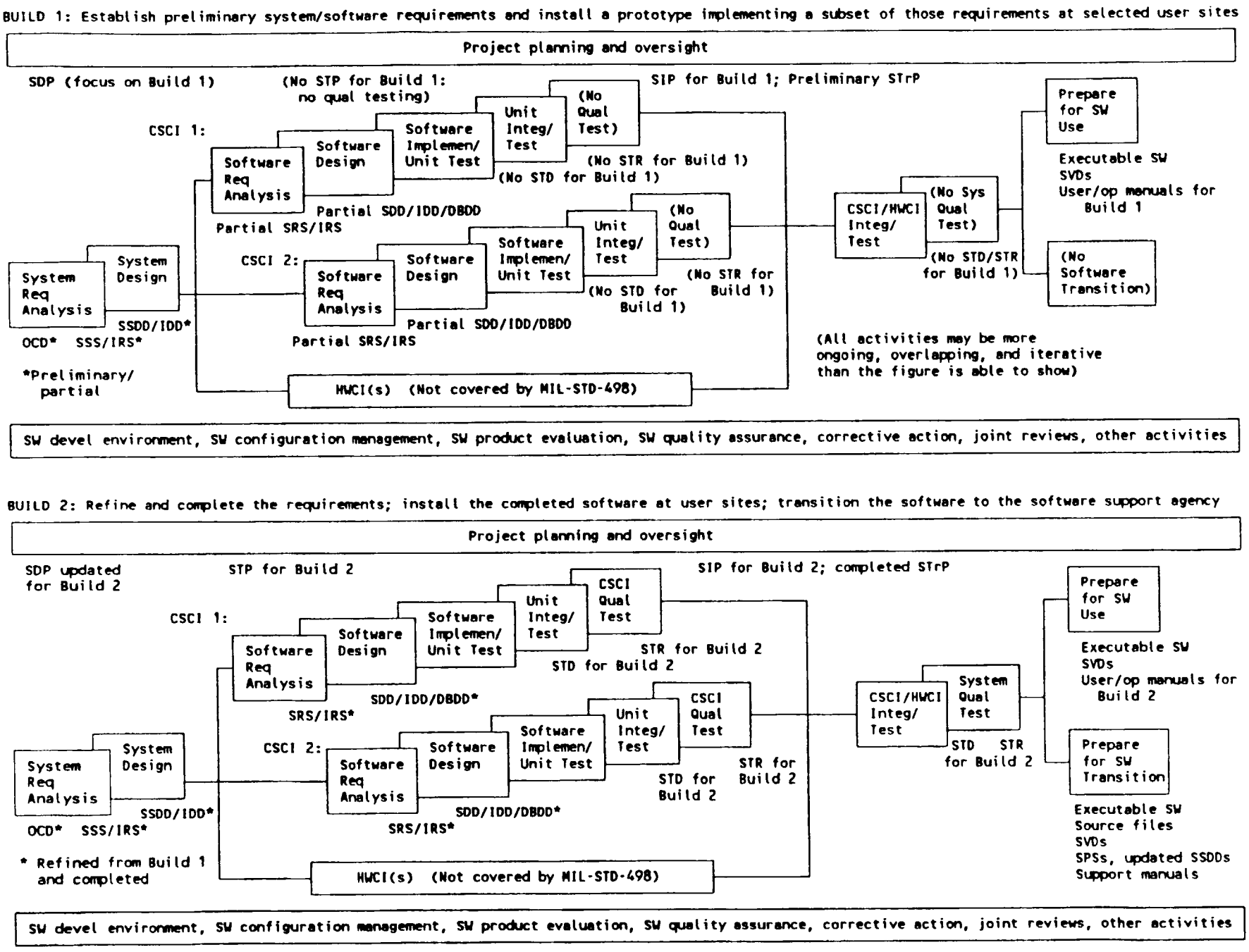


FIGURE 11. One possible way of applying MIL-STD-498 to the Evolutionary program strategy.

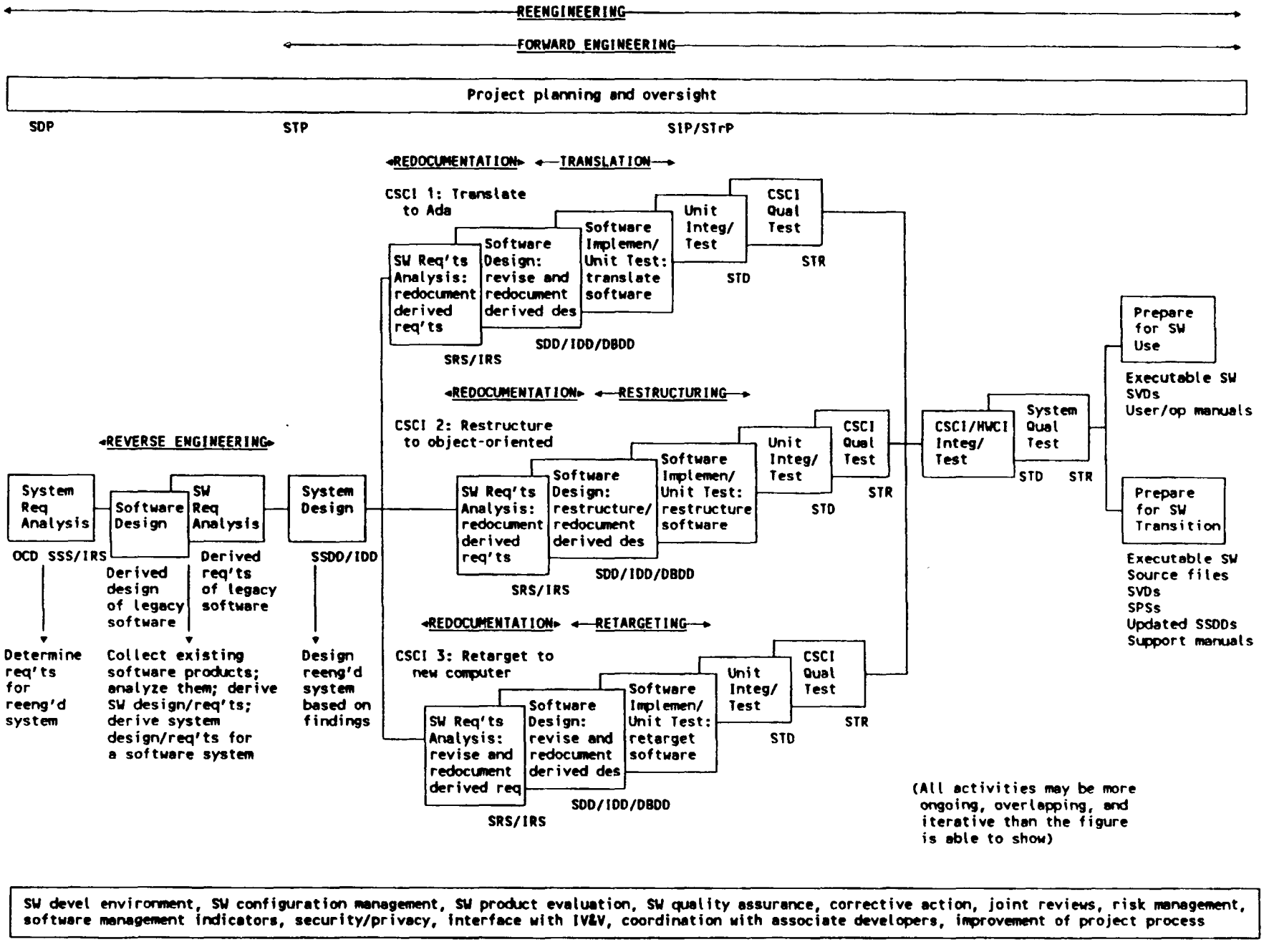


FIGURE 12. One possible way of applying MIL-STD-498 to a reengineering project.

BUILD PLANNING WORKSHEET		Build			
		1	2	3	4
1. Identify at right the objectives of each build 2. Indicate below which activities are to be accomplished during the development of each build. Add clarifying notes as needed.		Deliver to selected users an operational prototype that meets the following system-level requirements: SSS-1, SSS-5, ... SSS-1250	Deliver to selected users an operational prototype that meets the requirements of Build 1 plus: SSS-2, SSS-3, SSS-15, ..., SSS-1249	Deliver to all users a tested system that meets the requirements of Builds 1 and 2 plus: SSS-4, SSS-7, SSS-10, ..., SSS-1248	Deliver to all users a tested system that meets all system-level requirements; transition to designated support agency
Para	Activity				
5.1	PROJECT PLANNING AND OVERSIGHT				
5.1.1	Plan the software development effort	Yes: Plan Build 1 in detail; Builds 2-4 in general	Yes: Plan Build 2 in detail; Builds 3-4 in general	Yes: Plan Build 3 in detail; Build 4 in general	Yes: Plan Build 4 in detail
5.1.2	Plan for CSCI qualification testing	No: No CSCI qual testing in this build	No: No CSCI qual testing in this build	Yes: Plan for CSCI qual testing in this build	Yes: Update for CSCI qual testing in this build
5.1.3	Plan for system qualification testing	No: No system qual testing in this build	No: No system qual testing in this build	Yes: Plan for system qual testing in this build	Yes: Update for system qual testing in this build
5.1.4	Plan for installing software at user sites	No: Let users install on their own	No: Let users install on their own	Yes: Plan to install at user sites	Yes: Update as needed for installation of Bld 4
5.1.5	Plan for transitioning software to the support agency	Yes: Very preliminary planning only	Yes: Update preliminary plans	Yes: Update preliminary plans	Yes: Finalize transition planning
5.1.6	Follow plans; perform management review	Yes: For those plans that are in effect	Yes: For those plans that are in effect	Yes: For those plans that are in effect	Yes: For those plans that are in effect
5.2	ESTABLISHING A SOFTWARE DEVEL ENVIRONMENT				
5.2.1	Establish a software engineering environment	Yes: As needed for Build 1	Yes: Update as needed for Build 2	Yes: Update as needed for Build 3	Yes: Update as needed for Build 4
5.2.2	Establish a software test environment	Yes: As needed for Build 1 testing	Yes: As needed for Build 2 testing	Yes: Set up fully for Build 3 qualification testing	Yes: Update as needed for Build 4 qualification testing

FIGURE 13. Example of build planning for a MIL-STD-498 project.

a. Different decisions will apply to different types of software on a project. These differences can be shown within the entries of one worksheet or by using different worksheets for different types of software on a project.

b. If early builds are devoted to experimentation, developing "throw-away" software to arrive at a system concept or system requirements, it may be appropriate to forgo certain formalities, such as coding standards, that will be imposed later on the "real" software. If the early software will be used later, such formalities may be appropriate from the start. These decisions are project-dependent.

G.6.3 Recording tailoring decisions. Tailoring decisions made by the acquirer before the project begins are specified in the Statement of Work. Tailoring proposed by the developer may be communicated via feedback on draft solicitations, proposals written in response to solicitations, the software development plan, joint reviews during the project, or by other means of communication. Refinements to the tailoring decisions may be ongoing as the project proceeds. Those involving contractual changes should be handled accordingly.

G.6.4 Scheduling the selected activities in each build. Another important step in build planning is scheduling the activities in each build. As with tailoring, the acquirer may set forth general milestones and have the developer provide specifics or may provide specific schedules. The following guidelines apply:

a. A common mistake is to treat all CSCIs as though they must be developed in "lock-step," reaching key milestones at the same time. Allowing CSCIs to be on different schedules can result in more optimum development.

b. A similar mistake is to treat software units as though they must be developed in "lock-step," all designed by a certain date, implemented by a certain date, etc. Flexibility in the scheduling of software units can also be effective.

c. The activities in MIL-STD-498 need not be performed sequentially. Several may be taking place at one time, and an activity may be performed continually or intermittently throughout a build or over multiple builds. The activities in each build should be laid out in the manner that best suits the work to be done.

APPENDIX H

GUIDANCE ON ORDERING DELIVERABLES

H.1 Scope. This appendix provides guidance to the acquirer on the deliverables to be required on a software development project. This appendix is not a mandatory part of this standard. The information provided is intended for guidance only.

H.2 Applicable documents. This section is not applicable to this appendix.

H.3 Ordering deliverables. MIL-STD-498 has been worded to differentiate between the planning/engineering activities that make up a software development project and the generation of deliverables. A key objective of this wording is to eliminate the notion that the acquirer must order a given deliverable in order to have planning or engineering work take place. Under MIL-STD-498, the planning and engineering work takes place regardless of which deliverables are ordered, unless a given activity is tailored out of the standard. In addition, joint technical reviews have been included to review the results of that work in its natural form, without the generation of deliverables. Deliverables should be ordered only when there is a genuine need to have planning or engineering information transformed into a deliverable, recognizing that this transformation requires time and effort that would otherwise be spent on the engineering effort. Block 3 of each DID provides information helpful in deciding whether the corresponding deliverable should be ordered.

H.4 Scheduling deliverables. MIL-STD-498 has been structured to support a variety of program strategies and to provide the developer flexibility in laying out a software development process that will best suit the work to be done. All of this flexibility can be canceled by rigid scheduling of deliverables on the CDRL. If the CDRL lays out a strict "waterfall" sequence of deliverables, little room is left to propose innovative development processes. If the CDRL forces all CSCIs into lock-step with each other, little room is left to develop the CSCIs in an optimum order. To the maximum extent possible, the CDRL should avoid such pre-determination, leaving the door open for incremental delivery of software products, staggered development of CSCIs, and other variations to optimize the software development effort. The developer's software development plan will lay out a proposed schedule that meets the constraints in the CDRL. Final agreement on scheduling can take place at that time.

H.5 Format of deliverables. Traditional deliverables take the form of paper documents exactly following DID formats. While this form works well for some deliverables, it is not the only form, and alternatives should be considered. One variation from paper documents is word processing files containing those documents. This format saves paper, but still requires the developer to format the information as required by the DID. Another variation is specifying that a paper or word processor document is to include all DID contents but may be in the developer's format. Yet another variation is allowing deliverables to take forms that are not traditional documents at all, such as data in computer-aided software engineering (CASE) tools. These variations in required format can be specified on the CDRL, minimizing the time spent transforming actual work products into deliverables.

H.6 Tailoring the DIDs. Tailoring the DIDs consists of deleting requirements for unneeded information and making other changes that do not increase the required workload, such as combining two documents under one cover. DID tailoring for deliverables is specified in Block 16 of the CDRL.

APPENDIX I

CONVERSION GUIDE FROM DOD-STD-2167A AND DOD-STD-7935A

I.1 Scope. This appendix provides a conversion guide from DOD-STD-2167A and DOD-STD-7935A, the two standards that were merged to form MIL-STD-498. It maps key terms from each of these standards to their counterparts in MIL-STD-498 and shows the relationship of the DIDs required by these standards to their counterparts in MIL-STD-498. This appendix is not a mandatory part of the standard. The information provided is intended for guidance only.

I.2 Applicable documents. This appendix references the following standards, both of which are superseded by this standard:

a. DOD-STD-2167A, Defense System Software Development, 29 February 1988

b. DOD-STD-7935A, DoD Automated Information System Documentation Standards, 31 October 1988

I.3 Mapping of key terms. Figure 14 identifies selected terms in MIL-STD-498 and states their counterparts in DOD-STD-2167A and DOD-STD-7935A.

MIL-STD-498 Term	DOD-STD-2167A Counterpart	DOD-STD-7935A Counterpart
Acquirer	Contracting agency	User Group (no distinction made between acquirer and user roles)
Developer	Contractor (covers Government agency or contractor)	Development Group (covers Government agency or contractor)
Implementation	Coding	Development, production, coding, database generation
Installation (at user sites)	Deployment	Deployment, implementation, installation
Software unit	Computer software component and computer software unit	Software unit
Computer Software Configuration Item (CSCI)	Computer Software Configuration Item (CSCI)	Program, computer program
Software support	Software support	Software maintenance
Software system (consisting of software and possibly computers)	System (No specific term used to distinguish this type of system)	Automated Information System, system
Hardware-software system (where the hardware may be other than computers)	System (No specific term used to distinguish this type of system)	(This type of system not covered by DOD-STD-7935A)

FIGURE 14. Mapping of key terms.

I.4 Mapping of DIDs. Figure 15 identifies the DOD-STD-7935A DIDs and tells which MIL-STD-498 DIDs contain their contents. Figure 16 provides a similar mapping from the DOD-STD-2167A DIDs to the MIL-STD-498 DIDs. Figure 17 provides the reverse mapping, identifying the MIL-STD-498 DIDs and telling which DOD-STD-2167A and/or DOD-STD-7935A DIDs formed the basis for each.

DOD-STD-7935A DID	Incorporated into These MIL-STD-498 DIDs
Functional Description (FD)	System concepts into Operational Concept Description (OCD) System requirements into System/Subsystem Specification (SSS) Development planning into Software Development Plan (SDP)
System/Subsystem Specification (SS)	System requirements into System/Subsystem Specification (SSS) System design into System/Subsystem Design Description (SSDD)
Software Unit Specification (US)	Requirement information into Software Requirements Specification (SRS) and Interface Requirements Specification (IRS) Design information into Software Design Description (SDD) and Interface Design Description (IDD)
Database Specification (DS)	Database Design Description (DBDD)
Test Plan (PT)	High-level planning into Software Test Plan (STP) Detailed planning into Software Test Description (STD)
Test Analysis Report (RT)	Software Test Report (STR)
Users Manual (UM)	Software Input/Output Manual (SIOM)
End User Manual (EM)	Software User Manual (SUM)
Computer Operation Manual (OM)	Software Center Operator Manual (SCOM)
Maintenance Manual (MM)	Planning information into Software Transition Plan (STrP) Software description into Software Design Description (SDD) Maintenance procedures into Software Product Specification (SPS)
Implementation Procedures (IP)	Software Installation Plan (SIP)

FIGURE 15. Mapping of DOD-STD-7935A DIDs to MIL-STD-498 DIDs.

DOD-STD-2167A DID	Incorporated into These MIL-STD-498 DIDs
Software Development Plan (SDP)	Software Development Plan (SDP)
System/Segment Specification (SSS)	System/Subsystem Specification (SSS)
System/Segment Design Document (SSDD)	Operational concept into Operational Concept Description (OCD) System design into System/Subsystem Design Description (SSDD)
Software Requirements Specification (SRS)	Software Requirements Specification (SRS)
Interface Requirements Specification (IRS)	Interface Requirements Specification (IRS)
Software Design Document (SDD)	Software Design Description (SDD)
Interface Design Document (IDD)	Interface Design Description (IDD)
Software Test Plan (STP)	Software Test Plan (STP)
Software Test Description (STD)	Software Test Description (STD)
Software Test Report (STR)	Software Test Report (STR)
Computer System Operator's Manual (CSOM)	Computer Operation Manual (COM)
Software User's Manual (SUM)	Software User Manual (SUM)
Computer Resources Integrated Support Document (CRISD)	Planning information into Software Transition Plan (STrP) Modification procedures into Software Product Specification (SPS)
Software Product Specification (SPS)	Software Product Specification (SPS)
Software Programmer's Manual (SPM)	Computer Programming Manual (CPM)
Firmware Support Manual (FSM)	Firmware Support Manual (FSM)
Version Description Document (VDD)	Software Version Description (SVD)

FIGURE 16. Mapping of DOD-STD-2167A DIDs to MIL-STD-498 DIDs.

MIL-STD-498 DID	DOD-STD-2167A and DOD-STD-7935A Source DIDs
Software Development Plan (SDP)	2167A Software Development Plan (SDP) 7935A Functional Description (FD), section 7
Software Installation Plan (SIP)	7935A Implementation Procedures (IP)
Software Transition Plan (STrP)	2167A Comp Res Integ Sup Doc (CRISD) - planning info 7935A Maintenance Manual (MM) - planning info
Operational Concept Description (OCD)	2167A System/Segment Design Doc (SSDD), section 3 7935A Functional Description (FD), section 2
System/Subsystem Specification (SSS)	2167A System/Segment Specification (SSS) 7935A Functional Description (FD) - system req't info 7935A System/Subsystem Spec (SS) - system req't info
System/Subsystem Design Description (SSDD)	2167A System/Segment Design Document (SSDD) 7935A System/Subsystem Spec - system design info
Software Requirements Specification (SRS)	2167A Software Requirements Specification (SRS) 7935A Software Unit Specification (US) - req't info
Interface Requirements Specification (IRS)	2167A Interface Requirements Specification (IRS) 7935A SW Unit Specification (US) - interface req't info
Software Design Description (SDD)	2167A Software Design Document (SDD) 7935A Software Unit Specification (US) - design info 7935A Maintenance Manual (MM) - "as built" design info
Interface Design Description (IDD)	2167A Interface Design Document (IDD) 7935A SW Unit Specification (US) - interface design info
Database Design Description (DBDD)	7935A Database Specification (DS)
Software Test Plan (STP)	2167A Software Test Plan (STP) 7935A Test Plan (PT) - high-level information
Software Test Description (STD)	2167A Software Test Description (STD) 7935A Test Plan (PT) - detailed information
Software Test Report (STR)	2167A Software Test Report (STR) 7935A Test Analysis Report (RT)
Software Product Specification (SPS)	2167A Software Product Specification (SPS) 2167A CRISD - modification procedures 7935A MM - maintenance procedures
Software Version Description (SVD)	2167A Version Description Document (VDD)
Software User Manual (SUM)	2167A Software User's Manual (SUM) 7935A End User Manual (EM)
Software Center Operator Manual (SCOM)	7935A Computer Operation Manual (OM)
Software Input/Output Manual (SIOM)	7935A Users Manual (UM)
Computer Operation Manual (COM)	2167A Computer System Operator's Manual (CSOM)
Computer Programming Manual (CPM)	2167A Software Programmer's Manual (SPM)
Firmware Support Manual (FSM)	2167A Firmware Support Manual (FSM)

FIGURE 17. Mapping of MIL-STD-498 DIDs to DOD-STD-2167A and DOD-STD-7935A DIDs.

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This index covers both MIL-STD-498 and its DIDs. Paragraphs in the DIDs are indicated by the DID acronym followed by paragraph numbers; an overall DID is indicated by the DID acronym alone; paragraphs and figures in the standard have no preceding acronym. DID references that begin with "10.1" refer to paragraphs in Block 10, section 10.1 of the DID (General Instructions). All other DID references that do not cite a Block number refer to paragraphs in Block 10, section 10.2 of the DID (Content Requirements). Entries in bold indicate primary sources of information about a topic. The entry "et al" indicates that a topic (such as "software") appears too frequently to cite all references.

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Navy - EC
Air Force - 10
DISA - DC
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Review Activities:
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Navy - AS, SH, SA, TD, OM, MC
Air Force - 02, 06, 11, 13, 17, 19
DMA - MP
DNA - DS
NSA - NS

Civil Agency coordinating activities:
NASA - NA
DOT - FAA, USCG
COM - NIST
CIA

Other DoD activities:
DSMC
SEI

Agencies other than US Government:
DND Canada
MoD Germany
MoD UK
US Industry - CODSIA

Preparing Activity:
Navy - EC

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2. DOCUMENT DATE (YYMMDD): 941205

3. DOCUMENT TITLE: Software Development and Documentation

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) AUTOVON
(If applicable)

7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

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Space & Naval Warfare Systems Command

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IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
Telephone (703)756-2340 AUTOVON 289-2340

Data Item

Descriptions (DIDs)

for

MIL-STD-498

DATA ITEM DESCRIPTION

Form Approved
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Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
COMPUTER OPERATION MANUAL (COM)	DI-IPSC-81446

3. DESCRIPTION/PURPOSE

3.1 The Computer Operation Manual (COM) provides information needed to operate a given computer and its peripheral equipment. This manual focuses on the computer itself, not on particular software that will run on the computer.

3.2 The COM is intended for newly developed computers, special-purpose computers, or other computers for which commercial or other operation manuals are not readily available.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record information needed to operate the computer(s) on which software will run.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80018A and DI-MCCR-80316.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7089

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain the manufacturer's name, model number, and any other identifying information for the computer system to which this COM applies.

