EIA ENGINEERING BULLETIN

Diminishing Manufacturing Sources and Material Shortages (DMSMS) Management Practices

GEB1

WORK IN PROGRESS

ELECTRONIC INDUSTRIES ALLIANCE

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
ENGINEERING DEPARTMENT

GEIA The Government Electronics and Information Technology Association

A SECTOR OF

EIA Electronic Industries Alliance

DMSMS Conference 2000

Scott A. Hatch

Sanders