1.2 Computer system overview. This paragraph shall briefly state the purpose of the computer system to which this COM applies.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Computer system operation. This section shall be divided into the following paragraphs. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

3.1 Computer system preparation and shutdown. This paragraph shall be divided into the following subparagraphs.

3.1.1 Power on and off. This paragraph shall contain the procedures necessary to power-on and power-off the computer system.

3.1.2 Initiation. This paragraph shall contain the procedures necessary to initiate operation of the computer system, including, as applicable, equipment setup, pre-operation, bootstrapping, and commands typically used during computer system initiation.

3.1.3 Shutdown. This paragraph shall contain the procedures necessary to terminate computer system operation.

3.2 Operating procedures. This paragraph shall be divided into the following subparagraphs. If more than one mode of operation is available, instructions for each mode shall be provided.

3.2.1 Input and output procedures. This paragraph shall describe the input and output media (e.g., magnetic disk, tape) relevant to the computer system, state the procedures to read and write on these media, briefly describe the operating system control language, and list procedures for interactive messages and replies (e.g, terminals to use, passwords, keys).

3.2.2 Monitoring procedures. This paragraph shall contain the procedures to be followed for monitoring the computer system in operation. It shall describe available indicators, interpretation of those indicators, and routine and special monitoring procedures to be followed.

3.2.3 Off-line procedures. This paragraph shall contain the procedures necessary to operate all relevant off-line equipment of the computer system.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.2.4 Other procedures. This paragraph shall contain any additional procedures to be followed by the operator (e.g., computer system alarms, computer system security or privacy considerations, switch over to a redundant computer system, or other measures to ensure continuity of operations in the event of emergencies).

3.3 Problem-handling procedures. This paragraph shall identify problems that may occur in any step of operation described in the preceding paragraphs in Section 3. It shall state the error messages or other indications accompanying those problems and shall describe the automatic and manual procedures to be followed for each occurrence, including, as applicable, evaluation techniques, conditions requiring computer system shutdown, procedures for on-line intervention or abort, steps to be taken to restart computer system operation after an abort or interruption of operation, and procedures for recording information concerning a malfunction.

4. Diagnostic features. This section shall be divided into the following paragraphs to describe diagnostics that may be performed to identify and troubleshoot malfunctions in the computer system.

4.1 Diagnostic features summary. This paragraph shall summarize the diagnostic features of the computer system, including error message syntax and hierarchy for fault isolation. This paragraph shall describe the purpose of each diagnostic feature.

4.2 Diagnostic procedures. This paragraph shall be divided into subparagraphs as needed to describe the diagnostic procedures to be followed for the computer system, including:

a. Identification of hardware, software, or firmware necessary for executing each procedure

b. Step-by-step instructions for executing each procedure

c. Diagnostic messages and the corresponding required action

4.3 Diagnostic tools. This paragraph shall be divided into subparagraphs as needed to describe the diagnostics tools available for the computer system. These tools may be hardware, software, or firmware. This paragraph shall identify each tool by name and number and shall describe the tool and its application.

5. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

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1. TITLE	2. IDENTIFICATION NUMBER
COMPUTER PROGRAMMING MANUAL (CPM)	DI-IPSC-81447

3. DESCRIPTION/PURPOSE

3.1 The Computer Programming Manual (CPM) provides information needed by a programmer to understand how to program a given computer. This manual focuses on the computer itself, not on particular software that will run on the computer.

3.2 The CPM is intended for newly developed computers, special-purpose computers, or other computers for which commercial or other programming manuals are not readily available.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record informaton needed to program the computer(s) on which software was developed or on which it will run.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80021A.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7090

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain the manufacturer's name, model number, and any other identifying information for the computer system to which this document applies.

1.2 Computer system overview. This paragraph shall briefly state the purpose of the computer system to which this document applies.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Programming environment. This section shall be divided into paragraphs as appropriate to provide the following information.

a. The components and configuration of the computer system

b. Operating characteristics, capabilities, and limitations, including, as applicable:
   1) Machine cycle time
   2) Word length
   3) Memory capacity and characteristics
   4) Instruction set characteristics
   5) Interrupt capabilities
   6) Modes of operation (e.g., batch, interactive, privileged, non-privileged)
   7) Operational registers
   8) Error indicators
   9) Input/output characteristics
   10) Special features

c. Description of the equipment (e.g., tapes, disks, other peripheral equipment) necessary to perform compilations and assemblies on the computer system. Identify (as applicable) by name and version number the editor, linker, link-editor, compiler, assembler, cross-compilers, cross-assemblers, and other utilities used, and reference appropriate manuals describing their use. Highlight any special flags or instructions necessary for loading, executing, or recording the results.

4. Programming information. This section shall be divided into paragraphs as appropriate to provide the following information.

a. Description of the programming features of the computer's instruction set architecture, including, as applicable:
   1) Data representation (e.g., byte, word, integer, floating-point, double precision)
   2) Instruction formats and addressing modes
   3) Special registers and words (e.g., stack pointer, program counter)
   4) Control instructions (e.g., branch, jump, subroutine and procedure call instructions, privileged instructions, and the modes they operate in)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5) Subroutines and procedures (e.g., non-reentrant, reentrant, macrocode routines, argument lists, parameter passing conventions)
6) Interrupt processing
7) Timers and clocks
8) Memory protection features (e.g., read-only memory)
9) Additional features, such as instruction or data cache architecture

b. Description of each instruction, including, as applicable:
1) Use
2) Syntax
3) Condition codes set
4) Execution time
5) Machine-code format
6) Mnemonic conventions
7) Other characteristics

c. Description of input and output control programming, including, as applicable:
1) Initial loading and verification of computer memory
2) Serial and parallel data channels
3) Discrete inputs and outputs
4) Interface components
5) Device numbers, operational codes, and memory locations for peripheral equipment

d. Additional, restricted, or special programming techniques associated with the computer system (e.g., a concise description of the microprogram control section)

e. Examples that demonstrate the programming features described above, including examples of the proper use of all categories of instructions on the computer system

f. Error detection and diagnostic features associated with the computer system, including condition codes, overflow and addressing exception interrupts, and input and output error status indicators

5. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

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1. TITLE

DATABASE DESIGN DESCRIPTION (DBDD)

2. IDENTIFICATION NUMBER

DI-IPSC-81437

3. DESCRIPTION/PURPOSE

3.1 The Database Design Description (DBDD) describes the design of a database, that is, a collection of related data stored in one or more computerized files in a manner that can be accessed by users or computer programs via a database management system (DBMS). It can also describe the software units used to access or manipulate the data.

3.2 The DBDD is used as the basis for implementing the database and related software units. It provides the acquirer visibility into the design and provides information needed for software support.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the design of one or more databases.

7.3 Software units that access or manipulate the database may be described here or in Software Design Descriptions (SDDs) (DI-IPSC-81435). Interfaces may be described here or in Interface Design Descriptions (IDDs) (DI-IPSC-81436).

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-IPSC-80692 and DI-MCCR-80305.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7080

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the database to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 Database overview. This paragraph shall briefly state the purpose of the database to which this document applies. It shall describe the general nature of the database; summarize the history of its development, use, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Database-wide design decisions. This section shall be divided into paragraphs as needed to present database-wide design decisions, that is, decisions about the database's behavioral design (how it will behave, from a user's point of view, in meeting its requirements, ignoring internal implementation) and other decisions affecting further design of the database. If all such decisions are explicit in the system or CSCI requirements, this section shall so state. Design decisions that respond to requirements designated critical, such as those for safety, security, or privacy, shall be placed in separate subparagraphs. If a design decision depends upon system states or modes, this dependency shall be indicated. If some or all of the design decisions are described in the documentation of a custom or commercial database management system (DBMS), they may be referenced from this section. Design conventions needed to understand the design shall be presented or referenced. Examples of database-wide design decisions are the following:

a. Design decisions regarding queries or other inputs the database will accept and outputs (displays, reports, messages, responses, etc.) it will produce, including interfaces with other systems, HWCIs, CSCIs, and users (5.x.d of this DID identifies topics to be considered in this description). If part or all of this information is given in Interface Design Descriptions (IDDs), they may be referenced.

b. Design decisions on database behavior in response to each input or query, including actions, response times and other performance characteristics, selected equations/algorithms/rules, disposition, and handling of unallowed inputs

c. Design decisions on how databases/data files will appear to the user (4.x of this DID identifies topics to be considered in this description)

d. Design decisions on the database management system to be used (including name, version/release) and the type of flexibility to be built into the database for adapting to changing requirements

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

e. Design decisions on the levels and types of availability, security, privacy, and continuity of operations to be offered by the database

f. Design decisions on database distribution (such as client/server), master database file updates and maintenance, including maintaining consistency, establishing/ re-establishing and maintaining synchronization, enforcing integrity and business rules

g. Design decisions on backup and restoration including data and process distribution strategies, permissible actions during backup and restoration, and special considerations for new or non-standard technologies such as video and sound

h. Design decisions on repacking, sorting, indexing, synchronization, and consistency including automated disk management and space reclamation considerations, optimizing strategies and considerations, storage and size considerations, and population of the database and capture of legacy data

4. Detailed design of the database. This section shall be divided into paragraphs as needed to describe the detailed design of the database. The number of levels of design and the names of those levels shall be based on the design methodology used. Examples of database design levels include conceptual, internal, logical, and physical. If part or all of the design depends upon system states or modes, this dependency shall be indicated. Design conventions needed to understand the design shall be presented or referenced.

Note: This DID uses the term "data element assembly" to mean any entity, relation, schema, field, table, array, etc., that has structure (number/order/grouping of data elements) at a given design level (e.g., conceptual, internal, logical, physical) and the term "data element" to mean any relation, attribute, field, cell, data element, etc. that does not have structure at that level.

4.x (Name of database design level). This paragraph shall identify a database design level and shall describe the data elements and data element assemblies of the database in the terminology of the selected design method. The information shall include the following, as applicable, presented in any order suited to the information to be provided:

a. Characteristics of individual data elements in the database design, such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural-language) name
      c) DoD standard data element name
      d) Technical name (e.g., field name in the database)
      e) Abbreviation or synonymous names
   2) Data type (alphanumeric, integer, etc.)
   3) Size and format (such as length and punctuation of a character string)
   4) Units of measurement (such as meters, dollars, nanoseconds)
   5) Range or enumeration of possible values (such as 0-99)
   6) Accuracy (how correct) and precision (number of significant digits)

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply

8) Security and privacy constraints

9) Sources (setting/sending entities) and recipients (using/receiving entities)

b. Characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) in the database design, such as:

1) Names/identifiers

a) Project-unique identifier

b) Non-technical (natural language) name

c) Technical name (e.g., record or data structure name in code or database)

d) Abbreviations or synonymous names

2) Data elements in the assembly and their structure (number, order, grouping)

3) Medium (such as disk) and structure of data elements/assemblies on the medium

4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)

5) Relationships among assemblies, such as sorting/access characteristics

6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply

7) Security and privacy constraints

8) Sources (setting/sending entities) and recipients (using/receiving entities)

5. Detailed design of software units used for database access or manipulation. This section shall be divided into the following paragraphs to describe each software unit used for database access or manipulation. If part or all of this information is provided elsewhere, such as in a Software Design Description (SDD), the SDD for a customized DBMS, or the user manual of a commercial DBMS, that information may be referenced rather than repeated here. If part or all of the design depends upon system states or modes, this dependency shall be indicated. If design information falls into more than one paragraph, it may be presented once and referenced from the other paragraphs. Design conventions needed to understand the design shall be presented or referenced.

5.x (Project-unique identifier of a software unit, or designator for a group of software units). This paragraph shall identify a software unit by project-unique identifier and shall describe the unit. The description shall include the following information, as applicable. Alternatively, this paragraph may designate a group of software units and identify and describe the software units in subparagraphs. Software units that contain other software units may reference the descriptions of those units rather than repeating information.

a. Unit design decisions, if any, such as algorithms to be used, if not previously selected

b. Any constraints, limitations, or unusual features in the design of the software unit

c. The programming language to be used and rationale for its use if other than the specified CSCI language

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

d. If the software unit consists of or contains procedural commands (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts), a list of the procedural commands and a reference to user manuals or other documents that explain them

e. If the software unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements and data element assemblies, as applicable. Data local to the software unit shall be described separately from data input to or output from the software unit. Interface characteristics may be provided here or by referencing Interface Design Description(s). If a given interfacing entity is not covered by this DBDD (for example, an external system) but its interface characteristics need to be mentioned to describe software units that are, these characteristics shall be stated as assumptions or as "When [the entity not covered] does this, [the software unit] will...." This paragraph may reference other documents (such as data dictionaries, standards for protocols, and standards for user interfaces) in place of stating the information here. The design description shall include the following, as applicable, presented in any order suited to the information to be provided, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

1) Project-unique identifier for the interface

2) Identification of the interfacing entities (software units, configuration items, users, etc.) by name, number, version, and documentation references, as applicable

3) Priority assigned to the interface by the interfacing entity(ies)

4) Type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

5) Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc. Paragraph 4.x.a of this DID identifies topics to be covered in this description.

6) Characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the interfacing entity(ies) will provide, store, send, access, receive, etc. Paragraph 4.x.b of this DID identifies topics to be covered in this description.

7) Characteristics of communication methods that the interfacing entity(ies) will use for the interface, such as:

   a) Project-unique identifier(s)

   b) Communication links/bands/frequencies/media and their characteristics

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

c) Message formatting

d) Flow control (such as sequence numbering and buffer allocation)

e) Data transfer rate, whether periodic/aperiodic, and interval between transfers

f) Routing, addressing, and naming conventions

g) Transmission services, including priority and grade

h) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

8) Characteristics of protocols that the interfacing entity(ies) will use for the interface, such as:

a) Project-unique identifier(s)

b) Priority/layer of the protocol

c) Packeting, including fragmentation and reassembly, routing, and addressing

d) Legality checks, error control, and recovery procedures

e) Synchronization, including connection establishment, maintenance, termination

f) Status, identification, and any other reporting features

9) Other characteristics, such as physical compatibility of the interfacing entity(ies) (dimensions, tolerances, loads, voltages, plug compatibility, etc.)

f. If the software unit contains logic, the logic to be used by the software unit, including, as applicable:

1) Conditions in effect within the software unit when its execution is initiated

2) Conditions under which control is passed to other software units

3) Response and response time to each input, including data conversion, renaming, and data transfer operations

4) Sequence of operations and dynamically controlled sequencing during the software unit's operation, including:

a) The method for sequence control

b) The logic and input conditions of that method, such as timing variations, priority assignments

c) Data transfer in and out of memory

d) The sensing of discrete input signals, and timing relationships between interrupt operations within the software unit

5) Exception and error handling

6. Requirements traceability. This section shall contain:

a. Traceability from each database or other software unit covered by this DBDD to the system or CSCI requirements it addresses.

10. PREPARATION INSTRUCTIONS -- 10.2 Required Content (continued)

b. Traceability from each system or CSCI requirement that has been allocated to a database or other software unit covered in this DBDD to the database or other software units that address it.

7. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington , DC 20503

1. TITLE

FIRMWARE SUPPORT MANUAL (FSM)

2. IDENTIFICATION NUMBER

DI-IPSC-81448

3. DESCRIPTION/PURPOSE

3.1 The Firmware Support Manual (FSM) provides the information needed to program and reprogram the firmware devices of a system. It applies to read only memories (ROMs), Programmable ROMs (PROMs), Erasable PROMs (EPROMs), and other firmware devices.

3.2 The FSM describes the firmware devices and the equipment, software, and procedures needed to erase firmware devices, load software into the firmware devices, verify the load process, and mark the loaded firmware devices.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record information needed to program and reprogram firmware devices in which software will be installed.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80022A and DI-MCCR-80318.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7091

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system, software, and firmware devices to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s) of the system and software and manufacturer's name and model number for each firmware device.

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Firmware programming instructions. This section shall be divided into the following paragraphs.

3.x (Identifier of programmed firmware device). This paragraph shall state the project-unique identifier of a programmed firmware device to be used in the system and shall be divided into the following subparagraphs.

3.x.1 Description of pre-programmed device. This paragraph shall:

a. Identify by manufacturer's name and model number the firmware device to be programmed

b. Provide a complete physical description of the firmware device, including the following, as applicable:

   1) Memory size, type, speed, and configuration (such as 64Kx1, 8Kx8)
   2) Operating characteristics (such as access time, power requirements,logic levels)
   3) Pin functional descriptions
   4) Logical interfaces (such as addressing scheme, chip selection)
   5) Internal and external identification scheme used
   6) Timing diagrams

c. Describe the operational and environmental limits to which the firmware device may be subjected and still maintain satisfactory operation

3.x.2 Software to be programmed into the device. This paragraph shall identify by project-unique identifier(s) the software to be programmed into the firmware device.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.x.3 Programming equipment. This paragraph shall describe the equipment to be used for programming and reprogramming the firmware device. It shall include computer equipment, general purpose equipment, and special equipment to be used for device erasure, loading, verification, and marking, as applicable. Each piece of equipment shall be identified by manufacturer's name, model number, and any other information that is necessary to uniquely identify that piece of equipment. A description of each piece of equipment shall be provided, including its purpose, usage, and major capabilities.

3.x.4 Programming software. This paragraph shall describe the software to be used for programming and reprogramming the firmware device. It shall include software to be used for device erasure, loading, verification, and marking, as applicable. Each software item shall be identified by vendor's name, software name, number, version/release, and any other information necessary to uniquely identify the software item. A description of each software item shall be provided, including its purpose, usage, and major capabilities.

3.x.5 Programming procedures. This paragraph shall describe the procedures to be used for programming and reprogramming the firmware device. It shall include procedures to be used for device erasure, loading, verification, and marking, as applicable. All equipment and software necessary for each procedure shall be identified, together with any security and privacy measures to be applied.

3.x.6 Installation and repair procedures. This paragraph shall contain the installation, replacement, and repair procedures for the firmware device. This paragraph shall also include remove-and-replace procedures, device addressing scheme and implementation, description of the host board layout, and any procedures for ensuring continuity of operations in the event of emergencies. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

3.x.7 Vendor information. This section shall include or reference any relevant information supplied by the vendor(s) of the firmware device, programming equipment, or programming software.

4. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

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Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE
INTERFACE DESIGN DESCRIPTION (IDD)

2. IDENTIFICATION NUMBER
DI-IPSC-81436

3. DESCRIPTION/PURPOSE

3.1 The Interface Design Description (IDD) describes the interface characteristics of one or more systems, subsystems, Hardware Configuration Items (HWCIs), Computer Software Configuration Items (CSCIs), manual operations, or other system components. An IDD may describe any number of interfaces.

3.2 The IDD can be used to supplement the System/Subsystem Design Description (SSDD) (DI-IPSC-81432), Software Design Description (SDD) (DI-IPSC-81435), and Database Design Description (DBDD) (DI-IPSC-81437). The IDD and its companion Interface Requirements Specification (IRS) (DI-IPSC-81434) serve to communicate and control interface design decisions.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the interface design of one or more systems, subsystems, HWCIs, CSCIs, manual operations, or other system components.

7.3 The IRS specifies interface requirements; the IDD describes interface characteristics selected to meet those requirements. The IDD may reference the IRS to avoid repeating information. The IDD can be used to supplement the SSDD, SDD, or DBDD.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80027A.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7079

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier with signature blocks. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the systems, subsystems, or items to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; distribution statement; and signature blocks for the developer representative authorized to release the document, the acquirer representative authorized to approve the document, and the dates of release/approval. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system(s), the interfacing entities, and interfaces to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system(s) and software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Interface design. This section shall be divided into the following paragraphs to describe the interface characteristics of one or more systems, subsystems, configuration items, manual operations, or other system components. If part or all of the design depends upon system states or modes, this dependency shall be indicated. If design information falls into more than one paragraph, it may be presented once and referenced from the other paragraphs. If part or all of this information is documented elsewhere, it may be referenced. Design conventions needed to understand the design shall be presented or referenced.

3.1 Interface identification and diagrams. For each interface identified in 1.1, this paragraph shall state the project-unique identifier assigned to the interface and shall identify the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided, as appropriate, to depict the interfaces.

3.x (Project-unique identifier of interface). This paragraph (beginning with 3.2) shall identify an interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to describe the interface characteristics of one or both of the interfacing entities. If a given interfacing entity is not covered by this IDD (for example, an external system) but its interface characteristics need to be mentioned to describe interfacing entities that are, these characteristics shall be stated as assumptions or as "When [the entity not covered] does this, [the entity that is covered] will ...." This paragraph may reference other documents (such as data dictionaries, standards for protocols, and standards for user interfaces) in place of stating the information here. The design description shall include the following, as applicable, presented in any order suited to the information to be provided, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

a. Priority assigned to the interface by the interfacing entity(ies)

b. Type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural-language) name
      c) DoD standard data element name
      d) Technical name (e.g., variable or field name in code or database)
      e) Abbreviation or synonymous names
   2) Data type (alphanumeric, integer, etc.)
   3) Size and format (such as length and punctuation of a character string)
   4) Units of measurement (such as meters, dollars, nanoseconds)
   5) Range or enumeration of possible values (such as 0-99)
   6) Accuracy (how correct) and precision (number of significant digits)
   7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply
   8) Security and privacy constraints
   9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural language) name
      c) Technical name (e.g., record or data structure name in code or database)
      d) Abbreviations or synonymous names
   2) Data elements in the assembly and their structure (number, order, grouping)
   3) Medium (such as disk) and structure of data elements/assemblies on the medium
   4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)
   5) Relationships among assemblies, such as sorting/access characteristics
   6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply
   7) Security and privacy constraints
   8) Sources (setting/sending entities) and recipients (using/receiving entities)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Characteristics of communication methods that the interfacing entity(ies) will use for the interface, such as:

1) Project-unique identifier(s)
2) Communication links/bands/frequencies/media and their characteristics
3) Message formatting
4) Flow control (such as sequence numbering and buffer allocation)
5) Data transfer rate, whether periodic/aperiodic, and interval between transfers
6) Routing, addressing, and naming conventions
7) Transmission services, including priority and grade
8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Characteristics of protocols the interfacing entity(ies) will use for the interface, such as:

1) Project-unique identifier(s)
2) Priority/layer of the protocol
3) Packeting, including fragmentation and reassembly, routing, and addressing
4) Legality checks, error control, and recovery procedures
5) Synchronization, including connection establishment, maintenance, termination
6) Status, identification, and any other reporting features

g. Other characteristics, such as physical compatibility of the interfacing entity(ies) (dimensions, tolerances, loads, voltages, plug compatibility, etc.)

4. Requirements traceability. This paragraph shall contain:

a. Traceability from each interfacing entity covered by this IDD to the system or CSCI requirements addressed by the entity's interface design.

b. Traceability from each system or CSCI requirement that affects an interface covered in this IDD to the interfacing entities that address it.

5. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

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1. TITLE

INTERFACE REQUIREMENTS SPECIFICATION (IRS)

2. IDENTIFICATION NUMBER

DI-IPSC-81434

3. DESCRIPTION/PURPOSE

3.1 The Interface Requirements Specification (IRS) specifies the requirements imposed on one or more systems, subsystems, Hardware Configuration Items (HWCIs), Computer Software Configuration Items (CSCIs), manual operations, or other system components to achieve one or more interfaces among these entities. An IRS can cover any number of interfaces.

3.2 The IRS can be used to supplement the System/Subsystem Specification (SSS) (DI-IPSC-81431) and Software Requirements Specification (SRS) (DI-IPSC-81433) as the basis for design and qualification testing of systems and CSCIs.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
951205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the interface requirements for one or more systems, subsystem, HWCIs, CSCIs, manual operations, or other system components.

7.3 The IRS can be used to supplement the SSS and the SRS.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80026A and DI-MCCR-80303.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7077

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier with signature blocks. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the systems, subsystems, or items to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; distribution statement; and signature blocks for the developer representative authorized to release the document, the acquirer representative authorized to approve the document, and the dates of release/approval. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the systems, the interfacing entities, and the interfaces to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system(s) and software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this specification. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Requirements. This section shall be divided into the following paragraphs to specify the requirements imposed on one or more systems, subsystems, configuration items, manual operations, or other system components to achieve one or more interfaces among these entities. Each requirement shall be assigned a project-unique identifier to support testing and traceability and shall be stated in such a way that an objective test can be defined for it. Each requirement shall be annotated with associated qualification method(s) (see section 4) and traceability to system (or subsystem, if applicable) requirements (see section 5.a) if not provided in those sections. The degree of detail to be provided shall be guided by the following rule: Include those characteristics of the interfacing entities that are conditions for their acceptance; defer to design descriptions those characteristics that the acquirer is willing to leave up to the developer. If a given requirement fits into more than one paragraph, it may be stated once and referenced from the other paragraphs. If an interfacing entity included in this specification will operate in states and/or modes having interface requirements different from other states and modes, each requirement or group of requirements for that entity shall be correlated to the states and modes. The correlation may be indicated by a table or other method in this paragraph, in an appendix referenced from this paragraph, or by annotation of the requirements in the paragraphs where they appear.

3.1 Interface identification and diagrams. For each interface identified in 1.1, this paragraph shall include a project-unique identifier and shall designate the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided to depict the interfaces.

3.x (Project-unique identifier of interface). This paragraph (beginning with 3.2) shall identify an interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to state the requirements imposed on one or more

of the interfacing entities to achieve the interface. If the interface characteristics of an entity are not covered by this IRS but need to be mentioned to specify the requirements for entities that are, those characteristics shall be stated as assumptions or as "When [the entity not covered] does this, the [entity being specified] shall...," rather than as requirements on the entities not covered by this IRS. This paragraph may reference other documents (such as data dictionaries, standards for communication protocols, and standards for user interfaces) in place of stating the information here. The requirements shall include the following, as applicable, presented in any order suited to the requirements, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

a. Priority that the interfacing entity(ies) must assign the interface

b. Requirements on the type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Required characteristics of individual data elements that the interfacing entity(ies) must provide, store, send, access, receive, etc., such as:

   1) Names/identifiers

      a) Project-unique identifier

      b) Non-technical (natural-language) name

      c) DoD standard data element name

      d) Technical name (e.g., variable or field name in code or database)

      e) Abbreviation or synonymous names

   2) Data type (alphanumeric, integer, etc.)

   3) Size and format (such as length and punctuation of a character string)

   4) Units of measurement (such as meters, dollars, nanoseconds)

   5) Range or enumeration of possible values (such as 0-99)

   6) Accuracy (how correct) and precision (number of significant digits)

   7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply

   8) Security and privacy constraints

   9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Required characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the interfacing entity(ies) must provide, store, send, access, receive, etc., such as:

   1) Names/identifiers

      a) Project-unique identifier

      b) Non-technical (natural language) name

      c) Technical name (e.g., record or data structure name in code or database)

      d) Abbreviations or synonymous names

   2) Data elements in the assembly and their structure (number, order, grouping)

   3) Medium (such as disk) and structure of data elements/assemblies on the medium

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)
5) Relationships among assemblies, such as sorting/access characteristics
6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply
7) Security and privacy constraints
8) Sources (setting/sending entities) and recipients (using/receiving entities)

e. Required characteristics of communication methods that the interfacing entity(ies) must use for the interface, such as:
1) Project-unique identifier(s)
2) Communication links/bands/frequencies/media and their characteristics
3) Message formatting
4) Flow control (such as sequence numbering and buffer allocation)
5) Data transfer rate, whether periodic/aperiodic, and interval between transfers
6) Routing, addressing, and naming conventions
7) Transmission services, including priority and grade
8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Required characteristics of protocols the interfacing entity(ies) must use for the interface, such as:
1) Project-unique identifier(s)
2) Priority/layer of the protocol
3) Packeting, including fragmentation and reassembly, routing, and addressing
4) Legality checks, error control, and recovery procedures
5) Synchronization, including connection establishment, maintenance, termination
6) Status, identification, and any other reporting features

g. Other required characteristics, such as physical compatibility of the interfacing entities (dimensions, tolerances, loads, plug compatibility, etc.), voltages, etc.

3.y Precedence and criticality of requirements. This paragraph shall be numbered as the last paragraph in Section 3 and shall specify, if applicable, the order of precedence, criticality, or assigned weights indicating the relative importance of the requirements in this specification. Examples include identifying those requirements deemed critical to safety, to security, or to privacy for purposes of singling them out for special treatment. If all requirements have equal weight, this paragraph shall so state.

4. Qualification provisions. This section shall define a set of qualification methods and shall specify, for each requirement in Section 3, the qualification method(s) to be used to ensure that the requirement has been met. A table may be used to present this information, or each requirement in Section 3 may be annotated with the method(s) to be used. Qualification methods may include:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

a. Demonstration: The operation of interfacing entities that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.

b. Test: The operation of interfacing entities using instrumentation or special test equipment to collect data for later analysis.

c. Analysis: The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpretation, or extrapolation of test results.

d. Inspection: The visual examination of interfacing entities, documentation, etc.

e. Special qualification methods: Any special qualification methods for the interfacing entities, such as special tools, techniques, procedures, facilities, and acceptance limits.

5. Requirements traceability. For system-level interfacing entities, this paragraph does not apply. For each subsystem- or lower-level interfacing entity covered by this IRS, this paragraph shall contain:

a. Traceability from each requirement imposed on the entity in this specification to the system (or subsystem, if applicable) requirements it addresses. (Alternatively, this traceability may be provided by annotating each requirement in Section 3.)

Note: Each level of system refinement may result in requirements not directly traceable to higher-level requirements. For example, a system architectural design that creates multiple CSCIs may result in requirements about how the CSCIs will interface, even though these interfaces are not covered in system requirements. Such requirements may be traced to a general requirement such as "system implementation" or to the system design decisions that resulted in their generation.

b. Traceability from each system (or subsystem, if applicable) requirement that has been allocated to the interfacing entity and that affects an interface covered in this specification to the requirements in this specification that address it.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE
OPERATIONAL CONCEPT DESCRIPTION (OCD)

2. IDENTIFICATION NUMBER
DI-IPSC-81430

3. DESCRIPTION/PURPOSE

3.1 The Operational Concept Description (OCD) describes a proposed system in terms of the user needs it will fulfill, its relationship to existing systems or procedures, and the ways it will be used.

3.2 The OCD is used to obtain consensus among the acquirer, developer, support, and user agencies on the operational concept of a proposed system. Depending on its use, an OCD may focus on communicating the user's needs to the developer or the developer's ideas to the user and other interested parties. The term "system" may be interpreted to apply to a portion of a system.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the operational concept for a system.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-IPSC-80689.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7073

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system to which this document applies. It shall describe the general nature of the system; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Current system or situation. This section shall be divided into the following paragraphs to describe the system or situation as it currently exists.

3.1 Background, objectives, and scope. This paragraph shall describe the background, mission or objectives, and scope of the current system or situation.

3.2 Operational policies and constraints. This paragraph shall describe any operational policies and constraints that apply to the current system or situation.

3.3 Description of current system or situation. This paragraph shall provide a description of the current system or situation, identifying differences associated with different states or modes of operation (for example, regular, maintenance, training, degraded, emergency, alternative-site, wartime, peacetime). The distinction between states and modes is arbitrary. A system may be described in terms of states only, modes only, states within modes, modes within states, or any other scheme that is useful. If the system operates without states or modes, this paragraph shall so state, without the need to create artificial distinctions. The description shall include, as applicable:

a. The operational environment and its characteristics

b. Major system components and the interconnections among these components

c. Interfaces to external systems or procedures

d. Capabilities/functions of the current system

e. Charts and accompanying descriptions depicting inputs, outputs, data flow, and manual and automated processes sufficient to understand the current system or situation from the user's point of view

f. Performance characteristics, such as speed, throughput, volume, frequency

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

g. Quality attributes, such as reliability, maintainability, availability, flexibility, portability, usability, efficiency

h. Provisions for safety, security, privacy, and continuity of operations in emergencies

3.4 Users or involved personnel. This paragraph shall describe the types of users of the system, or personnel involved in the current situation, including, as applicable, organizational structures, training/skills, responsibilities, activities, and interactions with one another.

3.5 Support concept. This paragraph shall provide an overview of the support concept for the current system, including, as applicable to this document, support agency(ies); facilities; equipment; support software; repair/replacement criteria; maintenance levels and cycles; and storage, distribution, and supply methods.

4. Justification for and nature of changes. This section shall be divided into the following paragraphs.

4.1 Justification for change. This paragraph shall:

a. Describe new or modified aspects of user needs, threats, missions, objectives, environments, interfaces, personnel or other factors that require a new or modified system

b. Summarize deficiencies or limitations in the current system or situation that make it unable to respond to these factors

4.2 Description of needed changes. This paragraph shall summarize new or modified capabilities/functions, processes, interfaces, or other changes needed to respond to the factors identified in 4.1.

4.3 Priorities among the changes. This paragraph shall identify priorities among the needed changes. It shall, for example, identify each change as essential, desirable, or optional, and prioritize the desirable and optional changes.

4.4 Changes considered but not included. This paragraph shall identify changes considered but not included in 4.2, and rationale for not including them.

4.5 Assumptions and constraints. This paragraph shall identify any assumptions and constraints applicable to the changes identified in this section.

5. Concept for a new or modified system. This section shall be divided into the following paragraphs to describe a new or modified system.

5.1 Background, objectives, and scope. This paragraph shall describe the background, mission or objectives, and scope of the new or modified system.

5.2 Operational policies and constraints. This paragraph shall describe any operational policies and constraints that apply to the new or modified system.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.3 Description of the new or modified system. This paragraph shall provide a description of the new or modified system, identifying differences associated with different states or modes of operation (for example, regular, maintenance, training, degraded, emergency, alternative-site, wartime, peacetime). The distinction between states and modes is arbitrary. A system may be described in terms of states only, modes only, states within modes, modes within states, or any other scheme that is useful. If the system operates without states or modes, this paragraph shall so state, without the need to create artificial distinctions. The description shall include, as applicable:

a. The operational environment and its characteristics

b. Major system components and the interconnections among these components

c. Interfaces to external systems or procedures

d. Capabilities/functions of the new or modified system

e. Charts and accompanying descriptions depicting inputs, outputs, data flow, and manual and automated processes sufficient to understand the new or modified system or situation from the user's point of view

f. Performance characteristics, such as speed, throughput, volume, frequency

g. Quality attributes, such as reliability, maintainability, availability, flexibility, portability, usability, efficiency

h. Provisions for safety, security, privacy, and continuity of operations in emergencies

5.4 Users/affected personnel. This paragraph shall describe the types of users of the new or modified system, including, as applicable, organizational structures, training/skills, responsibilities, and interactions with one another.

5.5 Support concept. This paragraph shall provide an overview of the support concept for the new or modified system, including, as applicable, support agency(ies); facilities; equipment; support software; repair/replacement criteria; maintenance levels and cycles; and storage, distribution, and supply methods.

6. Operational scenarios. This section shall describe one or more operational scenarios that illustrate the role of the new or modified system, its interaction with users, its interface to other systems, and all states or modes identified for the system. The scenarios shall include events, actions, stimuli, information, interactions, etc., as applicable. Reference may be made to other media, such as videos, to provide part or all of this information.

7. Summary of impacts. This section shall be divided into the following paragraphs.

7.1 Operational impacts. This paragraph shall describe anticipated operational impacts on the user, acquirer, developer, and support agency(ies). These impacts may include changes in interfaces with computer operating centers; change in procedures; use of new data sources; changes in quantity, type, and timing of data to be input to the system; changes in data retention requirements; and new modes of operation based on peacetime, alert, wartime, or emergency conditions.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

7.2 Organizational impacts. This paragraph shall describe anticipated organizational impacts on the user, acquirer, developer, and support agency(ies). These impacts may include modification of responsibilities; addition or elimination of responsibilities or positions; need for training or retraining; and changes in number, skill levels, position identifiers, or location of personnel in various modes of operation.

7.3 Impacts during development. This paragraph shall describe anticipated impacts on the user, acquirer, developer, and support agency(ies) during the development effort. These impacts may include meetings/discussions regarding the new system; development or modification of databases; training; parallel operation of the new and existing systems; impacts during testing of the new system; and other activities needed to aid or monitor development.

8. Analysis of the proposed system.

8.1 Summary of advantages. This paragraph shall provide a qualitative and quantitative summary of the advantages to be obtained from the new or modified system. This summary shall include new capabilities, enhanced capabilities, and improved performance, as applicable, and their relationship to deficiencies identified in 4.1.

8.2 Summary of disadvantages/limitations. This paragraph shall provide a qualitative and quantitative summary of disadvantages or limitations of the new or modified system. These disadvantages and limitations shall include, as applicable, degraded or missing capabilities, degraded or less-than-desired performance, greater-than-desired use of computer hardware resources, undesirable operational impacts, conflicts with user assumptions, and other constraints.

8.3 Alternatives and trade-offs considered. This paragraph shall identify and describe major alternatives considered to the system or its characteristics, the trade-offs among them, and rationale for the decisions reached.

9. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE
SOFTWARE CENTER OPERATOR MANUAL (SCOM)

2. IDENTIFICATION NUMBER
DI-IPSC-81444

3. DESCRIPTION/PURPOSE

3.1 The Software Center Operator Manual (SCOM) provides personnel in a computer center or other centralized or networked software installation information on how to install and operate a software system.

3.2 The SCOM is developed for software systems that will be installed in a computer center or other centralized or networked software installation, with users accessing the system via terminals or personal computers or submitting and receiving inputs and outputs in batch or interactive mode.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record information needed by persons who will operate software in a computer center or other centralized or networked software installation, so that the software can be used by others.

7.3 This DID is often used with the Software Input/Output Manual (SIOM) (DI-IPSC-81445). This pair of manuals is an alternative to the Software User Manual (SUM) (DI-IPSC-81443).

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-IPSC-80695.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7087

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Software summary. This section shall be divided into the following paragraphs.

3.1 Software application. This paragraph shall provide a brief description of the intended uses of the software. Capabilities, operating improvements, and benefits expected from its use shall be described.

3.2 Software inventory. This paragraph shall identify all software files, including databases and data files, that must be installed for the software to operate. The identification shall include security and privacy considerations for each file and identification of the software necessary to continue or resume operation in case of an emergency.

3.3 Software environment. This paragraph shall identify the hardware, software, manual operations, and other resources needed to install and operate the software. Included, as applicable, shall be identification of:

a. Computer equipment that must be present, including amount of memory needed, amount of auxiliary storage needed, and peripheral equipment such as terminals, printers, and other input/output devices

b. Communications equipment that must be present

c. Other software that must be present, such as networking software, operating systems, databases, data files, utilities, permanent files that are referenced, created, or updated by the software; and databases/data files necessary to resume operation in the event of emergencies

d. Forms, procedures, or other manual operations that must be present

e. Other facilities, equipment, or resources that must be present

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.4 Software organization and overview of operation. This paragraph shall provide a brief description of the organization and operation of the software from the operator's point of view. The description shall include, as applicable:

a. Logical components of the software, from the operator's point of view, and an overview of the purpose/operation of each component

b. Types of inputs/access that can be made to the software and the software's response to each type

c. The reports and other outputs that are produced by the software, including security and privacy considerations for each

d. Typical run times and factors that affect it

e. Organization of software operation into runs. This description shall use a chart, if applicable, showing how the different operations are interrelated. If sets of runs are grouped by time periods or cycles, each set of integrated operations required on a daily, weekly, etc., basis shall be presented. If runs may be grouped logically by organizational level, the groups of runs that can be performed by each organizational level such as headquarters processing, field activity processing, etc., shall be presented.

f. Any system restrictions, waivers of operational standards, information oriented toward specific support areas (for example, library, small computer and teleprocessing support, interfaces with other systems), or other special aspects of processing

g. General description of the communications functions and processes of the software, including, as applicable, a diagram of the communications network used in the system

3.5 Contingencies and alternate states and modes of operation. This paragraph shall explain the differences in software operation at times of emergency and in various states and modes of operation, if applicable.

3.6 Security and privacy. This paragraph shall contain an overview of the security and privacy considerations associated with the software. A warning shall be included regarding making unauthorized copies of software or documents, if applicable.

3.7 Assistance and problem reporting. This paragraph shall identify points of contact and procedures to be followed to obtain assistance and report problems encountered in operating the software.

4. Installation and setup. This paragraph shall describe any procedures that the operator must perform to install the software on the equipment, to configure the software, to delete or overwrite former files or data, and to enter parameters for software operation. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5. Description of runs. This section shall be divided into the following paragraphs to provide a description of the runs to be performed. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

5.1 Run inventory. This paragraph shall provide a list of the runs to be performed, identifying the software and the jobs that make up each run. It shall include a brief summary of the purpose of each run and shall relate the list to the run descriptions included in the remainder of this section.

5.2 Phasing. This paragraph shall describe acceptable phasing of the software into a logical series of operations. A run may be phased to permit manual or semiautomatic checking of intermediate results, to provide the user with intermediate results for other purposes, or to permit a logical break if higher priority jobs are submitted. An example of the minimum division for most systems would be edit, file update, and report preparation.

5.3 Diagnostic procedures. This paragraph shall provide the setup and execution procedures for any software diagnostics. Included shall be procedures for validation and trouble shooting. All parameters (both input and output), codes, and range values for diagnostic software shall be explained.

5.4 Error messages. This paragraph shall list all error messages output by the software, along with the meaning and corresponding correction procedure for each message.

5.5 Description of each run. This paragraph shall be divided into the following subparagraphs.

5.5.x Run description for (run name or identifier). This paragraph shall identify a run and shall be divided into the following subparagraphs to describe the run.

5.5.x.1 Control inputs. This paragraph shall provide a listing of the run stream of job control statements needed to initiate the run.

5.5.x.2 Run management information. This paragraph shall provide the information needed to manage the run including, as applicable:

a. Peripheral and resource requirements
b. Security and privacy considerations
c. Method of initiation, such as on request, after another run, or at a predetermined time
d. Estimated run time
e. Required turnaround time
f. Messages and responses
g. Procedures for taking check points
h. Waivers from operational standards

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.5.x.3 Input-output files. This paragraph shall provide information about the files and databases that serve as input to or that are created or updated by the run. Included for each shall be information such as name, security and privacy, recording medium, retention schedule, and disposition.

5.5.x.4 Output reports. This paragraph shall provide information about the reports that are produced during the run. Included for each report shall be the following information, as applicable: report identifier, product control number, report control symbol, title, security and privacy, media (e.g., hard copy, magnetic tape), volume of report, number of copies, and distribution of copies.

5.5.x.5 Reproduced output reports. This paragraph shall provide information about computer-generated reports that are subsequently reproduced by other means. Included for each report shall be information such as report identification, security and privacy, reproduction technique, paper size, binding method, number of copies, and distribution of copies.

5.5.x.6 Procedures for restart/recovery and continuity of operations. This paragraph shall provide procedures to be followed by operator personnel concerning restart/recovery in the event of a system failure and for continuity of operations in the event of emergencies.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE DESIGN DESCRIPTION (SDD)	DI-IPSC-81435

3. DESCRIPTION/PURPOSE

3.1 The Software Design Description (SDD) describes the design of a Computer Software Configuration Item (CSCI). It describes the CSCI-wide design decisions, the CSCI architectural design, and the detailed design needed to implement the software. The SDD may be supplemented by Interface Design Descriptions (IDDs) (DI-IPSC-81436) and Database Design Descriptions (DBDDs) (DI-IPSC-81437) as described in Block 7 below.

3.2 The SDD, with its associated IDDs and DBDDs, is used as the basis for implementing the software. It provides the acquirer visibility into the design and provides information needed for software support.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the design of a CSCI.

7.3 Design pertaining to interfaces may be presented in the SDD or in IDDs. Design pertaining to databases may be presented in the SDD or in DBDDs.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80012A, DI-IPSC-80691, DI-MCCR-80304, and DI-MCCR-80306.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7078

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. CSCI-wide design decisions. This section shall be divided into paragraphs as needed to present CSCI-wide design decisions, that is, decisions about the CSCI's behavioral design (how it will behave, from a user's point of view, in meeting its requirements, ignoring internal implementation) and other decisions affecting the selection and design of the software units that make up the CSCI. If all such decisions are explicit in the CSCI requirements or are deferred to the design of the CSCI's software units, this section shall so state. Design decisions that respond to requirements designated critical, such as those for safety, security, or privacy, shall be placed in separate subparagraphs. If a design decision depends upon system states or modes, this dependency shall be indicated. Design conventions needed to understand the design shall be presented or referenced. Examples of CSCI-wide design decisions are the following:

a. Design decisions regarding inputs the CSCI will accept and outputs it will produce, including interfaces with other systems, HWCIs, CSCIs, and users (4.3.x of this DID identifies topics to be considered in this description). If part or all of this information is given in Interface Design Descriptions (IDDs), they may be referenced.

b. Design decisions on CSCI behavior in response to each input or condition, including actions the CSCI will perform, response times and other performance characteristics, description of physical systems modeled, selected equations/algorithms/rules, and handling of unallowed inputs or conditions.

c. Design decisions on how databases/data files will appear to the user (4.3.x of this DID identifies topics to be considered in this description). If part or all of this information is given in Database Design Descriptions (DBDDs), they may be referenced.

d. Selected approach to meeting safety, security, and privacy requirements.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Other CSCI-wide design decisions made in response to requirements, such as selected approach to providing required flexibility, availability, and maintainability.

4. CSCI architectural design. This section shall be divided into the following paragraphs to describe the CSCI architectural design. If part or all of the design depends upon system states or modes, this dependency shall be indicated. If design information falls into more than one paragraph, it may be presented once and referenced from the other paragraphs. Design conventions needed to understand the design shall be presented or referenced.

4.1 CSCI components. This paragraph shall:

a. Identify the software units that make up the CSCI. Each software unit shall be assigned a project-unique identifier.

Note: A software unit is an element in the design of a CSCI; for example, a major subdivision of a CSCI, a component of that subdivision, a class, object, module, function, routine, or database. Software units may occur at different levels of a hierarchy and may consist of other software units. Software units in the design may or may not have a one-to-one relationship with the code and data entities (routines, procedures, databases, data files, etc.) that implement them or with the computer files containing those entities. A database may be treated as a CSCI or as a software unit. The SDD may refer to software units by any name(s) consistent with the design methodology being used.

b. Show the static (such as "consists of") relationship(s) of the software units. Multiple relationships may be presented, depending on the selected software design methodology (for example, in an object-oriented design, this paragraph may present the class and object structures as well as the module and process architectures of the CSCI).

c. State the purpose of each software unit and identify the CSCI requirements and CSCI-wide design decisions allocated to it. (Alternatively, the allocation of requirements may be provided in 6.a.)

d. Identify each software unit's development status/type (such as new development, existing design or software to be reused as is, existing design or software to be reengineered, software to be developed for reuse, software planned for Build N, etc.) For existing design or software, the description shall provide identifying information, such as name, version, documentation references, library, etc.

e. Describe the CSCI's (and as applicable, each software unit's) planned utilization of computer hardware resources (such as processor capacity, memory capacity, input/output device capacity, auxiliary storage capacity, and communications/network equipment capacity). The description shall cover all computer hardware resources included in resource utilization requirements for the CSCI, in system-level resource allocations affecting the CSCI, and in resource utilization measurement planning in the Software Development Plan. If all utilization data for a given computer hardware resource are presented in a single location, such as in one SDD, this paragraph may reference that source. Included for each computer hardware resource shall be:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1) The CSCI requirements or system-level resource allocations being satisfied

2) The assumptions and conditions on which the utilization data are based (for example, typical usage, worst-case usage, assumption of certain events)

3) Any special considerations affecting the utilization (such as use of virtual memory, overlays, or multiprocessors or the impacts of operating system overhead, library software, or other implementation overhead)

4) The units of measure used (such as percentage of processor capacity, cycles per second, bytes of memory, kilobytes per second)

5) The level(s) at which the estimates or measures will be made (such as software unit, CSCI, or executable program)

f. Identify the program library in which the software that implements each software unit is to be placed

4.2 Concept of execution. This paragraph shall describe the concept of execution among the software units. It shall include diagrams and descriptions showing the dynamic relationship of the software units, that is, how they will interact during CSCI operation, including, as applicable, flow of execution control, data flow, dynamically controlled sequencing, state transition diagrams, timing diagrams, priorities among units, handling of interrupts, timing/sequencing relationships, exception handling, concurrent execution, dynamic allocation/deallocation, dynamic creation/deletion of objects, processes, tasks, and other aspects of dynamic behavior.

4.3 Interface design. This paragraph shall be divided into the following subparagraphs to describe the interface characteristics of the software units. It shall include both interfaces among the software units and their interfaces with external entities such as systems, configuration items, and users. If part or all of this information is contained in Interface Design Descriptions (IDDs), in section 5 of the SDD, or elsewhere, these sources may be referenced.

4.3.1 Interface identification and diagrams. This paragraph shall state the project-unique identifier assigned to each interface and shall identify the interfacing entities (software units, systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided, as appropriate, to depict the interfaces.

4.3.x (Project-unique identifier of interface). This paragraph (beginning with 4.3.2) shall identify an interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to describe the interface characteristics of one or both of the interfacing entities. If a given interfacing entity is not covered by this SDD (for example, an external system) but its interface characteristics need to be mentioned to describe interfacing entities that are, these characteristics shall be stated as assumptions or as "When [the entity not covered] does this, [the entity that is covered] will ...." This

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

paragraph may reference other documents (such as data dictionaries, standards for protocols, and standards for user interfaces) in place of stating the information here. The design description shall include the following, as applicable, presented in any order suited to the information to be provided, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

a. Priority assigned to the interface by the interfacing entity(ies)

b. Type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural-language) name
      c) DoD standard data element name
      d) Technical name (e.g., variable or field name in code or database)
      e) Abbreviation or synonymous names
   2) Data type (alphanumeric, integer, etc.)
   3) Size and format (such as length and punctuation of a character string)
   4) Units of measurement (such as meters, dollars, nanoseconds)
   5) Range or enumeration of possible values (such as 0-99)
   6) Accuracy (how correct) and precision (number of significant digits)
   7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply
   8) Security and privacy constraints
   9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural language) name
      c) Technical name (e.g., record or data structure name in code or database)
      d) Abbreviations or synonymous names
   2) Data elements in the assembly and their structure (number, order, grouping)
   3) Medium (such as disk) and structure of data elements/assemblies on the medium
   4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5) Relationships among assemblies, such as sorting/access characteristics
6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply
7) Security and privacy constraints
8) Sources (setting/sending entities) and recipients (using/receiving entities)

e. Characteristics of communication methods that the interfacing entity(ies) will use for the interface, such as:
1) Project-unique identifier(s)
2) Communication links/bands/frequencies/media and their characteristics
3) Message formatting
4) Flow control (such as sequence numbering and buffer allocation)
5) Data transfer rate, whether periodic/aperiodic, and interval between transfers
6) Routing, addressing, and naming conventions
7) Transmission services, including priority and grade
8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Characteristics of protocols that the interfacing entity(ies) will use for the interface, such as:
1) Project-unique identifier(s)
2) Priority/layer of the protocol
3) Packeting, including fragmentation and reassembly, routing, and addressing
4) Legality checks, error control, and recovery procedures
5) Synchronization, including connection establishment, maintenance, termination
6) Status, identification, and any other reporting features

g. Other characteristics, such as physical compatibility of the interfacing entity(ies) (dimensions, tolerances, loads, voltages, plug compatibility, etc.)

5. CSCI detailed design. This section shall be divided into the following paragraphs to describe each software unit of the CSCI. If part of all of the design depends upon system states or modes, this dependency shall be indicated. If design information falls into more than one paragraph, it may be presented once and referenced from the other paragraphs. Design conventions needed to understand the design shall be presented or referenced. Interface characteristics of software units may be described here, in Section 4, or in Interface Design Descriptions (IDDs). Software units that are databases, or that are used to access or manipulate databases, may be described here or in Database Design Descriptions (DBDDs).

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.x (Project-unique identifier of a software unit, or designator of a group of software units). This paragraph shall identify a software unit by project-unique identifier and shall describe the unit. The description shall include the following information, as applicable. Alternatively, this paragraph may designate a group of software units and identify and describe the software units in subparagraphs. Software units that contain other software units may reference the descriptions of those units rather than repeating information.

a. Unit design decisions, if any, such as algorithms to be used, if not previously selected

b. Any constraints, limitations, or unusual features in the design of the software unit

c. The programming language to be used and rationale for its use if other than the specified CSCI language

d. If the software unit consists of or contains procedural commands (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts), a list of the procedural commands and reference to user manuals or other documents that explain them

e. If the software unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements and data element assemblies, as applicable. Paragraph 4.3.x of this DID provides a list of topics to be covered, as applicable. Data local to the software unit shall be described separately from data input to or output from the software unit. If the software unit is a database, a corresponding Database Design Description (DBDD) shall be referenced; interface characteristics may be provided here or by referencing section 4 or the corresponding Interface Design Description(s).

f. If the software unit contains logic, the logic to be used by the software unit, including, as applicable:

    1) Conditions in effect within the software unit when its execution is initiated
    2) Conditions under which control is passed to other software units
    3) Response and response time to each input, including data conversion, renaming, and data transfer operations
    4) Sequence of operations and dynamically controlled sequencing during the software unit's operation, including:
        a) The method for sequence control
        b) The logic and input conditions of that method, such as timing variations, priority assignments
        c) Data transfer in and out of memory
        d) The sensing of discrete input signals, and timing relationships between interrupt operations within the software unit
    5) Exception and error handling

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

6. Requirements traceability. This section shall contain:

   a. Traceability from each software unit identified in this SDD to the CSCI requirements allocated to it. (Alternatively, this traceability may be provided in 4.1.)

   b. Traceability from each CSCI requirement to the software units to which it is allocated.

7. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE DEVELOPMENT PLAN (SDP)	DI-IPSC-81427

3. DESCRIPTION/PURPOSE

3.1 The Software Development Plan (SDP) describes a developer's plans for conducting a software development effort. The term "software development" in this DID is meant to include new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products.

3.2 The SDP provides the acquirer insight into, and a tool for monitoring, the processes to be followed for software development, the methods to be used, the approach to be followed for each activity, and project schedules, organization, and resources.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to develop and record plans for conducting software development activities.

7.3 Portions of this plan may be bound separately if this approach enhances their usability. Examples include plans for software configuration management and software quality assurance.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80030A, DI-MCCR-80297, DI-MCCR-80298, DI-MCCR-80299, DI-MCCR-80300, and DI-MCCR-80319.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7070

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents, including other project plans, may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

1.4 Relationship to other plans. This paragraph shall describe the relationship, if any, of the SDP to other project management plans.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this plan. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Overview of required work. This section shall be divided into paragraphs as needed to establish the context for the planning described in later sections. It shall include, as applicable, an overview of:

a. Requirements and constraints on the system and software to be developed
b. Requirements and constraints on project documentation
c. Position of the project in the system life cycle
d. The selected program/acquisition strategy or any requirements or constraints on it
e. Requirements and constraints on project schedules and resources
f. Other requirements and constraints, such as on project security, privacy, methods, standards, interdependencies in hardware and software development, etc.

4. Plans for performing general software development activities. This section shall be divided into the following paragraphs. Provisions corresponding to non-required activities may be satisfied by the words "Not applicable." If different builds or different software on the project require different planning, these differences shall be noted in the paragraphs. In addition to the content specified below, each paragraph shall identify applicable risks/uncertainties and plans for dealing with them.

4.1 Software development process. This paragraph shall describe the software development process to be used. The planning shall cover all contractual clauses concerning this topic, identifying planned builds, if applicable, their objectives, and the software development activities to be performed in each build.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.2 General plans for software development. This paragraph shall be divided into the following subparagraphs.

4.2.1 Software development methods. This paragraph shall describe or reference the software development methods to be used. Included shall be descriptions of the manual and automated tools and procedures to be used in support of these methods. The methods shall cover all contractual clauses concerning this topic. Reference may be made to other paragraphs in this plan if the methods are better described in context with the activities to which they will be applied.

4.2.2 Standards for software products. This paragraph shall describe or reference the standards to be followed for representing requirements, design, code, test cases, test procedures, and test results. The standards shall cover all contractual clauses concerning this topic. Reference may be made to other paragraphs in this plan if the standards are better described in context with the activities to which they will be applied. Standards for code shall be provided for each programming language to be used. They shall include at a minimum:

a. Standards for format (such as indentation, spacing, capitalization, and order of information)

b. Standards for header comments (requiring, for example, name/identifier of the code; version identification; modification history; purpose; requirements and design decisions implemented; notes on the processing (such as algorithms used, assumptions, constraints, limitations, and side effects); and notes on the data (inputs, outputs, variables, data structures, etc.)

c. Standards for other comments (such as required number and content expectations)

d. Naming conventions for variables, parameters, packages, procedures, files, etc.

e. Restrictions, if any, on the use of programming language constructs or features

f. Restrictions, if any, on the complexity of code aggregates

4.2.3 Reusable software products. This paragraph shall be divided into the following subparagraphs.

4.2.3.1 Incorporating reusable software products. This paragraph shall describe the approach to be followed for identifying, evaluating, and incorporating reusable software products, including the scope of the search for such products and the criteria to be used for their evaluation. It shall cover all contractual clauses concerning this topic. Candidate or selected reusable software products known at the time this plan is prepared or updated shall be identified and described, together with benefits, drawbacks, and restrictions, as applicable, associated with their use.

4.2.3.2 Developing reusable software products. This paragraph shall describe the approach to be followed for identifying, evaluating, and reporting opportunities for developing reusable software products. It shall cover all contractual clauses concerning this topic.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.2.4 Handling of critical requirements. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for handling requirements designated critical. The planning in each subparagraph shall cover all contractual clauses concerning the identified topic.

4.2.4.1 Safety assurance
4.2.4.2 Security assurance
4.2.4.3 Privacy assurance
4.2.4.4 Assurance of other critical requirements

4.2.5 Computer hardware resource utilization. This paragraph shall describe the approach to be followed for allocating computer hardware resources and monitoring their utilization. It shall cover all contractual clauses concerning this topic.

4.2.6 Recording rationale. This paragraph shall describe the approach to be followed for recording rationale that will be useful to the support agency for key decisions made on the project. It shall interpret the term "key decisions" for the project and state where the rationale are to be recorded. It shall cover all contractual clauses concerning this topic.

4.2.7 Access for acquirer review. This paragraph shall describe the approach to be followed for providing the acquirer or its authorized representative access to developer and subcontractor facilities for review of software products and activities. It shall cover all contractual clauses concerning this topic.

5. Plans for performing detailed software development activities. This section shall be divided into the following paragraphs. Provisions corresponding to non-required activities may be satisfied by the words "Not applicable." If different builds or different software on the project require different planning, these differences shall be noted in the paragraphs. The discussion of each activity shall include the approach (methods/procedures/tools) to be applied to: 1) the analysis or other technical tasks involved, 2) the recording of results, and 3) the preparation of associated deliverables, if applicable. The discussion shall also identify applicable risks/uncertainties and plans for dealing with them. Reference may be made to 4.2.1 if applicable methods are described there.

5.1 Project planning and oversight. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for project planning and oversight. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.1.1 Software development planning (covering updates to this plan)
5.1.2 CSCI test planning
5.1.3 System test planning
5.1.4 Software installation planning
5.1.5 Software transition planning
5.1.6 Following and updating plans, including the intervals for management review

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.2 Establishing a software development environment. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for establishing, controlling, and maintaining a software development environment. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.2.1 Software engineering environment
5.2.2 Software test environment
5.2.3 Software development library
5.2.4 Software development files
5.2.5 Non-deliverable software

5.3 System requirements analysis. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in system requirements analysis. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.3.1 Analysis of user input
5.3.2 Operational concept
5.3.3 System requirements

5.4 System design. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in system design. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.4.1 System-wide design decisions
5.4.2 System architectural design

5.5 Software requirements analysis. This paragraph shall describe the approach to be followed for software requirements analysis. The approach shall cover all contractual clauses concerning this topic.

5.6 Software design. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software design. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.6.1 CSCI-wide design decisions
5.6.2 CSCI architectural design
5.6.3 CSCI detailed design

5.7 Software implementation and unit testing. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software implementation and unit testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.7.1 Software implementation
5.7.2 Preparing for unit testing
5.7.3 Performing unit testing
5.7.4 Revision and retesting
5.7.5 Analyzing and recording unit test results

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.8 Unit integration and testing. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for unit integration and testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.8.1 Preparing for unit integration and testing
5.8.2 Performing unit integration and testing
5.8.3 Revision and retesting
5.8.4 Analyzing and recording unit integration and test results

5.9 CSCI qualification testing. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for CSCI qualification testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.9.1 Independence in CSCI qualification testing
5.9.2 Testing on the target computer system
5.9.3 Preparing for CSCI qualification testing
5.9.4 Dry run of CSCI qualification testing
5.9.5 Performing CSCI qualification testing
5.9.6 Revision and retesting
5.9.7 Analyzing and recording CSCI qualification test results

5.10 CSCI/HWCI integration and testing. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in CSCI/HWCI integration and testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.10.1 Preparing for CSCI/HWCI integration and testing
5.10.2 Performing CSCI/HWCI integration and testing
5.10.3 Revision and retesting
5.10.4 Analyzing and recording CSCI/HWCI integration and test results

5.11 System qualification testing. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in system qualification testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.11.1 Independence in system qualification testing
5.11.2 Testing on the target computer system
5.11.3 Preparing for system qualification testing
5.11.4 Dry run of system qualification testing
5.11.5 Performing system qualification testing
5.11.6 Revision and retesting
5.11.7 Analyzing and recording system qualification test results

5.12 Preparing for software use. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for preparing for software use. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.12.1 Preparing the executable software
5.12.2 Preparing version descriptions for user sites
5.12.3 Preparing user manuals
5.12.4 Installation at user sites

5.13 Preparing for software transition. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for preparing for software transition. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.13.1 Preparing the executable software
5.13.2 Preparing source files
5.13.3 Preparing version descriptions for the support site
5.13.4 Preparing the "as built" CSCI design and other software support information
5.13.5 Updating the system design description
5.13.6 Preparing support manuals
5.13.7 Transition to the designated support site

5.14 Software configuration management. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software configuration management. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.14.1 Configuration identification
5.14.2 Configuration control
5.14.3 Configuration status accounting
5.14.4 Configuration audits
5.14.5 Packaging, storage, handling, and delivery

5.15 Software product evaluation. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software product evaluation. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.15.1 In-process and final software product evaluations
5.15.2 Software product evaluation records, including items to be recorded
5.15.3 Independence in software product evaluation

5.16 Software quality assurance. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software quality assurance. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.16.1 Software quality assurance evaluations
5.16.2 Software quality assurance records, including items to be recorded
5.16.3 Independence in software quality assurance

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.17 Corrective action. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for corrective action. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.17.1 Problem/change reports, including items to be recorded (candidate items include project name, originator, problem number, problem name, software element or document affected, origination date, category and priority, description, analyst assigned to the problem, date assigned, date completed, analysis time, recommended solution, impacts, problem status, approval of solution, follow-up actions, corrector, correction date, version where corrected, correction time, description of solution implemented)

5.17.2 Corrective action system

5.18 Joint technical and management reviews. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for joint technical and management reviews. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.18.1 Joint technical reviews, including a proposed set of reviews
5.18.2 Joint management reviews, including a proposed set of reviews

5.19 Other software development activities. This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for other software development activities. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.19.1 Risk management, including known risks and corresponding strategies
5.19.2 Software management indicators, including indicators to be used
5.19.3 Security and privacy
5.19.4 Subcontractor management
5.19.5 Interface with software independent verification and validation (IV&V) agents
5.19.6 Coordination with associate developers
5.19.7 Improvement of project processes
5.19.8 Other activities not covered elsewhere in the plan

6. Schedules and activity network. This section shall present:

a. Schedule(s) identifying the activities in each build and showing initiation of each activity, availability of draft and final deliverables and other milestones, and completion of each activity

b. An activity network, depicting sequential relationships and dependencies among activities and identifying those activities that impose the greatest time restrictions on the project

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

7. Project organization and resources. This section shall be divided into the following paragraphs to describe the project organization and resources to be applied in each build.

7.1 Project organization. This paragraph shall describe the organizational structure to be used on the project, including the organizations involved, their relationships to one another, and the authority and responsibility of each organization for carrying out required activities.

7.2 Project resources. This paragraph shall describe the resources to be applied to the project. It shall include, as applicable:

a. Personnel resources, including:

   1) The estimated staff-loading for the project (number of personnel over time)

   2) The breakdown of the staff-loading numbers by responsibility (for example, management, software engineering, software testing, software configuration management, software product evaluation, software quality assurance)

   3) A breakdown of the skill levels, geographic locations, and security clearances of personnel performing each responsibility

b. Overview of developer facilities to be used, including geographic locations in which the work will be performed, facilities to be used, and secure areas and other features of the facilities as applicable to the contracted effort.

c. Acquirer-furnished equipment, software, services, documentation, data, and facilities required for the contracted effort. A schedule detailing when these items will be needed shall also be included.

d. Other required resources, including a plan for obtaining the resources, dates needed, and availability of each resource item.

8. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE

SOFTWARE INPUT/OUTPUT MANUAL (SIOM)

2. IDENTIFICATION NUMBER

DI-IPSC-81445

3. DESCRIPTION/PURPOSE

3.1 The Software Input/Output Manual (SIOM) tells a user how to access, submit inputs to, and interpret output from, a batch or interactive software system that is run by personnel in a computer center or other centralized or networked software installation.

3.2 The SIOM is developed for software systems that will be installed in a computer center or other centralized or networked software installation, with users accessing the system via terminals or personal computers or submitting and receiving inputs and outputs in batch mode.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record information needed by persons who will submit inputs to, and recieve outputs from, software, relying on others to operate the software in a computer center or other centralized or networked software installation.

7.3 This DID is often used with the Software Center Operator Manual (SCOM) (DI-IPSC-81444). This pair of manuals is an alternative to the Software User Manual (SUM) (DI-IPSC-81443).

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-IPSC-80693.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7088

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Software summary. This section shall be divided into the following paragraphs.

3.1 Software application. This paragraph shall provide a brief description of the intended uses of the software. Capabilities, operating improvements, and benefits expected from its use shall be described.

3.2 Software inventory. This paragraph shall identify the software files, if any, including databases and data files, that the user is responsible for requesting in order to access the software described in this manual. The identification shall include security and privacy considerations for each file and identification of the software necessary to continue or resume operation in case of an emergency.

3.3 Software environment. This paragraph shall identify the hardware, software, manual operations, and other resources needed to access and use the software. This paragraph shall be based on the assumption that the software is installed in a computer center or other centralized or networked environment and shall focus on the resources that a user must have to access and use the software in that environment. Included, as applicable, shall be identification of:

a. Computer equipment that must be present, such as terminals, printers, or other input/output devices
b. Communications equipment that must be present
c. Other software that must be present, such as networking software
d. Forms, procedures, or other manual operations that must be present
e. Other facilities, equipment, or resources that must be present

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.4 Software organization and overview of operation. This paragraph shall provide a brief description of the organization and operation of the software from the user's point of view. The description shall include, as applicable:

a. Logical components of the software, from the user's point of view, including databases and data files the user can access, Database Management Systems (DBMSs), and communications paths, and an overview of the purpose/operation of each component

b. Performance characteristics that can be expected by the user, such as:
   1) Types, volumes, rate of inputs accepted
   2) Types, volume, accuracy, rate of outputs that the software can produce
   3) Typical response time and factors that affect it
   4) Typical processing time and factors that affect it
   5) Limitations, e.g, restrictions on what data may be queried and from what location
   6) Error rate that can be expected
   7) Reliability that can be expected

c. Relationships of the functions performed by the software with interfacing systems and with the organizations or stations that are sources of input or recipients of output

d. Supervisory controls that can be implemented (such as passwords) to manage the software

3.5 Contingencies and alternate states and modes of operation. This paragraph shall explain the differences in what the user will be able to do with the software at times of emergency and in various states and modes of operation, if applicable.

3.6 Security and privacy. This paragraph shall contain an overview of the security and privacy considerations associated with the software. A warning shall be included regarding making unauthorized copies of software or documents, if applicable.

3.7 Assistance and problem reporting. This paragraph shall identify points of contact and procedures to be followed to obtain assistance and report problems encountered in using the software.

4. Using the software. This section shall be divided into the following paragraphs to describe how to prepare inputs to, and interpret output from, the software. If the software has a query capability, this paragraph shall reference section 5 for a description of this capability. If the software can be accessed via terminal, this paragraph shall reference Sections 6 through n to describe terminal processing procedures. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

4.1 Initiation procedures. This paragraph shall contain the procedures that must be followed to initiate use of the software. Included may be information such as sample job request forms or sample control statements.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.2 Description of inputs. This paragraph shall be divided into the following subparagraphs.

4.2.1 Input conditions. This paragraph shall describe the conditions to be observed in preparing each type or class of input to the software. The conditions shall include the following, as applicable:

a. Reason for input, such as normal status report, need to update data
b. Frequency of input, such as monthly, on demand
c. Origin of input, such as the organization or station authorized to generate the input
d. Medium of input, such as magnetic tape
e. Related inputs that are required to be entered at the same time as this input
f. Other applicable information, such as priority; security and privacy considerations

4.2.2 Input formats. This paragraph shall illustrate the layout formats to be used in the preparation of inputs to the software and shall explain the information that may be entered in the various sections and lines of each format.

4.2.3 Composition rules. This paragraph shall describe any rules and conventions that must be observed to prepare inputs. The rules of syntax, usage of punctuation, etc., shall be explained. The rules shall include the following, as applicable:

a. Input transaction length, such as 100 characters maximum
b. Format conventions, such as all input items must be left-justified
c. Labeling, such as usage of identifiers to denote major data sets to the software
d. Sequencing, such as order and placement of items in the input
e. Punctuation, such as spacing and use of symbols (virgule, asterisk, character combinations, etc.) to denote start and end of input, of data groups, and of fields
f. Restrictions, such as rules forbidding use of particular characters or parameter sets

4.2.4 Input vocabulary. This paragraph shall explain the legal character combinations or codes that must be used to prepare inputs. An appendix may be provided containing an ordered listing of these codes.

4.2.5 Sample inputs. This paragraph shall provide examples that illustrate and explain each type or class of input acceptable by the software. Included shall be information on the following types of inputs, as applicable:

a. Headers denoting the start of input
b. Text or body of the input
c. Trailers denoting the end of input
d. Portions of the input that may be omitted
e. Portions of the input that may be repeated

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.3 Description of outputs. This paragraph shall be divided into the following subparagraphs.

4.3.1 General description. This paragraph shall provide the following information, as applicable, for each type or class of output:

a. Reasons why the output is generated
b. Frequency of the output, such as monthly, on demand
c. Any modifications or variations of the basic output that are available
d. Media, such as printout, display screen, tape
e. Location where the output will appear, such as in the computer area or remotely
f. Any additional characteristics, such as priority, security and privacy considerations, associated outputs that complement the information in this output

4.3.2 Output formats. This paragraph shall illustrate and explain the layout of each type or class of output from the software. The following aspects shall be explained, as applicable:

a. Security and privacy markings
b. Data that may appear in headers
c. Information that may appear in the body or text of the output, including column headings and subsets or sections in the output format
d. Data that may appear in trailers
e. Additional characteristics, such as the meaning of special symbols

4.3.3 Sample outputs. This paragraph shall provide illustrations of each type or class of output from the software. A description of each sample shall be provided, including, as applicable:

a. Meaning and use of each column, entry, etc.
b. Source, such as extracted from database, calculated
c. Characteristics, such as when omitted, range of values, unit of measure

4.3.4 Output vocabulary. This paragraph shall describe any codes or abbreviations that appear in the output that differ from those used in the input described in paragraph 4.2.4.

4.4 Use of outputs. This paragraph shall explain the use of the output by the operational area or activity that receives it.

4.5 Recovery and error correction procedures. This paragraph shall list the error codes generated by the software, give their meanings, and describe the corrective actions to be taken by the user. Also included shall be the procedures to be followed by the user with respect to restart, recovery, and continuity of operations in the event of emergencies.

4.6 Communications diagnostics. This paragraph shall describe the diagnostic procedures available to the user for validating communications and for identifying and classifying problems.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5. Query procedures. This section shall be prepared for software with a query capability. It shall be divided into the following paragraphs.

5.1 Database/data file format. This paragraph shall provide a user's view of the format and content of each database and data file that can be queried. Figure 1 provides an example. Information such as the following shall be provided for each data element, as applicable:

a. Data element name
b. Synonymous names
c. Definition
d. Format
e. Range and enumeration of values
f. Unit of measurement
g. Data item names, abbreviations, and codes

5.2 Query capabilities. This paragraph shall identify and describe the preprogrammed and ad hoc query capabilities provided by the software. An example of preprogrammed queries is shown in Figure 2.

5.3 Query preparation. This paragraph shall provide instructions for preparing queries. Figure 3 shows an example of the format for a preprogrammed query. Figure 4 shows an example of a query statement.

5.4 Control instructions. This paragraph shall provide instructions for the sequencing of runs and other actions necessary to extract responses to query requests. These instructions shall include control statements that may be required by the computer system or software.

6. User terminal processing procedures. This section shall be divided into the following paragraphs to provide the user with information on the use of terminals to accomplish processing. If the procedures are complicated or extensive, Sections 7 through n may be added in the same paragraph structure as this section and with titles meaningful to the sections selected. The organization of the document will depend on the characteristics of the software being documented. For example, sections might be based on the organizations in which users work, their assigned positions, work sites, or the tasks they must perform. For other software, it may be more appropriate to have Section 6 be a guide to menus, Section 7 be a guide to the command language, and Section 8 be a guide to functions. Detailed procedures are intended to be presented in paragraphs 6.2 through 6.5. Depending on the design of the software, the subparagraphs might be organized on a function-by-function, menu-by-menu, transaction-by-transaction, or other basis. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

6.1 Available capabilities. This paragraph shall describe in general terms the capabilities for retrieval, display, and update of data through terminal operations.

6.2 Access procedures. This paragraph shall present the sequence of steps and any applicable rules pertaining to accessing the software to initiate software operations.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

6.3 Display, updates, and retrieval procedures. This paragraph shall be divided into subparagraphs to provide the step-by-step procedures necessary to produce the displays, updates, and retrievals that are available through the use of a terminal. Each procedure shall include the name of the operation, input formats, and sample responses, as applicable.

6.4 Recovery and error correction procedures. This paragraph shall identify error messages that may be displayed and shall indicate their meanings and any corrective actions that should be taken. Also included shall be any procedures to be followed by the user with respect to restart, recovery, and continuity of operations in the event of emergencies.

6.5 Termination procedures. This paragraph shall present the sequence of steps necessary to terminate the processing.

7. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document. If section 6 has been expanded into section(s) 7,..., this section shall be numbered as the next section following section n.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

Format of Data Record

ITEM NAME	FORMAT		RANGE OF VALUES	UNIT OF MEASUREMENT
ORG-NAME	30	AN	1-9,A-Z	
ORG-ID	6	AN	1-9,A-Z	
SOC-SEC-NO	9	N	0-9	
NAME	20	AN	---	
PAY-GRADE	4	AN	---	
GROSS-PAY	6	SN	0-9	Dollars
GROSS-PAY-YTD	8	SN	0-9	Dollars
FED-TAX	6	SN	0-9	Dollars
FED-TAX-YTD	8	SN	0-9	Dollars
FICA	6	SN	0-9	Dollars
FICA-YTD	8	SN	0-9	Dollars
STATE-TAX	6	SN	0-9	Dollars
STATE-TAX-YTD	8	SN	0-9	Dollars
STATE-TAX-CODE	2	AN	B3-F6	
ALLOTMENTS	6	SN	0-9	Dollars
NET-PAY	6	SN	0-9	Dollars

AN = Alphanumeric
SN = Signed Numeric

Figure 1. Example of data record format.

Preprogrammed Query Capabilities

DESCRIPTION	QUERY CODE
Number of employees within an organization	A
Number of employees in a specific pay grade	B
Total gross pay for employees within an organization	C
State tax year-to-date for specific state	D
FICA tax year-to-date for a specific employee	E
Total deductions for a specific employee	F
Net pay for a specific employee	G

Figure 2. Example of preprogrammed query capability.

Format of Query A

NUMBER OF EMPLOYEES WITHIN AN ORGANIZATION

QUERY ITEM TITLE	CHARACTER POSITION	CONTENT/ COMMENT	
Query Designator	1	Q	Constant
File Number	2-3	01	Constant
Query Number	4-5		Insert 01-99
Security Classification	10	U	Unclassified
Query Card Format Code	12	A	
Organization	14-19		Insert ORG-ID as requested by query. Refer to data format for applicable code.

Figure 3. Example of query format.

Query Statement

Request - No. of employees within an organization (Office of Secretary of Defense)

Query Statement - IF ORG-ID EQ OSD LIST NO OF EMPLOYEES

Figure 4. Example of query statement.

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE INSTALLATION PLAN (SIP)	DI-IPSC-81428

3. DESCRIPTION/PURPOSE

3.1 The Software Installation Plan (SIP) is a plan for installing software at user sites, including preparations, user training, and conversion from existing systems.

3.2 The SIP is developed when the developer will be involved in the installation of software at user sites and when the installation process will be sufficiently complex to require a documented plan. For software embedded in a hardware-software system, a fielding or deployment plan for the hardware-software system may make a separate SIP unnecessary.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6c. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to develop and record plans for performing software installation and training at user sites.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-IPSC-80699.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7071

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this plan and shall describe any security or privacy considerations associated with its use.

1.4 Relationship to other plans. This paragraph shall describe the relationship, if any, of the SIP to other project management plans.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this plan. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Installation overview. This section shall be divided into the following paragraphs to provide an overview of the installation process.

3.1 Description. This paragraph shall provide a general description of the installation process to provide a frame of reference for the remainder of the document. A list of sites for software installation, the schedule dates, and the method of installation shall be included.

3.2 Contact point. This paragraph shall provide the organizational name, office symbol/code, and telephone number of a point of contact for questions relating to this installation.

3.3 Support materials. This paragraph shall list the type, source, and quantity of support materials needed for the installation. Included shall be items such as magnetic tapes, disk packs, computer printer paper, and special forms.

3.4 Training. This paragraph shall describe the developer's plans for training personnel who will operate and/or use the software installed at user sites. Included shall be the delineation between general orientation, classroom training, and "hands-on" training.

3.5 Tasks. This paragraph shall list and describe in general terms each task involved in the software installation. Each task description shall identify the organization that will accomplish the task, usually either the user, computer operations, or the developer. The task list shall include such items as:

a. Providing overall planning, coordination, and preparation for installation

b. Providing personnel for the installation team

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

c. Arranging lodging, transportation, and office facilities for the installation team

d. Ensuring that all manuals applicable to the installation are available when needed

e. Ensuring that all other prerequisites have been fulfilled prior to the installation

f. Planning and conducting training activities

g. Providing students for the training

h. Providing computer support and technical assistance for the installation

i. Providing for conversion from the current system

3.6 Personnel. This paragraph shall describe the number, type, and skill level of the personnel needed during the installation period, including the need for multishift operation, clerical support, etc.

3.7 Security and privacy. This paragraph shall contain an overview of the security and privacy considerations associated with the system.

4. Site-specific information for software center operations staff. This section applies if the software will be installed in computer center(s) or other centralized or networked software installations for users to access via terminals or using batch inputs/outputs. If this type of installation does not apply, this section shall contain the words "Not applicable."

4.x (Site name). This paragraph shall identify a site or set of sites and shall be divided into the following subparagraphs to discuss those sites. Multiple sites may be discussed together when the information for those sites is generally the same.

4.x.1 Schedule. This paragraph shall present a schedule of tasks to be accomplished during installation. It shall depict the tasks in chronological order with beginning and ending dates of each task and supporting narrative as necessary.

4.x.2 Software inventory. This paragraph shall provide an inventory of the software needed to support the installation. The software shall be identified by name, identification number, version number, release number, configuration, and security classification, as applicable. This paragraph shall indicate whether the software is expected to be on site or will be delivered for the installation and shall identify any software to be used only to facilitate the installation process.

4.x.3 Facilities. This paragraph shall detail the physical facilities and accommodations needed during the installation period. This description shall include the following, as applicable:

a. Classroom, work space, and training aids needed, specifying hours per day, number of days, and shifts

b. Hardware that must be operational and available

c. Transportation and lodging for the installation team

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.x.4 Installation team. This paragraph shall describe the composition of the installation team. Each team member's tasks shall be defined.

4.x.5 Installation procedures. This paragraph shall provide step-by-step procedures for accomplishing the installation. References may be made to other documents, such as operator manuals. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable. The procedures shall include the following, as applicable:

a. Installing the software
b. Checking out the software once installed
c. Initializing databases and other software with site-specific data
d. Conversion from the current system, possibly involving running in parallel
e. Dry run of the procedures in operator and user manuals

4.x.6 Data update procedures. This paragraph shall present the data update procedures to be followed during the installation period. When the data update procedures are the same as normal updating or processing procedures, reference may be made to other documents, such as operator manuals.

5. Site-specific information for software users. This section shall provide installation planning pertinent to users of the software. When more than one type of user is involved, for example, users at different positions, performing different functions, or in different organizations, a separate section (Sections 5 through n) may be written for each type of user and the section titles modified to reflect each user.

5.x (Site name). This paragraph shall identify a site or set of sites and shall be divided into the following subparagraphs to discuss those sites. Multiple sites may be discussed together when the information for those sites is generally the same.

5.x.1 Schedule. This paragraph shall present a schedule of tasks to be accomplished by the user during installation. It shall depict the tasks in chronological order including beginning and ending dates for each task and supporting narrative as necessary.

5.x.2 Installation procedures. This paragraph shall provide step-by-step procedures for accomplishing the installation. Reference may be made to other documents, such as user manuals. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable. The procedures shall include the following, as applicable:

a. Performing the tasks under 4.x.5 if not performed by operations staff
b. Initializing user-specific data
c. Setting up queries and other user inputs
d. Performing sample processing
e. Generating sample reports
f. Conversion from the current system, possibly involving running in parallel
g. Dry run of procedures in user manuals

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.x.3 Data update procedures. This paragraph shall be divided into subparagraphs to present the user's data update procedures to be followed during the installation period. When update procedures are the same as normal processing, reference may be made to other documents, such as user manuals, and to Section 4 of this document

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document. If section 5 has been expanded into section(s) 6,...n, this section shall be numbered as the next section following section n.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE PRODUCT SPECIFICATION (SPS)	DI-IPSC-81441

3. DESCRIPTION/PURPOSE

3.1 The Software Product Specification (SPS) contains or references the executable software, source files, and software support information, including "as built" design information and compilation, build, and modification procedures, for a Computer Software Configuration Item (CSCI).

3.2 The SPS can be used to order the executable software and/or source files for a CSCI and is the primary software support document for the CSCI. Note: Different organizations have different policies for ordering delivery of software. These policies should be determined before applying this DID.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to prepare executable software, source files, "as built" CSCI design, and/or related support information for delivery.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80029A, DI-IPSC-80696, and DI-MCCR-80317.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7084

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier with signature blocks. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; distribution statement; and signature blocks for the developer representative authorized to release the document, the acquirer representative authorized to approve the document, and the dates of release/approval. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this specification. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Requirements. This section shall be divided into the following paragraphs to achieve delivery of the software and to establish the requirements that another body of software must meet to be considered a valid copy of the CSCI.

> Note: In past versions of this DID, Section 3 required a presentation of the software design describing the "as built" software. That approach was modeled on hardware development, in which the product specification presents the final design as the requirement to which hardware items must be manufactured. For software, however, this approach does not apply. Software "manufacturing" consists of electronic duplication of the software itself, not recreation from design, and the validity of a "manufactured" copy is determined by comparison to the software itself, not to a design description. This section therefore establishes the software itself as the criterion that must be matched for a body of software to be considered a valid copy of the CSCI. The updated software design has been placed in Section 5 below, not as a requirement, but as information to be used to modify, enhance, or otherwise support the software. If any portion of this specification is placed under acquirer configuration control, it should be limited to Section 3. It is the software itself that establishes the product baseline, not a description of the software's design.

3.1 Executable software. This paragraph shall provide, by reference to enclosed or otherwise provided electronic media, the executable software for the CSCI, including any batch files, command files, data files, or other software files needed to install and operate the software on its target computer(s). In order for a body of software to be considered a valid copy of the CSCI's executable software, it must be shown to match these files exactly.

3.2 Source files. This paragraph shall provide, by reference to enclosed or otherwise provided electronic media, the source files for the CSCI, including any batch files, command files, data files, or other files needed to regenerate the executable software for the CSCI. In order for a body of software to be considered a valid copy of the CSCI's source files, it must be shown to match these files exactly.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.3 Packaging requirements. This paragraph shall state the requirements, if any, for packaging and marking copies of the CSCI.

4. Qualification provisions. This paragraph shall state the method(s) to be used to demonstrate that a given body of software is a valid copy of the CSCI. For example, the method for executable files might be to establish that each executable file referenced in 3.1 has an identically-named counterpart in the software in question and that each such counterpart can be shown, via bit-for-bit comparison, check sum, or other method, to be identical to the corresponding executable file. The method for source files might be comparable, using the source files referenced in 3.2.

5. Software support information. This section shall be divided into the following paragraphs to provide information needed to support the CSCI.

5.1 "As built" software design. This paragraph shall contain, or reference an appendix or other deliverable document that contains, information describing the design of the "as built" CSCI. The information shall be the same as that required in a Software Design Description (SDD), Interface Design Description (IDD), and Database Design Description (DBDD), as applicable. If these documents or their equivalents are to be delivered for the "as built" CSCI, this paragraph shall reference them. If not, the information shall be provided in this document. Information provided in the headers, comments, and code of the source code listings may be referenced and need not be repeated in this section. If the SDD, IDD, or DBDD is included in an appendix, the paragraph numbers and page numbers need not be changed.

5.2 Compilation/build procedures. This paragraph shall describe, or reference an appendix that describes, the compilation/build process to be used to create the executable files from the source files and to prepare the executable files to be loaded into firmware or other distribution media. It shall specify the compiler(s)/assembler(s) to be used, including version numbers; other hardware and software needed, including version numbers; any settings, options, or conventions to be used; and procedures for compiling/assembling, linking, and building the CSCI and the software system/subsystem containing the CSCI, including variations for different sites, configurations, versions, etc. Build procedures above the CSCI level may be presented in one SPS and referenced from the others.

5.3 Modification procedures. This paragraph shall describe procedures that must be followed to modify the CSCI. It shall include or reference information on the following, as applicable:

a. Support facilities, equipment, and software, and procedures for their use
b. Databases/data files used by the CSCI and procedures for using and modifying them
c. Design, coding, and other conventions to be followed
d. Compilation/build procedures if different from those above
e. Integration and testing procedures to be followed

5.4 Computer hardware resource utilization. This paragraph shall describe the "as built" CSCI's measured utilization of computer hardware resources (such as processor capacity, memory capacity, input/output device capacity, auxiliary storage capacity, and communications/network equipment capacity). It shall cover all computer hardware resources

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

included in utilization requirements for the CSCI, in system-level resource allocations affecting the CSCI, or in the software development plan. If all utilization data for a given computer hardware resource is presented in a single location, such as in one SPS, this paragraph may reference that source. Included for each computer hardware resource shall be:

a. The CSCI requirements or system-level resource allocations being satisfied. (Alternatively, the traceability to CSCI requirements may be provided in 6.c.)

b. The assumptions and conditions on which the utilization data are based (for example, typical usage, worst-case usage, assumption of certain events)

c. Any special considerations affecting the utilization (such as use of virtual memory, overlays, or multiprocessors or the impacts of operating system overhead, library software, or other implementation overhead)

d. The units of measure used (such as percentage of processor capacity, cycles per second, bytes of memory, kilobytes per second)

e. The level(s) at which the estimates or measures have been made (such as software unit, CSCI, or executable program)

6. Requirements traceability. This section shall provide:

a. Traceability from each CSCI source file to the software unit(s) that it implements.

b. Traceability from each software unit to the source files that implement it.

c. Traceability from each computer hardware resource utilization measurement given in 5.4 to the CSCI requirements it addresses. (Alternatively, this traceability may be provided in 5.4.)

d. Traceability from each CSCI requirement regarding computer hardware resource utilization to the utilization measurements given in 5.4.

7. Notes. This section shall contain any general information that aids in understanding this specification (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE REQUIREMENTS SPECIFICATION (SRS)	DI-IPSC-81433

3. DESCRIPTION/PURPOSE

3.1 The Software Requirements Specification (SRS) specifies the requirements for a Computer Software Configuration Item (CSCI) and the methods to be used to ensure that each requirement has been met. Requirements pertaining to the CSCI's external interfaces may be presented in the SRS or in one or more Interface Requirements Specifications (IRSs) (DI-IPSC-81434) referenced from the SRS.

3.2 The SRS, possibly supplemented by IRSs, is used as the basis for design and qualification testing of a CSCI.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the software requirements to be met by a CSCI.

7.3 Requirements pertaining to CSCI interfaces may be presented in the SRS or in IRSs.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80025A and DI-MCCR-80301.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7076

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier with signature blocks. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; distribution statement; and signature blocks for the developer representative authorized to release the document, the acquirer representative authorized to approve the document, and the dates of release/approval. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this specification. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Requirements. This section shall be divided into the following paragraphs to specify the CSCI requirements, that is, those characteristics of the CSCI that are conditions for its acceptance. CSCI requirements are software requirements generated to satisfy the system requirements allocated to this CSCI. Each requirement shall be assigned a project-unique identifier to support testing and traceability and shall be stated in such a way that an objective test can be defined for it. Each requirement shall be annotated with associated qualification method(s) (see section 4) and traceability to system (or subsystem, if applicable) requirements (see section 5.a) if not provided in those sections. The degree of detail to be provided shall be guided by the following rule: Include those characteristics of the CSCI that are conditions for CSCI acceptance; defer to design descriptions those characteristics that the acquirer is willing to leave up to the developer. If there are no requirements in a given paragraph, the paragraph shall so state. If a given requirement fits into more than one paragraph, it may be stated once and referenced from the other paragraphs.

3.1 Required states and modes. If the CSCI is required to operate in more than one state or mode having requirements distinct from other states or modes, this paragraph shall identify and define each state and mode. Examples of states and modes include: idle, ready, active, post-use analysis, training, degraded, emergency, backup, wartime, peacetime. The distinction between states and modes is arbitrary. A CSCI may be described in terms of states only, modes only, states within modes, modes within states, or any other scheme that is useful. If no states or modes are required, this paragraph shall so state, without the need to create artificial distinctions. If states and/or modes are required, each requirement or group of requirements in this specification shall be correlated to the states and modes. The correlation may be indicated by a table or other method in this paragraph, in an appendix referenced from this paragraph, or by annotation of the requirements in the paragraphs where they appear.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.2 CSCI capability requirements. This paragraph shall be divided into subparagraphs to itemize the requirements associated with each capability of the CSCI. A "capability" is defined as a group of related requirements. The word "capability" may be replaced with "function," "subject," "object," or other term useful for presenting the requirements.

3.2.x (CSCI capability). This paragraph shall identify a required CSCI capability and shall itemize the requirements associated with the capability. If the capability can be more clearly specified by dividing it into constituent capabilities, the constituent capabilities shall be specified in subparagraphs. The requirements shall specify required behavior of the CSCI and shall include applicable parameters, such as response times, throughput times, other timing constraints, sequencing, accuracy, capacities (how much/how many), priorities, continuous operation requirements, and allowable deviations based on operating conditions. The requirements shall include, as applicable, required behavior under unexpected, unallowed, or "out of bounds" conditions, requirements for error handling, and any provisions to be incorporated into the CSCI to provide continuity of operations in the event of emergencies. Paragraph 3.3.x of this DID provides a list of topics to be considered when specifying requirements regarding inputs the CSCI must accept and outputs it must produce.

3.3 CSCI external interface requirements. This paragraph shall be divided into subparagraphs to specify the requirements, if any, for the CSCI's external interfaces. This paragraph may reference one or more Interface Requirements Specifications (IRSs) or other documents containing these requirements.

3.3.1 Interface identification and diagrams. This paragraph shall identify the required external interfaces of the CSCI (that is, relationships with other entities that involve sharing, providing or exchanging data). The identification of each interface shall include a project-unique identifier and shall designate the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided to depict the interfaces.

3.3.x (Project-unique identifier of interface). This paragraph (beginning with 3.3.2) shall identify a CSCI external interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to state the requirements imposed on the CSCI to achieve the interface. Interface characteristics of the other entities involved in the interface shall be stated as assumptions or as "When [the entity not covered] does this, the CSCI shall...," not as requirements on the other entities. This paragraph may reference other documents (such as data dictionaries, standards for communication protocols, and standards for user interfaces) in place of stating the information here. The requirements shall include the following, as applicable, presented in any order suited to the requirements, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

a. Priority that the CSCI must assign the interface

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

b. Requirements on the type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Required characteristics of individual data elements that the CSCI must provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural-language) name
      c) DoD standard data element name
      d) Technical name (e.g., variable or field name in code or database)
      e) Abbreviation or synonymous names
   2) Data type (alphanumeric, integer, etc.)
   3) Size and format (such as length and punctuation of a character string)
   4) Units of measurement (such as meters, dollars, nanoseconds)
   5) Range or enumeration of possible values (such as 0-99)
   6) Accuracy (how correct) and precision (number of significant digits)
   7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply
   8) Security and privacy constraints
   9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Required characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the CSCI must provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural language) name
      c) Technical name (e.g., record or data structure name in code or database)
      d) Abbreviations or synonymous names
   2) Data elements in the assembly and their structure (number, order, grouping)
   3) Medium (such as disk) and structure of data elements/assemblies on the medium
   4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)
   5) Relationships among assemblies, such as sorting/access characteristics
   6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply
   7) Security and privacy constraints
   8) Sources (setting/sending entities) and recipients (using/receiving entities)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Required characteristics of communication methods that the CSCI must use for the interface, such as:
   1) Project-unique identifier(s)
   2) Communication links/bands/frequencies/media and their characteristics
   3) Message formatting
   4) Flow control (such as sequence numbering and buffer allocation)
   5) Data transfer rate, whether periodic/aperiodic, and interval between transfers
   6) Routing, addressing, and naming conventions
   7) Transmission services, including priority and grade
   8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Required characteristics of protocols the CSCI must use for the interface, such as:
   1) Project-unique identifier(s)
   2) Priority/layer of the protocol
   3) Packeting, including fragmentation and reassembly, routing, and addressing
   4) Legality checks, error control, and recovery procedures
   5) Synchronization, including connection establishment, maintenance, termination
   6) Status, identification, and any other reporting features

g. Other required characteristics, such as physical compatibility of the interfacing entities (dimensions, tolerances, loads, plug compatibility, etc.), voltages, etc.

3.4 CSCI internal interface requirements. This paragraph shall specify the requirements, if any, imposed on interfaces internal to the CSCI. If all internal interfaces are left to the design, this fact shall be so stated. If such requirements are to be imposed, paragraph 3.3 of this DID provides a list of topics to be considered.

3.5 CSCI internal data requirements. This paragraph shall specify the requirements, if any, imposed on data internal to the CSCI. Included shall be requirements, if any, on databases and data files to be included in the CSCI. If all decisions about internal data are left to the design, this fact shall be so stated. If such requirements are to be imposed, paragraphs 3.3.x.c and 3.3.x.d of this DID provide a list of topics to be considered.

3.6 Adaptation requirements. This paragraph shall specify the requirements, if any, concerning installation-dependent data to be provided by the CSCI (such as site-dependent latitude and longitude or site-dependent state tax codes) and operational parameters that the CSCI is required to use that may vary according to operational needs (such as parameters indicating operation-dependent targeting constants or data recording).

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.7 Safety requirements. This paragraph shall specify the CSCI requirements, if any, concerned with preventing or minimizing unintended hazards to personnel, property, and the physical environment. Examples include safeguards the CSCI must provide to prevent inadvertent actions (such as accidentally issuing an "auto pilot off" command) and non-actions (such as failure to issue an intended "auto pilot off" command). This paragraph shall include the CSCI requirements, if any, regarding nuclear components of the system, including, as applicable, prevention of inadvertent detonation and compliance with nuclear safety rules.

3.8 Security and privacy requirements. This paragraph shall specify the CSCI requirements, if any, concerned with maintaining security and privacy. These requirements shall include, as applicable, the security/privacy environment in which the CSCI must operate, the type and degree of security or privacy to be provided, the security/privacy risks the CSCI must withstand, required safeguards to reduce those risks, the security/privacy policy that must be met, the security/privacy accountability the CSCI must provide, and the criteria that must be met for security/privacy certification/accreditation.

3.9 CSCI environment requirements. This paragraph shall specify the requirements, if any, regarding the environment in which the CSCI must operate. Examples include the computer hardware and operating system on which the CSCI must run. (Additional requirements concerning computer resources are given in the next paragraph.)

3.10 Computer resource requirements. This paragraph shall be divided into the following subparagraphs.

3.10.1 Computer hardware requirements. This paragraph shall specify the requirements, if any, regarding computer hardware that must be used by the CSCI. The requirements shall include, as applicable, number of each type of equipment, type, size, capacity, and other required characteristics of processors, memory, input/output devices, auxiliary storage, communications/network equipment, and other required equipment.

3.10.2 Computer hardware resource utilization requirements. This paragraph shall specify the requirements, if any, on the CSCI's computer hardware resource utilization, such as maximum allowable use of processor capacity, memory capacity, input/output device capacity, auxiliary storage device capacity, and communications/network equipment capacity. The requirements (stated, for example, as percentages of the capacity of each computer hardware resource) shall include the conditions, if any, under which the resource utilization is to be measured.

3.10.3 Computer software requirements. This paragraph shall specify the requirements, if any, regarding computer software that must be used by, or incorporated into, the CSCI. Examples include operating systems, database management systems, communications/network software, utility software, input and equipment simulators, test software, and manufacturing software. The correct nomenclature, version, and documentation references of each such software item shall be provided.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.10.4 Computer communications requirements. This paragraph shall specify the additional requirements, if any, concerning the computer communications that must be used by the CSCI. Examples include geographic locations to be linked; configuration and network topology; transmission techniques; data transfer rates; gateways; required system use times; type and volume of data to be transmitted/received; time boundaries for transmission/reception/response; peak volumes of data; and diagnostic features.

3.11 Software quality factors. This paragraph shall specify the CSCI requirements, if any, concerned with software quality factors identified in the contract or derived from a higher level specification. Examples include quantitative requirements regarding CSCI functionality (the ability to perform all required functions), reliability (the ability to perform with correct, consistent results), maintainability (the ability to be easily corrected), availability (the ability to be accessed and operated when needed), flexibility (the ability to be easily adapted to changing requirements), portability (the ability to be easily modified for a new environment), reusability (the ability to be used in multiple applications), testability (the ability to be easily and thoroughly tested), usability (the ability to be easily learned and used), and other attributes.

3.12 Design and implementation constraints. This paragraph shall specify the requirements, if any, that constrain the design and implementation of the CSCI. These requirements may be specified by reference to appropriate commercial or military standards and specifications. Examples include requirements concerning:

a. Use of a particular CSCI architecture or requirements on the architecture, such as required databases or other software units; use of standard, military, or existing components; or use of Government/acquirer-furnished property (equipment, information, or software)

b. Use of particular design or implementation standards; use of particular data standards; use of a particular programming language

c. Flexibility and expandability that must be provided to support anticipated areas of growth or changes in technology, threat, or mission

3.13 Personnel-related requirements. This paragraph shall specify the CSCI requirements, if any, included to accommodate the number, skill levels, duty cycles, training needs, or other information about the personnel who will use or support the CSCI. Examples include requirements for number of simultaneous users and for built-in help or training features. Also included shall be the human factors engineering requirements, if any, imposed on the CSCI. These requirements shall include, as applicable, considerations for the capabilities and limitations of humans; foreseeable human errors under both normal and extreme conditions; and specific areas where the effects of human error would be particularly serious. Examples include requirements for color and duration of error messages, physical placement of critical indicators or keys, and use of auditory signals.

3.14 Training-related requirements. This paragraph shall specify the CSCI requirements, if any, pertaining to training. Examples include training software to be included in the CSCI.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.15 Logistics-related requirements. This paragraph shall specify the CSCI requirements, if any, concerned with logistics considerations. These considerations may include: system maintenance, software support, system transportation modes, supply-system requirements, impact on existing facilities, and impact on existing equipment.

3.16 Other requirements. This paragraph shall specify additional CSCI requirements, if any, not covered in the previous paragraphs.

3.17 Packaging requirements. This section shall specify the requirements, if any, for packaging, labeling, and handling the CSCI for delivery (for example, delivery on 8 track magnetic tape labelled and packaged in a certain way). Applicable military specifications and standards may be referenced if appropriate.

3.18 Precedence and criticality of requirements. This paragraph shall specify, if applicable, the order of precedence, criticality, or assigned weights indicating the relative importance of the requirements in this specification. Examples include identifying those requirements deemed critical to safety, to security, or to privacy for purposes of singling them out for special treatment. If all requirements have equal weight, this paragraph shall so state.

4. Qualification provisions. This section shall define a set of qualification methods and shall specify for each requirement in Section 3 the method(s) to be used to ensure that the requirement has been met. A table may be used to present this information, or each requirement in Section 3 may be annotated with the method(s) to be used. Qualification methods may include:

a. Demonstration: The operation of the CSCI, or a part of the CSCI, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.

b. Test: The operation of the CSCI, or a part of the CSCI, using instrumentation or other special test equipment to collect data for later analysis.

c. Analysis: The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpretation, or extrapolation of test results.

d. Inspection: The visual examination of CSCI code, documentation, etc.

e. Special qualification methods: Any special qualification methods for the CSCI, such as special tools, techniques, procedures, facilities, and acceptance limits.

5. Requirements traceability. This paragraph shall contain:

a. Traceability from each CSCI requirement in this specification to the system (or subsystem, if applicable) requirements it addresses. (Alternatively, this traceability may be provided by annotating each requirement in Section 3.)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

Note: Each level of system refinement may result in requirements not directly traceable to higher-level requirements. For example, a system architectural design that creates multiple CSCIs may result in requirements about how the CSCIs will interface, even though these interfaces are not covered in system requirements. Such requirements may be traced to a general requirement such as "system implementation" or to the system design decisions that resulted in their generation.

b. Traceability from each system (or subsystem, if applicable) requirement allocated to this CSCI to the CSCI requirements that address it. All system (subsystem) requirements allocated to this CSCI shall be accounted for. Those that trace to CSCI requirements contained in IRSs shall reference those IRSs.

6. Notes. This section shall contain any general information that aids in understanding this specification (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE
SYSTEM/SUBSYSTEM DESIGN DESCRIPTION (SSDD)

2. IDENTIFICATION NUMBER
DI-IPSC-81432

3. DESCRIPTION/PURPOSE

3.1 The System/Subsystem Design Description (SSDD) describes the system- or subsystem-wide design and the architectural design of a system or subsystem. The SSDD may be supplemented by Interface Design Descriptions (IDDs) (DI-IPSC-81436) and Database Design Descriptions (DBDDs) (DI-IPSC-81437) as described in Block 7 below.

3.2 The SSDD, with its associated IDDs and DBDDs, is used as the basis for further system development. Throughout this DID, the term "system" may be interpreted to mean "subsystem" as applicable. The resulting document should be titled System Design Description or Subsystem Design Description (SSDD).

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked define and record the design of a system or subsystem.

7.3 Design pertaining to interfaces may be presented in the SSDD or in IDDs. Design pertaining to databases may be presented in the SSDD or in DBDDs.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-CMAN-80534 and DI-MCCR-80302.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7075

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system to which this document applies. It shall describe the general nature of the system; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. System-wide design decisions. This section shall be divided into paragraphs as needed to present system-wide design decisions, that is, decisions about the system's behavioral design (how it will behave, from a user's point of view, in meeting its requirements, ignoring internal implementation) and other decisions affecting the selection and design of system components. If all such decisions are explicit in the requirements or are deferred to the design of the system components, this section shall so state. Design decisions that respond to requirements designated critical, such as those for safety, security, or privacy, shall be placed in separate subparagraphs. If a design decision depends upon system states or modes, this dependency shall be indicated. Design conventions needed to understand the design shall be presented or referenced. Examples of system-wide design decisions are the following:

a. Design decisions regarding inputs the system will accept and outputs it will produce, including interfaces with other systems, configuration items, and users (4.3.x of this DID identifies topics to be considered in this description). If part or all of this information is given in Interface Design Descriptions (IDDs), they may be referenced.

b. Design decisions on system behavior in response to each input or condition, including actions the system will perform, response times and other performance characteristics, description of physical systems modeled, selected equations/algorithms/rules, and handling of unallowed inputs or conditions.

c. Design decisions on how system databases/data files will appear to the user (4.3.x of this DID identifies topics to be considered in this description). If part or all of this information is given in Database Design Descriptions (DBDDs), they may be referenced.

d. Selected approach to meeting safety, security, and privacy requirements.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Design and construction choices for hardware or hardware-software systems, such as physical size, color, shape, weight, materials, and markings.

f. Other system-wide design decisions made in response to requirements, such as selected approach to providing required flexibility, availability, and maintainability.

4. System architectural design. This section shall be divided into the following paragraphs to describe the system architectural design. If part or all of the design depends upon system states or modes, this dependency shall be indicated. If design information falls into more than one paragraph, it may be presented once and referenced from the other paragraphs. Design conventions needed to understand the design shall be presented or referenced.

Note: For brevity, this section is written in terms of organizing a system directly into Hardware Configuration Items (HWCIs), Computer Software Configuration Items (CSCIs), and manual operations, but should be interpreted to cover organizing a system into subsystems, organizing a subsystem into HWCIs, CSCIs, and manual operations, or other variations as appropriate.

4.1 System components. This paragraph shall:

a. Identify the components of the system (HWCIs, CSCIs, and manual operations). Each component shall be assigned a project-unique identifier. Note: a database may be treated as a CSCI or as part of a CSCI.

b. Show the static (such as "consists of") relationship(s) of the components. Multiple relationships may be presented, depending on the selected design methodology.

c. State the purpose of each component and identify the system requirements and system-wide design decisions allocated to it. (Alternatively, the allocation of requirements may be provided in 5.a.)

d. Identify each component's development status/type, if known (such as new development, existing component to be reused as is, existing design to be reused as is, existing design or component to be reengineered, component to be developed for reuse, component planned for Build N, etc.) For existing design or components, the description shall provide identifying information, such as name, version, documentation references, location, etc.

e. For each computer system or other aggregate of computer hardware resources identified for use in the system, describe its computer hardware resources (such as processors, memory, input/output devices, auxiliary storage, and communications/network equipment). Each description shall, as applicable, identify the configuration items that will use the resource, describe the allocation of resource utilization to each CSCI that will use the resource (for example, 20% of the resource's capacity allocated to CSCI 1, 30% to CSCI 2), describe the conditions under which utilization will be measured, and describe the characteristics of the resource:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1) Descriptions of computer processors shall include, as applicable, manufacturer name and model number, processor speed/capacity, identification of instruction set architecture, applicable compiler(s), word size (number of bits in each computer word), character set standard (such as ASCII, EBCDIC), and interrupt capabilities.

2) Descriptions of memory shall include, as applicable, manufacturer name and model number and memory size, type, speed, and configuration (such as 256K cache memory, 16MB RAM (4MB x 4)).

3) Descriptions of input/output devices shall include, as applicable, manufacturer name and model number, type of device, and device speed/capacity.

4) Descriptions of auxiliary storage shall include, as applicable, manufacturer name and model number, type of storage, amount of installed storage, and storage speed.

5) Descriptions of communications/network equipment, such as modems, network interface cards, hubs, gateways, cabling, high speed data lines, or aggregates of these or other components, shall include, as applicable, manufacturer name and model number, data transfer rates/capacities, network topologies, transmission techniques, and protocols used.

6) Each description shall also include, as applicable, growth capabilities, diagnostic capabilities, and any additional hardware capabilities relevant to the description.

f. Present a specification tree for the system, that is, a diagram that identifies and shows the relationships among the planned specifications for the system components.

4.2 Concept of execution. This paragraph shall describe the concept of execution among the system components. It shall include diagrams and descriptions showing the dynamic relationship of the components, that is, how they will interact during system operation, including, as applicable, flow of execution control, data flow, dynamically controlled sequencing, state transition diagrams, timing diagrams, priorities among components, handling of interrupts, timing/sequencing relationships, exception handling, concurrent execution, dynamic allocation/deallocation, dynamic creation/deletion of objects, processes, tasks, and other aspects of dynamic behavior.

4.3 Interface design. This paragraph shall be divided into the following subparagraphs to describe the interface characteristics of the system components. It shall include both interfaces among the components and their interfaces with external entities such as other systems, configuration items, and users. Note: There is no requirement for these interfaces to be completely designed at this level; this paragraph is provided to allow the recording of interface design decisions made as part of system architectural design. If part or all of this information is contained in Interface Design Descriptions (IDDs) or elsewhere, these sources may be referenced.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.3.1 Interface identification and diagrams. This paragraph shall state the project-unique identifier assigned to each interface and shall identify the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided, as appropriate, to depict the interfaces.

4.3.x (Project-unique identifier of interface). This paragraph (beginning with 4.3.2) shall identify an interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to describe the interface characteristics of one or both of the interfacing entities. If a given interfacing entity is not covered by this SSDD (for example, an external system) but its interface characteristics need to be mentioned to describe interfacing entities that are, these characteristics shall be stated as assumptions or as "When [the entity not covered] does this, [the entity that is covered] will ...." This paragraph may reference other documents (such as data dictionaries, standards for protocols, and standards for user interfaces) in place of stating the information here. The design description shall include the following, as applicable, presented in any order suited to the information to be provided, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

a. Priority assigned to the interface by the interfacing entity(ies)

b. Type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:
   1) Names/identifiers
      a) Project-unique identifier
      b) Non-technical (natural-language) name
      c) DoD standard data element name
      d) Technical name (e.g., variable or field name in code or database)
      e) Abbreviation or synonymous names
   2) Data type (alphanumeric, integer, etc.)
   3) Size and format (such as length and punctuation of a character string)
   4) Units of measurement (such as meters, dollars, nanoseconds)
   5) Range or enumeration of possible values (such as 0-99)
   6) Accuracy (how correct) and precision (number of significant digits)
   7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply
   8) Security and privacy constraints
   9) Sources (setting/sending entities) and recipients (using/receiving entities)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

d. Characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:

1) Names/identifiers

a) Project-unique identifier to be used for traceability

b) Non-technical (natural language) name

c) Technical name (e.g., record or data structure name in code or database)

d) Abbreviations or synonymous names

2) Data elements in the assembly and their structure (number, order, grouping)

3) Medium (such as disk) and structure of data elements/assemblies on the medium

4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)

5) Relationships among assemblies, such as sorting/access characteristics

6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply

7) Security and privacy constraints

8) Sources (setting/sending entities) and recipients (using/receiving entities)

e. Characteristics of communication methods that the interfacing entity(ies) will use for the interface, such as:

1) Project-unique identifier(s)

2) Communication links/bands/frequencies/media and their characteristics

3) Message formatting

4) Flow control (such as sequence numbering and buffer allocation)

5) Data transfer rate, whether periodic/aperiodic, and interval between transfers

6) Routing, addressing, and naming conventions

7) Transmission services, including priority and grade

8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Characteristics of protocols that the interfacing entity(ies) will use for the interface, such as:

1) Project-unique identifier(s)

2) Priority/layer of the protocol

3) Packeting, including fragmentation and reassembly, routing, and addressing

4) Legality checks, error control, and recovery procedures

5) Synchronization, including connection establishment, maintenance, termination

6) Status, identification, and any other reporting features

g. Other characteristics, such as physical compatibility of the interfacing entity(ies) (dimensions, tolerances, loads, voltages, plug compatibility, etc.)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5. Requirements traceability. This paragraph shall contain:

a. Traceability from each system component identified in this SSDD to the system requirements allocated to it. (Alternatively, this traceability may be provided in 4.1.)

b. Traceability from each system requirement to the system components to which it is allocated.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall contain an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SYSTEM/SUBSYSTEM SPECIFICATION (SSS)	DI-IPSC-81431

3. DESCRIPTION/PURPOSE

3.1 The System/Subsystem Specification (SSS) specifies the requirements for a system or subsystem and the methods to be used to ensure that each requirement has been met. Requirements pertaining to the system or subsystem's external interfaces may be presented in the SSS or in one or more Interface Requirements Specifications (IRSs) (DI-IPSC-81434) referenced from the SSS.

3.2 The SSS, possibly supplemented by IRSs, is used as the basis for design and qualification testing of a system or subsystem. Throughout this DID, the term "system" may be interpreted to mean "subsystem" as applicable. The resulting document should be titled System Specification or Subsystem Specification (SSS).

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the requirements to be met by a system or subsystem.

7.3 Requirements pertaining to system or subsystem interfaces may be presented in the SSS or in IRSs.

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-CMAN-80008A and DI-IPSC-80690.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7074

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier with signature blocks. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; distribution statement; and signature blocks for the developer representative authorized to release the document, the acquirer representative authorized to approve the document, and the dates of release/approval. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system to which this document applies. It shall describe the general nature of the system; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this specification. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Requirements. This section shall be divided into the following paragraphs to specify the system requirements, that is, those characteristics of the system that are conditions for its acceptance. Each requirement shall be assigned a project-unique identifier to support testing and traceability and shall be stated in such a way that an objective test can be defined for it. Each requirement shall be annotated with associated qualification method(s) (see section 4) and, for subsystems, traceability to system requirements (see section 5.a), if not provided in those sections. The degree of detail to be provided shall be guided by the following rule: Include those characteristics of the system that are conditions for system acceptance; defer to design descriptions those characteristics that the acquirer is willing to leave up to the developer. If there are no requirements in a given paragraph, the paragraph shall so state. If a given requirement fits into more than one paragraph, it may be stated once and referenced from the other paragraphs.

3.1 Required states and modes. If the system is required to operate in more than one state or mode having requirements distinct from other states or modes, this paragraph shall identify and define each state and mode. Examples of states and modes include: idle, ready, active, post-use analysis, training, degraded, emergency, backup, wartime, peacetime. The distinction between states and modes is arbitrary. A system may be described in terms of states only, modes only, states within modes, modes within states, or any other scheme that is useful. If no states or modes are required, this paragraph shall so state, without the need to create artificial distinctions. If states and/or modes are required, each requirement or group of requirements in this specification shall be correlated to the states and modes. The correlation may be indicated by a table or other method in this paragraph, in an appendix referenced from this paragraph, or by annotation of the requirements in the paragraphs where they appear.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.2 System capability requirements. This paragraph shall be divided into subparagraphs to itemize the requirements associated with each capability of the system. A "capability" is defined as a group of related requirements. The word "capability" may be replaced with "function," "subject," "object," or other term useful for presenting the requirements.

3.2.x (System capability). This paragraph shall identify a required system capability and shall itemize the requirements associated with the capability. If the capability can be more clearly specified by dividing it into constituent capabilities, the constituent capabilities shall be specified in subparagraphs. The requirements shall specify required behavior of the system and shall include applicable parameters, such as response times, throughput times, other timing constraints, sequencing, accuracy, capacities (how much/how many), priorities, continuous operation requirements, and allowable deviations based on operating conditions. The requirements shall include, as applicable, required behavior under unexpected, unallowed, or "out of bounds" conditions, requirements for error handling, and any provisions to be incorporated into the system to provide continuity of operations in the event of emergencies. Paragraph 3.3.x of this DID provides a list of topics to be considered when specifying requirements regarding inputs the system must accept and outputs it must produce.

3.3 System external interface requirements. This paragraph shall be divided into subparagraphs to specify the requirements, if any, for the system's external interfaces. This paragraph may reference one or more Interface Requirements Specifications (IRSs) or other documents containing these requirements.

3.3.1 Interface identification and diagrams. This paragraph shall identify the required external interfaces of the system. The identification of each interface shall include a project-unique identifier and shall designate the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable. The identification shall state which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). One or more interface diagrams shall be provided to depict the interfaces.

3.3.x (Project-unique identifier of interface). This paragraph (beginning with 3.3.2) shall identify a system external interface by project-unique identifier, shall briefly identify the interfacing entities, and shall be divided into subparagraphs as needed to state the requirements imposed on the system to achieve the interface. Interface characteristics of the other entities involved in the interface shall be stated as assumptions or as "When [the entity not covered] does this, the system shall...," not as requirements on the other entities. This paragraph may reference other documents (such as data dictionaries, standards for communication protocols, and standards for user interfaces) in place of stating the information here. The requirements shall include the following, as applicable, presented in any order suited to the requirements, and shall note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements):

a. Priority that the system must assign the interface

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

b. Requirements on the type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented

c. Required characteristics of individual data elements that the system must provide, store, send, access, receive, etc., such as:

1) Names/identifiers

a) Project-unique identifier

b) Non-technical (natural-language) name

c) DoD standard data element name

d) Technical name (e.g., variable or field name in code or database)

e) Abbreviation or synonymous names

2) Data type (alphanumeric, integer, etc.)

3) Size and format (such as length and punctuation of a character string)

4) Units of measurement (such as meters, dollars, nanoseconds)

5) Range or enumeration of possible values (such as 0-99)

6) Accuracy (how correct) and precision (number of significant digits)

7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply

8) Security and privacy constraints

9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Required characteristics of data element assemblies (records, messages, files, arrays, displays, reports, etc.) that the system must provide, store, send, access, receive, etc., such as:

1) Names/identifiers

a) Project-unique identifier

b) Non-technical (natural language) name

c) Technical name (e.g., record or data structure name in code or database)

d) Abbreviations or synonymous names

2) Data elements in the assembly and their structure (number, order, grouping)

3) Medium (such as disk) and structure of data elements/assemblies on the medium

4) Visual and auditory characteristics of displays and other outputs (such as colors, layouts, fonts, icons and other display elements, beeps, lights)

5) Relationships among assemblies, such as sorting/access characteristics

6) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the assembly may be updated and whether business rules apply

7) Security and privacy constraints

8) Sources (setting/sending entities) and recipients (using/receiving entities)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Required characteristics of communication methods that the system must use for the interface, such as:
   1) Project-unique identifier(s)
   2) Communication links/bands/frequencies/media and their characteristics
   3) Message formatting
   4) Flow control (such as sequence numbering and buffer allocation)
   5) Data transfer rate, whether periodic/aperiodic, and interval between transfers
   6) Routing, addressing, and naming conventions
   7) Transmission services, including priority and grade
   8) Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing

f. Required characteristics of protocols the system must use for the interface, such as:
   1) Project-unique identifier(s)
   2) Priority/layer of the protocol
   3) Packeting, including fragmentation and reassembly, routing, and addressing
   4) Legality checks, error control, and recovery procedures
   5) Synchronization, including connection establishment, maintenance, termination
   6) Status, identification, and any other reporting features

g. Other required characteristics, such as physical compatibility of the interfacing entities (dimensions, tolerances, loads, plug compatibility, etc.), voltages, etc.

3.4 System internal interface requirements. This paragraph shall specify the requirements, if any, imposed on interfaces internal to the system. If all internal interfaces are left to the design or to requirement specifications for system components, this fact shall be so stated. If such requirements are to be imposed, paragraph 3.3 of this DID provides a list of topics to be considered.

3.5 System internal data requirements. This paragraph shall specify the requirements, if any, imposed on data internal to the system. Included shall be requirements, if any, on databases and data files to be included in the system. If all decisions about internal data are left to the design or to requirements specifications for system components, this fact shall be so stated. If such requirements are to be imposed, paragraphs 3.3.x.c and 3.3.x.d of this DID provide a list of topics to be considered.

3.6 Adaptation requirements. This paragraph shall specify the requirements, if any, concerning installation-dependent data that the system is required to provide (such as site-dependent latitude and longitude or site-dependent state tax codes) and operational parameters that the system is required to use that may vary according to operational needs (such as parameters indicating operation-dependent targeting constants or data recording).

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.7 Safety requirements. This paragraph shall specify the system requirements, if any, concerned with preventing or minimizing unintended hazards to personnel, property, and the physical environment. Examples include restricting the use of dangerous materials; classifying explosives for purposes of shipping, handling, and storing; abort/escape provisions from enclosures; gas detection and warning devices; grounding of electrical systems; decontamination; and explosion proofing. This paragraph shall include the system requirements, if any, for nuclear components, including, as applicable, requirements for component design, prevention of inadvertent detonation, and compliance with nuclear safety rules.

3.8 Security and privacy requirements. This paragraph shall specify the system requirements, if any, concerned with maintaining security and privacy. The requirements shall include, as applicable, the security/privacy environment in which the system must operate, the type and degree of security or privacy to be provided, the security/privacy risks the system must withstand, required safeguards to reduce those risks, the security/privacy policy that must be met, the security/privacy accountability the system must provide, and the criteria that must be met for security/privacy certification/accreditation.

3.9 System environment requirements. This paragraph shall specify the requirements, if any, regarding the environment in which the system must operate. Examples for a software system are the computer hardware and operating system on which the software must run. (Additional requirements concerning computer resources are given in the next paragraph). Examples for a hardware-software system include the environmental conditions that the system must withstand during transportation, storage, and operation, such as conditions in the natural environment (wind, rain, temperature, geographic location), the induced environment (motion, shock, noise, electromagnetic radiation), and environments due to enemy action (explosions, radiation).

3.10 Computer resource requirements. This paragraph shall be divided into the following subparagraphs. Depending upon the nature of the system, the computer resources covered in these subparagraphs may constitute the environment of the system (as for a software system) or components of the system (as for a hardware-software system).

3.10.1 Computer hardware requirements. This paragraph shall specify the requirements, if any, regarding computer hardware that must be used by, or incorporated into, the system. The requirements shall include, as applicable, number of each type of equipment, type, size, capacity, and other required characteristics of processors, memory, input/output devices, auxiliary storage, communications/network equipment, and other required equipment.

3.10.2 Computer hardware resource utilization requirements. This paragraph shall specify the requirements, if any, on the system's computer hardware resource utilization, such as maximum allowable use of processor capacity, memory capacity, input/output device capacity, auxiliary storage device capacity, and communications/network equipment capacity. The requirements (stated, for example, as percentages of the capacity of each computer hardware resource) shall include the conditions, if any, under which the resource utilization is to be measured.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.10.3 Computer software requirements. This paragraph shall specify the requirements, if any, regarding computer software that must be used by, or incorporated into, the system. Examples include operating systems, database management systems, communications/network software, utility software, input and equipment simulators, test software, and manufacturing software. The correct nomenclature, version, and documentation references of each such software item shall be provided.

3.10.4 Computer communications requirements. This paragraph shall specify the additional requirements, if any, concerning the computer communications that must be used by, or incorporated into, the system. Examples include geographic locations to be linked; configuration and network topology; transmission techniques; data transfer rates; gateways; required system use times; type and volume of data to be transmitted/received; time boundaries for transmission/reception/response; peak volumes of data; and diagnostic features.

3.11 System quality factors. This paragraph shall specify the requirements, if any, pertaining to system quality factors. Examples include quantitative requirements concerning system functionality (the ability to perform all required functions), reliability (the ability to perform with correct, consistent results -- such as mean time between failure for equipment), maintainability (the ability to be easily serviced, repaired, or corrected), availability (the ability to be accessed and operated when needed), flexibility (the ability to be easily adapted to changing requirements), portability of software (the ability to be easily modified for a new environment), reusability (the ability to be used in multiple applications), testability (the ability to be easily and thoroughly tested), usability (the ability to be easily learned and used), and other attributes.

3.12 Design and construction constraints. This paragraph shall specify the requirements, if any, that constrain the design and construction of the system. For hardware-software systems, this paragraph shall include the physical requirements imposed on the system. These requirements may be specified by reference to appropriate commercial or military standards and specifications. Examples include requirements concerning:

a. Use of a particular system architecture or requirements on the architecture, such as required subsystems; use of standard, military, or existing components; or use of Government/acquirer-furnished property (equipment, information, or software)

b. Use of particular design or construction standards; use of particular data standards; use of a particular programming language; workmanship requirements and production techniques

c. Physical characteristics of the system (such as weight limits, dimensional limits, color, protective coatings); interchangeability of parts; ability to be transported from one location to another; ability to be carried or set up by one, or a given number of, persons

d. Materials that can and cannot be used; requirements on the handling of toxic materials; limits on the electromagnetic radiation that the system is permitted to generate

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Use of nameplates, part marking, serial and lot number marking, and other identifying markings

f. Flexibility and expandability that must be provided to support anticipated areas of growth or changes in technology, threat, or mission

3.13 Personnel-related requirements. This paragraph shall specify the system requirements, if any, included to accommodate the number, skill levels, duty cycles, training needs, or other information about the personnel who will use or support the system. Examples include requirements for the number of work stations to be provided and for built-in help and training features. Also included shall be the human factors engineering requirements, if any, imposed on the system. These requirements shall include, as applicable, considerations for the capabilities and limitations of humans, foreseeable human errors under both normal and extreme conditions, and specific areas where the effects of human error would be particularly serious. Examples include requirements for adjustable-height work stations, color and duration of error messages, physical placement of critical indicators or buttons, and use of auditory signals.

3.14 Training-related requirements. This paragraph shall specify the system requirements, if any, pertaining to training. Examples include training devices and training materials to be included in the system.

3.15 Logistics-related requirements. This paragraph shall specify the system requirements, if any, concerned with logistics considerations. These considerations may include: system maintenance, software support, system transportation modes, supply-system requirements, impact on existing facilities, and impact on existing equipment.

3.16 Other requirements. This paragraph shall specify additional system requirements, if any, not covered in the previous paragraphs. Examples include requirements for system documentation, such as specifications, drawings, technical manuals, test plans and procedures, and installation instruction data, if not covered in other contractual documents.

3.17 Packaging requirements. This section shall specify the requirements, if any, for packaging, labeling, and handling the system and its components for delivery. Applicable military specifications and standards may be referenced if appropriate.

3.18 Precedence and criticality of requirements. This paragraph shall specify, if applicable, the order of precedence, criticality, or assigned weights indicating the relative importance of the requirements in this specification. Examples include identifying those requirements deemed critical to safety, to security, or to privacy for purposes of singling them out for special treatment. If all requirements have equal weight, this paragraph shall so state.

4. Qualification provisions. This section shall define a set of qualification methods and shall specify for each requirement in Section 3 the method(s) to be used to ensure that the requirement has been met. A table may be used to present this information, or each requirement in Section 3 may be annotated with the method(s) to be used. Qualification methods may include:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

a. Demonstration: The operation of the system, or a part of the system, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.

b. Test: The operation of the system, or a part of the system, using instrumentation or other special test equipment to collect data for later analysis.

c. Analysis: The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpolation, or extrapolation of test results.

d. Inspection: The visual examination of system components, documentation, etc.

e. Special qualification methods. Any special qualification methods for the system, such as special tools, techniques, procedures, facilities, acceptance limits, use of standard samples, preproduction or periodic production samples, pilot models, or pilot lots.

5. Requirements traceability. For system-level specifications, this paragraph does not apply. For subsystem-level specifications, this paragraph shall contain:

a. Traceability from each subsystem requirement in this specification to the system requirements it addresses. (Alternatively, this traceability may be provided by annotating each requirement in Section 3.)

Note: Each level of system refinement may result in requirements not directly traceable to higher-level requirements. For example, a system architectural design that creates two subsystems may result in requirements about how the subsystems will interface, even though these interfaces are not covered in system requirements. Such requirements may be traced to a general requirement such as "system implementation" or to the system design decisions that resulted in their generation.

b. Traceability from each system requirement that has been allocated to the subsystem covered by this specification to the subsystem requirements that address it. All system requirements allocated to the subsystem shall be accounted for. Those that trace to subsystem requirements contained in IRSs shall reference those IRSs.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall contain an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE TEST DESCRIPTION (STD)	DI-IPSC-81439

3. DESCRIPTION/PURPOSE

3.1 The Software Test Description (STD) describes the test preparations, test cases, and test procedures to be used to perform qualification testing of a Computer Software Configuration Item (CSCI) or a software system or subsystem.

3.2 The STD enables the acquirer to assess the adequacy of the qualification testing to be performed.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to define and record the test preparations, test cases, and test procedures to be used for CSCI qualification testing or for system qualification testing of a software system.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80015A and DI-MCCR-80310.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7082

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Test preparations. This section shall be divided into the following paragraphs. Safety precautions, marked by WARNING or CAUTION, and security and privacy considerations shall be included as applicable.

3.x (Project-unique identifier of a test). This paragraph shall identify a test by project-unique identifier, shall provide a brief description, and shall be divided into the following subparagraphs. When the information required duplicates information previously specified for another test, that information may be referenced rather than repeated.

3.x.1 Hardware preparation. This paragraph shall describe the procedures necessary to prepare the hardware for the test. Reference may be made to published operating manuals for these procedures. The following shall be provided, as applicable:

a. The specific hardware to be used, identified by name and, if applicable, number

b. Any switch settings and cabling necessary to connect the hardware

c. One or more diagrams to show hardware, interconnecting control, and data paths

d. Step-by-step instructions for placing the hardware in a state of readiness

3.x.2 Software preparation. This paragraph shall describe the procedures necessary to prepare the item(s) under test and any related software, including data, for the test. Reference may be made to published software manuals for these procedures. The following information shall be provided, as applicable:

a. The specific software to be used in the test

b. The storage medium of the item(s) under test (e.g., magnetic tape, diskette)

c. The storage medium of any related software (e.g., simulators, test drivers, databases)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

d. Instructions for loading the software, including required sequence

e. Instructions for software initialization common to more than one test case

3.x.3 Other pre-test preparations. This paragraph shall describe any other pre-test personnel actions, preparations, or procedures necessary to perform the test.

4. Test descriptions. This section shall be divided into the following paragraphs. Safety precautions, marked by WARNING or CAUTION, and security and privacy considerations shall be included as applicable.

4.x (Project-unique identifier of a test). This paragraph shall identify a test by project-unique identifier and shall be divided into the following subparagraphs. When the required information duplicates information previously provided, that information may be referenced rather than repeated.

4.x.y (Project-unique identifier of a test case). This paragraph shall identify a test case by project-unique identifier, state its purpose, and provide a brief description. The following subparagraphs shall provide a detailed description of the test case.

4.x.y.1 Requirements addressed. This paragraph shall identify the CSCI or system requirements addressed by the test case. (Alternatively, this information may be provided in 5.a.)

4.x.y.2 Prerequisite conditions. This paragraph shall identify any prerequisite conditions that must be established prior to performing the test case. The following considerations shall be discussed, as applicable:

a. Hardware and software configuration

b. Flags, initial breakpoints, pointers, control parameters, or initial data to be set/reset prior to test commencement

c. Preset hardware conditions or electrical states necessary to run the test case

d. Initial conditions to be used in making timing measurements

e. Conditioning of the simulated environment

f. Other special conditions peculiar to the test case

4.x.y.3 Test inputs. This paragraph shall describe the test inputs necessary for the test case. The following shall be provided, as applicable:

a. Name, purpose, and description (e.g., range of values, accuracy) of each test input

b. Source of the test input and the method to be used for selecting the test input

c. Whether the test input is real or simulated

d. Time or event sequence of test input

e. The manner in which the input data will be controlled to:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1) Test the item(s) with a minimum/reasonable number of data types and values

2) Exercise the item(s) with a range of valid data types and values that test for overload, saturation, and other "worst case" effects

3) Exercise the item(s) with invalid data types and values to test for appropriate handling of irregular inputs

4) Permit retesting, if necessary

4.x.y.4 Expected test results. This paragraph shall identify all expected test results for the test case. Both intermediate and final test results shall be provided, as applicable.

4.x.y.5 Criteria for evaluating results. This paragraph shall identify the criteria to be used for evaluating the intermediate and final results of the test case. For each test result, the following information shall be provided, as applicable:

a. The range or accuracy over which an output can vary and still be acceptable

b. Minimum number of combinations or alternatives of input and output conditions that constitute an acceptable test result

c. Maximum/minimum allowable test duration, in terms of time or number of events

d. Maximum number of interrupts, halts, or other system breaks that may occur

e. Allowable severity of processing errors

f. Conditions under which the result is inconclusive and re-testing is to be performed

g. Conditions under which the outputs are to be interpreted as indicating irregularities in input test data, in the test database/data files, or in test procedures

h. Allowable indications of the control, status, and results of the test and the readiness for the next test case (may be output of auxiliary test software)

i. Additional criteria not mentioned above.

4.x.y.6 Test procedure. This paragraph shall define the test procedure for the test case. The test procedure shall be defined as a series of individually numbered steps listed sequentially in the order in which the steps are to be performed. For convenience in document maintenance, the test procedures may be included as an appendix and referenced in this paragraph. The appropriate level of detail in each test procedure depends on the type of software being tested. For some software, each keystroke may be a separate test procedure step; for most software, each step may include a logically related series of keystrokes or other actions. The appropriate level of detail is the level at which it is useful to specify expected results and compare them to actual results. The following shall be provided for each test procedure, as applicable:

a. Test operator actions and equipment operation required for each step, including commands, as applicable, to:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1) Initiate the test case and apply test inputs
2) Inspect test conditions
3) Perform interim evaluations of test results
4) Record data
5) Halt or interrupt the test case
6) Request data dumps or other aids, if needed
7) Modify the database/data files
8) Repeat the test case if unsuccessful
9) Apply alternate modes as required by the test case
10) Terminate the test case

b. Expected result and evaluation criteria for each step

c. If the test case addresses multiple requirements, identification of which test procedure step(s) address which requirements. (Alternatively, this information may be provided in 5.)

d. Actions to follow in the event of a program stop or indicated error, such as:

1) Recording of critical data from indicators for reference purposes
2) Halting or pausing time-sensitive test-support software and test apparatus
3) Collection of system and operator records of test results

e. Procedures to be used to reduce and analyze test results to accomplish the following, as applicable:

1) Detect whether an output has been produced
2) Identify media and location of data produced by the test case
3) Evaluate output as a basis for continuation of test sequence
4) Evaluate test output against required output

4.x.y.7 Assumptions and constraints. This paragraph shall identify any assumptions made and constraints or limitations imposed in the description of the test case due to system or test conditions, such as limitations on timing, interfaces, equipment, personnel, and database/data files. If waivers or exceptions to specified limits and parameters are approved, they shall be identified and this paragraph shall address their effects and impacts upon the test case.

5. Requirements traceability. This paragraph shall contain:

a. Traceability from each test case in this STD to the system or CSCI requirements it addresses. If a test case addresses multiple requirements, traceability from each set of test procedure steps to the requirement(s) addressed. (Alternatively, this traceability may be provided in 4.x.y.1.)

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

b. Traceability from each system or CSCI requirement covered by this STD to the test case(s) that address it. For CSCI testing, traceability from each CSCI requirement in the CSCI's Software Requirements Specification (SRS) and associated Interface Requirements Specifications (IRSs). For system testing, traceability from each system requirement in the system's System/Subsystem Specification (SSS) and associated IRSs. If a test case addresses multiple requirements, the traceability shall indicate the particular test procedure steps that address each requirement.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE

SOFTWARE TEST PLAN (STP)

2. IDENTIFICATION NUMBER

DI-IPSC-81438

3. DESCRIPTION/PURPOSE

3.1 The Software Test Plan (STP) describes plans for qualification testing of Computer Software Configuration Items (CSCIs) and software systems. It describes the software test environment to be used for the testing, identifies the tests to be performed, and provides schedules for test activities.

3.2 There is usually a single STP for a project. The STP enables the acquirer to assess the adequacy of planning for CSCI and, if applicable, software system qualification testing.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to develop and record plans for conducting CSCI qualification testing and/or system qualification testing of a software system.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80014A, DI-IPSC-80697, DI-MCCR-80307, DI-MCCR-80308, and DI-MCCR-80309.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7081

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

1.4 Relationship to other plans. This paragraph shall describe the relationship, if any, of the STP to related project management plans.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this plan. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Software test environment. This section shall be divided into the following paragraphs to describe the software test environment at each intended test site. Reference may be made to the Software Development Plan (SDP) for resources that are described there.

3.x (Name of test site(s)). This paragraph shall identify one or more test sites to be used for the testing, and shall be divided into the following subparagraphs to describe the software test environment at the site(s). If all tests will be conducted at a single site, this paragraph and its subparagraphs shall be presented only once. If multiple test sites use the same or similar software test environments, they may be discussed together. Duplicative information among test site descriptions may be reduced by referencing earlier descriptions.

3.x.1 Software items. This paragraph shall identify by name, number, and version, as applicable, the software items (e.g., operating systems, compilers, communications software, related applications software, databases, input files, code auditors, dynamic path analyzers, test drivers, preprocessors, test data generators, test control software, other special test software, post-processors) necessary to perform the planned testing activities at the test site(s). This paragraph shall describe the purpose of each item, describe its media (tape, disk, etc.), identify those that are expected to be supplied by the site, and identify any classified processing or other security or privacy issues associated with the software items.

3.x.2 Hardware and firmware items. This paragraph shall identify by name, number, and version, as applicable, the computer hardware, interfacing equipment, communications equipment, test data reduction equipment, apparatus such as extra peripherals (tape drives, printers, plotters), test message generators, test timing devices, test event records, etc., and firmware items that will be used in the software test environment at the test site(s). This paragraph shall describe the purpose of each item, state the period of usage and the number

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

of each item needed, identify those that are expected to be supplied by the site, and identify any classified processing or other security or privacy issues associated with the items.

3.x.3 Other materials. This paragraph shall identify and describe any other materials needed for the testing at the test site(s). These materials may include manuals, software listings, media containing the software to be tested, media containing data to be used in the tests, sample listings of outputs, and other forms or instructions. This paragraph shall identify those items that are to be delivered to the site and those that are expected to be supplied by the site. The description shall include the type, layout, and quantity of the materials, as applicable. This paragraph shall identify any classified processing or other security or privacy issues associated with the items.

3.x.4 Proprietary nature, acquirer's rights, and licensing. This paragraph shall identify the proprietary nature, acquirer's rights, and licensing issues associated with each element of the software test environment.

3.x.5 Installation, testing, and control. This paragraph shall identify the developer's plans for performing each of the following, possibly in conjunction with personnel at the test site(s):

a. Acquiring or developing each element of the software test environment
b. Installing and testing each item of the software test environment prior to its use
c. Controlling and maintaining each item of the software test environment

3.x.6 Participating organizations. This paragraph shall identify the organizations that will participate in the testing at the test sites(s) and the roles and responsibilities of each.

3.x.7 Personnel. This paragraph shall identify the number, type, and skill level of personnel needed during the test period at the test site(s), the dates and times they will be needed, and any special needs, such as multishift operation and retention of key skills to ensure continuity and consistency in extensive test programs.

3.x.8 Orientation plan. This paragraph shall describe any orientation and training to be given before and during the testing. This information shall be related to the personnel needs given in 3.x.7. This training may include user instruction, operator instruction, maintenance and control group instruction, and orientation briefings to staff personnel. If extensive training is anticipated, a separate plan may be developed and referenced here.

3.x.9 Tests to be performed. This paragraph shall identify, by referencing section 4, the tests to be performed at the test site(s).

4. Test identification. This section shall be divided into the following paragraphs to identify and describe each test to which this STP applies.

4.1 General information. This paragraph shall be divided into subparagraphs to present general information applicable to the overall testing to be performed.

4.1.1 Test levels. This paragraph shall describe the levels at which testing will be performed, for example, CSCI level or system level.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.1.2 Test classes. This paragraph shall describe the types or classes of tests that will be performed (for example, timing tests, erroneous input tests, maximum capacity tests).

4.1.3 General test conditions. This paragraph shall describe conditions that apply to all of the tests or to a group of tests. For example: "Each test shall include nominal, maximum, and minimum values;" "each test of type x shall use live data;" "execution size and time shall be measured for each CSCI." Included shall be a statement of the extent of testing to be performed and rationale for the extent selected. The extent of testing shall be expressed as a percentage of some well defined total quantity, such as the number of samples of discrete operating conditions or values, or other sampling approach. Also included shall be the approach to be followed for retesting/regression testing.

4.1.4 Test progression. In cases of progressive or cumulative tests, this paragraph shall explain the planned sequence or progression of tests.

4.1.5 Data recording, reduction, and analysis. This paragraph shall identify and describe the data recording, reduction, and analysis procedures to be used during and after the tests identified in this STP. These procedures shall include, as applicable, manual, automatic, and semi-automatic techniques for recording test results, manipulating the raw results into a form suitable for evaluation, and retaining the results of data reduction and analysis.

4.2 Planned tests. This paragraph shall be divided into the following subparagraphs to describe the total scope of the planned testing.

4.2.x (Item(s) to be tested). This paragraph shall identify a CSCI, subsystem, system, or other entity by name and project-unique identifier, and shall be divided into the following subparagraphs to describe the testing planned for the item(s). (Note: the "tests" in this plan are collections of test cases. There is no intent to describe each test case in this document.)

4.2.x.y (Project-unique identifier of a test). This paragraph shall identify a test by project-unique identifier and shall provide the information specified below for the test. Reference may be made as needed to the general information in 4.1.

a. Test objective

b. Test level

c. Test type or class

d. Qualification method(s) as specified in the requirements specification

e. Identifier of the CSCI requirements and, if applicable, software system requirements addressed by this test. (Alternatively, this information may be provided in Section 6.)

f. Special requirements (for example, 48 hours of continuous facility time, weapon simulation, extent of test, use of a special input or database)

g. Type of data to be recorded

h. Type of data recording/reduction/analysis to be employed

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

i. Assumptions and constraints, such as anticipated limitations on the test due to system or test conditions--timing, interfaces, equipment, personnel, database, etc.

j. Safety, security, and privacy considerations associated with the test

5. Test schedules. This section shall contain or reference the schedules for conducting the tests identified in this plan. It shall include:

a. A listing or chart depicting the sites at which the testing will be scheduled and the time frames during which the testing will be conducted

b. A schedule for each test site depicting the activities and events listed below, as applicable, in chronological order with supporting narrative as necessary:

1) On-site test period and periods assigned to major portions of the testing

2) Pretest on-site period needed for setting up the software test environment and other equipment, system debugging, orientation, and familiarization

3) Collection of database/data file values, input values, and other operational data needed for the testing

4) Conducting the tests, including planned retesting

5) Preparation, review, and approval of the Software Test Report (STR)

6. Requirements traceability. This paragraph shall contain:

a. Traceability from each test identified in this plan to the CSCI requirements and, if applicable, software system requirements it addresses. (Alternatively, this traceability may be provided in 4.2.x.y and referenced from this paragraph.)

b. Traceability from each CSCI requirement and, if applicable, each software system requirement covered by this test plan to the test(s) that address it. The traceability shall cover the CSCI requirements in all applicable Software Requirements Specifications (SRSs) and associated Interface Requirements Specifications (IRSs), and, for software systems, the system requirements in all applicable System/ Subsystem Specifications (SSSs) and associated system-level IRSs.

7. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE TEST REPORT (STR)	DI-IPSC-81440

3. DESCRIPTION/PURPOSE

3.1 The Software Test Report (STR) is a record of the qualification testing performed on a Computer Software Configuration Item (CSCI), a software system or subsystem, or other software-related item.

3.2 The STR enables the acquirer to assess the testing and its results.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to analyze and record the results of CSCI qualification testing, system qualification testing of a software system, or other testing identified in the contract.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80017A, DI-IPSC-80698, and DI-MCCR-80311.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7083

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this report. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Overview of test results. This section shall be divided into the following paragraphs to provide an overview of test results.

3.1 Overall assessment of the software tested. This paragraph shall:

a. Provide an overall assessment of the software as demonstrated by the test results in this report

b. Identify any remaining deficiencies, limitations, or constraints that were detected by the testing performed. Problem/change reports may be used to provide deficiency information.

c. For each remaining deficiency, limitation, or constraint, describe:

1) Its impact on software and system performance, including identification of requirements not met

2) The impact on software and system design to correct it

3) A recommended solution/approach for correcting it

3.2 Impact of test environment. This paragraph shall provide an assessment of the manner in which the test environment may be different from the operational environment and the effect of this difference on the test results.

3.3 Recommended improvements. This paragraph shall provide any recommended improvements in the design, operation, or testing of the software tested. A discussion of each recommendation and its impact on the software may be provided. If no recommended improvements are provided, this paragraph shall state "None."

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4. Detailed test results. This section shall be divided into the following paragraphs to describe the detailed results for each test. Note: The word "test" means a related collection of test cases.

4.x (Project-unique identifier of a test). This paragraph shall identify a test by project-unique identifier and shall be divided into the following subparagraphs to describe the test results.

4.x.1 Summary of test results. This paragraph shall summarize the results of the test. The summary shall include, possibly in a table, the completion status of each test case associated with the test (for example, "all results as expected," "problems encountered," "deviations required"). When the completion status is not "as expected," this paragraph shall reference the following paragraphs for details.

4.x.2 Problems encountered. This paragraph shall be divided into subparagraphs that identify each test case in which one or more problems occurred.

4.x.2.y (Project-unique identifier of a test case). This paragraph shall identify by project-unique identifier a test case in which one or more problems occurred, and shall provide:

a. A brief description of the problem(s) that occurred

b. Identification of the test procedure step(s) in which they occurred

c. Reference(s) to the associated problem/change report(s) and backup data, as applicable

d. The number of times the procedure or step was repeated in attempting to correct the problem(s) and the outcome of each attempt

e. Back-up points or test steps where tests were resumed for retesting

4.x.3 Deviations from test cases/procedures. This paragraph shall be divided into subparagraphs that identify each test case in which deviations from test case/test procedures occurred.

4.x.3.y (Project-unique identifier of a test case). This paragraph shall identify by project-unique identifier a test case in which one or more deviations occurred, and shall provide:

a. A description of the deviation(s) (for example, test case run in which the deviation occurred and nature of the deviation, such as substitution of required equipment, procedural steps not followed, schedule deviations). (Red-lined test procedures may be used to show the deviations)

b. The rationale for the deviation(s)

c. An assessment of the deviations' impact on the validity of the test case

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5. Test log. This section shall present, possibly in a figure or appendix, a chronological record of the test events covered by this report. This test log shall include:

a. The date(s), time(s), and location(s) of the tests performed

b. The hardware and software configurations used for each test including, as applicable, part/model/serial number, manufacturer, revision level, and calibration date of all hardware, and version number and name for the software components used

c. The date and time of each test-related activity, the identity of the individual(s) who performed the activity, and the identities of witnesses, as applicable

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE TRANSITION PLAN (STrP)	DI-IPSC-81429

3. DESCRIPTION/PURPOSE

3.1 The Software Transition Plan (STrP) identifies the hardware, software, and other resources needed for life cycle support of deliverable software and describes the developer's plans for transitioning deliverable items to the support agency.

3.2 The STrP is developed if the software support concept calls for transition of responsibility from the developer to a separate support agency. The STrP may also be used by the acquirer for updating the Computer Resources Life Cycle Management Plan.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to develop and record plans for transitioning deliverable items to the support agency.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80024A.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7072

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

1.4 Relationship to other plans. This paragraph shall describe the relationship, if any, of the STrP to other project management plans.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Software support resources. This section shall be divided into paragraphs to identify and describe the resources needed to support the deliverable software. These resources shall include items needed to control, copy, and distribute the software and its documentation, and to specify, design, implement, document, test, evaluate, control, copy, and distribute modifications to the software.

3.1 Facilities. This paragraph shall describe the facilities needed to support the deliverable software. These facilities may include special buildings, rooms, mock-ups, building features such as raised flooring or cabling; building features to support security and privacy requirements (TEMPEST shielding, vaults, etc.), building features to support safety requirements (smoke alarms, safety glass, etc.), special power requirements, and so on. The purpose of each item shall be described. Diagrams may be included as applicable.

3.2 Hardware. This paragraph shall identify and describe the hardware and associated documentation needed to support the deliverable software. This hardware may include computers, peripheral equipment, hardware simulators, stimulators, emulators, diagnostic equipment, and non-computer equipment. The description shall include:

a. Specific models, versions, and configurations

b. Rationale for the selected hardware

c. Reference to user/operator manuals or instructions for each item, as applicable

d. Identification of each hardware item and document as acquirer-furnished, an item that will be delivered to the support agency, an item the support agency is known to have, an item the support agency must acquire, or other description of status

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. If items must be acquired, information about a current source of supply, including whether the item is currently available and whether it is expected to be available at the time of delivery

f. Information about manufacturer support, licensing, and data rights, including whether the item is currently supported by the manufacturer, whether it is expected to be supported at the time of delivery, whether licenses will be assigned to the support agency, and the terms of such licenses

g. Security and privacy considerations, limitations, or other items of interest

3.3 Software. This paragraph shall identify and describe the software and associated documentation needed to support the deliverable software. This software may include computer-aided software engineering (CASE) tools, data in these tools, compilers, test tools, test data, simulations, emulations, utilities, configuration management tools, databases and data files, and other software. The description shall include:

a. Specific names, identification numbers, version numbers, release numbers, and configurations, as applicable

b. Rationale for the selected software

c. Reference to user/operator manuals or instructions for each item, as applicable

d. Identification of each software item and document as acquirer-furnished, an item that will be delivered to the support agency, an item the support agency is known to have, an item the support agency must acquire, or other description of status

e. If items must be acquired, information about a current source of supply, including whether the item is currently available and whether it is expected to be available at the time of delivery

f. Information about vendor support, licensing, and data rights, including whether the item is currently supported by the vendor, whether it is expected to be supported at the time of delivery, whether licenses will be assigned to the support agency, and the terms of such licenses

g. Security and privacy considerations, limitations, or other items of interest

3.4 Other documentation. This paragraph shall identify any other documentation needed to support the deliverable software. The list will include, for example, plans, reports, studies, specifications, design descriptions, test cases/procedures, test reports, user/operator manuals, and support manuals for the deliverable software. This paragraph shall provide:

a. Names, identification numbers, version numbers, and release numbers, as applicable

b. Rationale for including each document in the list

c. Identification of each document as acquirer-furnished, an item that will be delivered to the support agency, an item the support agency is known to have, an item the support agency must acquire, or other description of status

d. If a document must be acquired, information about where to acquire it

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

e. Information about licensing and data rights

f. Security and privacy considerations, limitations, or other items of interest

3.5 Personnel. This paragraph shall describe the personnel needed to support the deliverable software, including anticipated number of personnel, types and levels of skills and expertise, and security clearances. This paragraph shall cite, as applicable, actual staffing on the development project as a basis for the staffing needs cited.

3.6 Other resources. This paragraph shall identify any other resources needed to support the deliverable software. Included may be consumables such as magnetic tapes and diskettes, together with an estimate of the type and number that should be acquired.

3.7 Interrelationship of components. This paragraph shall identify the interrelationships of the components identified in the preceding paragraphs. A figure may be used to show the interrelationships.

4. Recommended procedures. This section shall be divided into paragraphs as needed to describe any procedures, including advice and lessons learned, that the developer may wish to recommend to the support agency for supporting the deliverable software and associated support environment.

5. Training. This section shall be divided into paragraphs as appropriate to describe the developer's plans for training support personnel to support of the deliverable software. This section shall include:

a. The schedule, duration, and location for the training

b. The delineation between classroom training and "hands-on" training

c. Provision (either directly or by reference) for:

1) Familiarization with the operational software and target computer(s)

2) Familiarization with the support software and host system

6. Anticipated areas of change. This section shall describe anticipated areas of change to the deliverable software.

7. Transition planning. This section shall be divided into paragraphs as needed to describe the developer's plans for transitioning the deliverable software to the support agency. This section shall address the following:

a. All activities to be performed to transition the deliverable software to the support agency. These activities may include planning/coordination meetings; preparation of items to be delivered to the support agency; packaging, shipment, installation, and checkout of the software support environment; packaging, shipment, installation, and checkout of the operational software; and training of support personnel.

b. Roles and responsibilities for each activity

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

c. The resources needed to carry out the transition activities and the source from which each resource will be provided

d. Schedules and milestones for conducting the transition activities. These schedules and milestones shall be compatible with the contract master schedule.

e. Procedures for installation and checkout of deliverable items in the support environment

8. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington , DC 20503.

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE USER MANUAL (SUM)	DI-IPSC-81443

3. DESCRIPTION/PURPOSE

3.1 The Software User Manual (SUM) tells a hands-on software user how to install and use a Computer Software Configuration Item (CSCI), a group of related CSCIs, or a software system or subsystem. It may also cover a particular aspect of software operation, such as instructions for a particular position or task.

3.2 The SUM is developed for software that is run by the user and has a user interface requiring on-line user input or interpretation of displayed output. If the software is embedded in a hardware-software system, user manuals or operating procedures for that system may make separate SUMs unnecessary.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record information needed by hands-on users of software.

7.3 The SUM is an alternative to the Software Input/Output Manual (SIOM) (DI-IPSC-81445) and Software Center Operator Manual (SCOM) (DI-IPSC-81444).

7.4 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.5 This DID supersedes DI-MCCR-80019A, DI-IPSC-80694, DI-MCCR-80313, DI-MCCR-80314, and DI-MCCR-80315.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7086

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents and index. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix, and an index providing an alphabetic listing of key terms and concepts covered in the document and the pages or paragraphs in which the terms or concepts are covered. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this manual and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this manual. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Software summary. This section shall be divided into the following paragraphs.

3.1 Software application. This paragraph shall provide a brief description of the intended uses of the software. Capabilities, operating improvements, and benefits expected from its use shall be described.

3.2 Software inventory. This paragraph shall identify all software files, including databases and data files, that must be installed for the software to operate. The identification shall include security and privacy considerations for each file and identification of the software necessary to continue or resume operation in case of an emergency.

3.3 Software environment. This paragraph shall identify the hardware, software, manual operations, and other resources needed for a user to install and run the software. Included, as applicable, shall be identification of:

a. Computer equipment that must be present, including amount of memory needed, amount of auxiliary storage needed, and peripheral equipment such as printers and other input/output devices
b. Communications equipment that must be present
c. Other software that must be present, such as operating systems, databases, data files, utilities, and other supporting systems
d. Forms, procedures, or other manual operations that must be present
e. Other facilities, equipment, or resources that must be present

3.4 Software organization and overview of operation. This paragraph shall provide a brief description of the organization and operation of the software from the user's point of view. The description shall include, as applicable:

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

a. Logical components of the software, from the user's point of view, and an overview of the purpose/operation of each component

b. Performance characteristics that can be expected by the user, such as:

1) Types, volumes, rate of inputs accepted

2) Types, volume, accuracy, rate of outputs that the software can produce

3) Typical response time and factors that affect it

4) Typical processing time and factors that affect it

5) Limitations, such as number of events that can be tracked

6) Error rate that can be expected

7) Reliability that can be expected

c. Relationship of the functions performed by the software with interfacing systems, organizations, or positions

d. Supervisory controls that can be implemented (such as passwords) to manage the software

3.5 Contingencies and alternate states and modes of operation. This paragraph shall explain differences in what the user will be able to do with the software at times of emergency and in various states and modes of operation, if applicable.

3.6 Security and privacy. This paragraph shall contain an overview of the security and privacy considerations associated with the software. A warning shall be included regarding making unauthorized copies of software or documents, if applicable.

3.7 Assistance and problem reporting. This paragraph shall identify points of contact and procedures to be followed to obtain assistance and report problems encountered in using the software.

4. Access to the software. This section shall contain step-by-step procedures oriented to the first time/occasional user. Enough detail shall be presented so that the user can reliably access the software before learning the details of its functional capabilities. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

4.1 First-time user of the software. This paragraph shall be divided into the following subparagraphs.

4.1.1 Equipment familiarization. This paragraph shall describe the following as appropriate:

a. Procedures for turning on power and making adjustments

b. Dimensions and capabilities of the visual display screen

c. Appearance of the cursor, how to identify an active cursor if more than one cursor can appear, how to position a cursor, and how to use a cursor

d. Keyboard layout and role of different types of keys and pointing devices

e. Procedures for turning power off if special sequencing of operations is needed

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

4.1.2 Access control. This paragraph shall present an overview of the access and security features of the software that are visible to the user. The following items shall be included, as applicable:

a. How and from whom to obtain a password
b. How to add, delete, or change passwords under user control
c. Security and privacy considerations pertaining to the storage and marking of output reports and other media that the user will generate

4.1.3 Installation and setup. This paragraph shall describe any procedures that the user must perform to be identified or authorized to access or install software on the equipment, to perform the installation, to configure the software, to delete or overwrite former files or data, and to enter parameters for software operation.

4.2 Initiating a session. This paragraph shall provide step-by-step procedures for beginning work, including any options available. A checklist for problem determination shall be included in case difficulties are encountered.

4.3 Stopping and suspending work. This paragraph shall describe how the user can cease or interrupt use of the software and how to determine whether normal termination or cessation has occurred.

5. Processing reference guide. This section shall provide the user with procedures for using the software. If procedures are complicated or extensive, additional Sections 6, 7, ... may be added in the same paragraph structure as this section and with titles meaningful to the sections selected. The organization of the document will depend on the characteristics of the software being documented. For example, one approach is to base the sections on the organizations in which users work, their assigned positions, their work sites, or the tasks they must perform. For other software, it may be more appropriate to have Section 5 be a guide to menus, Section 6 be a guide to the command language used, and Section 7 be a guide to functions. Detailed procedures are intended to be presented in subparagraphs of paragraph 5.3. Depending on the design of the software, the subparagraphs might be organized on a function-by-function, menu-by-menu, transaction-by-transaction, or other basis. Safety precautions, marked by WARNING or CAUTION, shall be included where applicable.

5.1 Capabilities. This paragraph shall briefly describe the interrelationships of the transactions, menus, functions, or other processes in order to provide an overview of the use of the software.

5.2 Conventions. This paragraph shall describe any conventions used by the software, such as the use of colors in displays, the use of audible alarms, the use of abbreviated vocabulary, and the use of rules for assigning names or codes.

5.3 Processing procedures. This paragraph shall explain the organization of subsequent paragraphs, e.g., by function, by menu, by screen. Any necessary order in which procedures must be accomplished shall be described.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

5.3.x (Aspect of software use). The title of this paragraph shall identify the function, menu, transaction, or other process being described. This paragraph shall describe and give options and examples, as applicable, of menus, graphical icons, data entry forms, user inputs, inputs from other software or hardware that may affect the software's interface with the user, outputs, diagnostic or error messages or alarms, and help facilities that can provide on-line descriptive or tutorial information. The format for presenting this information can be adapted to the particular characteristics of the software, but a consistent style of presentation shall be used, i.e., the descriptions of menus shall be consistent, the descriptions of transactions shall be consistent among themselves.

5.4 Related processing. This paragraph shall identify and describe any related batch, offline, or background processing performed by the software that is not invoked directly by the user and is not described in paragraph 5.3. Any user responsibilities to support this processing shall be specified.

5.5 Data backup. This paragraph shall describe procedures for creating and retaining backup data that can be used to replace primary copies of data in event of errors, defects, malfunctions, or accidents.

5.6 Recovery from errors, malfunctions, and emergencies. This paragraph shall present detailed procedures for restart or recovery from errors or malfunctions occurring during processing and for ensuring continuity of operations in the event of emergencies.

5.7 Messages. This paragraph shall list, or refer to an appendix that lists, all error messages, diagnostic messages, and information messages that can occur while accomplishing any of the user's functions. The meaning of each message and the action that should be taken after each such message shall be identified and described.

5.8 Quick-reference guide. If appropriate to the software, this paragraph shall provide or reference a quick-reference card or page for using the software. This quick-reference guide shall summarize, as applicable, frequently-used function keys, control sequences, formats, commands, or other aspects of software use.

6. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of terms and definitions needed to understand this document. If section 5 has been expanded into section(s) 6, ..., this section shall be numbered as the next section following section n.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).

DATA ITEM DESCRIPTION

Form Approved
OMB NO.0704-0188

Public reporting burden for collection of this information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate of Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

1. TITLE
SOFTWARE VERSION DESCRIPTION (SVD)

2. IDENTIFICATION NUMBER
DI-IPSC-81442

3. DESCRIPTION/PURPOSE

3.1 The Software Version Description (SVD) identifies and describes a software version consisting of one or more Computer Software Configuration Items (CSCIs). It is used to release, track, and control software versions.

3.2 The term "version" may be applied to the initial release of the software, to a subsequent release of that software, or to one of multiple forms of the software released at approximately the same time (for example, to different sites).

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY	6a. DTIC APPLICABLE	6b. GIDEP APPLICABLE
941205	EC		

7. APPLICATION/INTERRELATIONSHIP

7.1 This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by specific and discrete task requirements as delineated in the contract.

7.2 This DID is used when the developer is tasked to identify and record the exact version of software to be delivered to a user, support, or other site.

7.3 The Contract Data Requirements List (CDRL) (DD 1423) should specify whether deliverable data are to be delivered on paper or electronic media; are to be in a given electronic form (such as ASCII, CALS, or compatible with a specified word processor or other support software); may be delivered in developer format rather than in the format specified herein; and may reside in a computer-aided software engineering (CASE) or other automated tool rather than in the form of a traditional document.

7.4 This DID supersedes DI-MCCR-80013A, and DI-MCCR-80312.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
Limited Approval from 12/5/94 through 12/5/96		N7085

10. PREPARATION INSTRUCTIONS

10.1 General instructions.

a. Automated techniques. Use of automated techniques is encouraged. The term "document" in this DID means a collection of data regardless of its medium.

b. Alternate presentation styles. Diagrams, tables, matrices, and other presentation styles are acceptable substitutes for text when data required by this DID can be made more readable using these styles.

(Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

10. PREPARATION INSTRUCTIONS -- 10.1 General Instructions (continued)

c. Title page or identifier. The document shall include a title page containing, as applicable: document number; volume number; version/revision indicator; security markings or other restrictions on the handling of the document; date; document title; name, abbreviation, and any other identifier for the system, subsystem, or item to which the document applies; contract number; CDRL item number; organization for which the document has been prepared; name and address of the preparing organization; and distribution statement. For data in a database or other alternative form, this information shall be included on external and internal labels or by equivalent identification methods.

d. Table of contents. The document shall contain a table of contents providing the number, title, and page number of each titled paragraph, figure, table, and appendix. For data in a database or other alternative form, this information shall consist of an internal or external table of contents containing pointers to, or instructions for accessing, each paragraph, figure, table, and appendix or their equivalents.

e. Page numbering/labeling. Each page shall contain a unique page number and display the document number, including version, volume, and date, as applicable. For data in a database or other alternative form, files, screens, or other entities shall be assigned names or numbers in such a way that desired data can be indexed and accessed.

f. Response to tailoring instructions. If a paragraph is tailored out of this DID, the resulting document shall contain the corresponding paragraph number and title, followed by "This paragraph has been tailored out." For data in a database or other alternative form, this representation need occur only in the table of contents or equivalent.

g. Multiple paragraphs and subparagraphs. Any section, paragraph, or subparagraph in this DID may be written as multiple paragraphs or subparagraphs to enhance readability.

h. Standard data descriptions. If a data description required by this DID has been published in a standard data element dictionary specified in the contract, reference to an entry in that dictionary is preferred over including the description itself.

i. Substitution of existing documents. Commercial or other existing documents may be substituted for all or part of the document if they contain the required data.

10.2 Content requirements. Content requirements begin on the following page. The numbers shown designate the paragraph numbers to be used in the document. Each such number is understood to have the prefix "10.2" within this DID. For example, the paragraph numbered 1.1 is understood to be paragraph 10.2.1.1 within this DID.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

1. Scope. This section shall be divided into the following paragraphs.

1.1 Identification. This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s). It shall also identify the intended recipients of the SVD to the extent that this identification affects the contents of the software released (for example, source code may not be released to all recipients.)

1.2 System overview. This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

1.3 Document overview. This paragraph shall summarize the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

2. Referenced documents. This section shall list the number, title, revision, and date of all documents referenced in this document. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Version description. This section shall be divided into the following paragraphs.

3.1 Inventory of materials released. This paragraph shall list by identifying numbers, titles, abbreviations, dates, version numbers, and release numbers, as applicable, all physical media (for example, listings, tapes, disks) and associated documentation that make up the software version being released. It shall include applicable security and privacy considerations for these items, safeguards for handling them, such as concerns for static and magnetic fields, and instructions and restrictions regarding duplication and license provisions.

3.2 Inventory of software contents. This paragraph shall list by identifying numbers, titles, abbreviations, dates, version numbers, and release numbers, as applicable, all computer files that make up the software version being released. Any applicable security and privacy considerations shall be included.

3.3 Changes installed. This paragraph shall contain a list of all changes incorporated into the software version since the previous version. If change classes have been used, such as the Class I/Class II changes in MIL-STD-973, the changes shall be separated into these classes. This paragraph shall identify, as applicable, the problem reports, change proposals, and change notices associated with each change and the effects, if any, of each change on system operation and on interfaces with other hardware and software. This paragraph does not apply to the initial software version.

3.4 Adaptation data. This paragraph shall identify or reference all unique-to-site data contained in the software version. For software versions after the first, this paragraph shall describe changes made to the adaptation data.

10. PREPARATION INSTRUCTIONS -- 10.2 Content Requirements (continued)

3.5 Related documents. This paragraph shall list by identifying numbers, titles, abbreviations, dates, version numbers, and release numbers, as applicable, all documents pertinent to the software version being released but not included in the release.

3.6 Installation instructions. This paragraph shall provide or reference the following information, as applicable:

a. Instructions for installing the software version

b. Identification of other changes that have to be installed for this version to be used, including site-unique adaptation data not included in the software version

c. Security, privacy, or safety precautions relevant to the installation

d. Procedures for determining whether the version has been installed properly

e. A point of contact to be consulted if there are problems or questions with the installation

3.7 Possible problems and known errors. This paragraph shall identify any possible problems or known errors with the software version at the time of release, any steps being taken to resolve the problems or errors, and instructions (either directly or by reference) for recognizing, avoiding, correcting, or otherwise handling each one. The information presented shall be appropriate to the intended recipient of the SVD (for example, a user agency may need advice on avoiding errors, a support agency on correcting them).

4. Notes. This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

A. Appendixes. Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).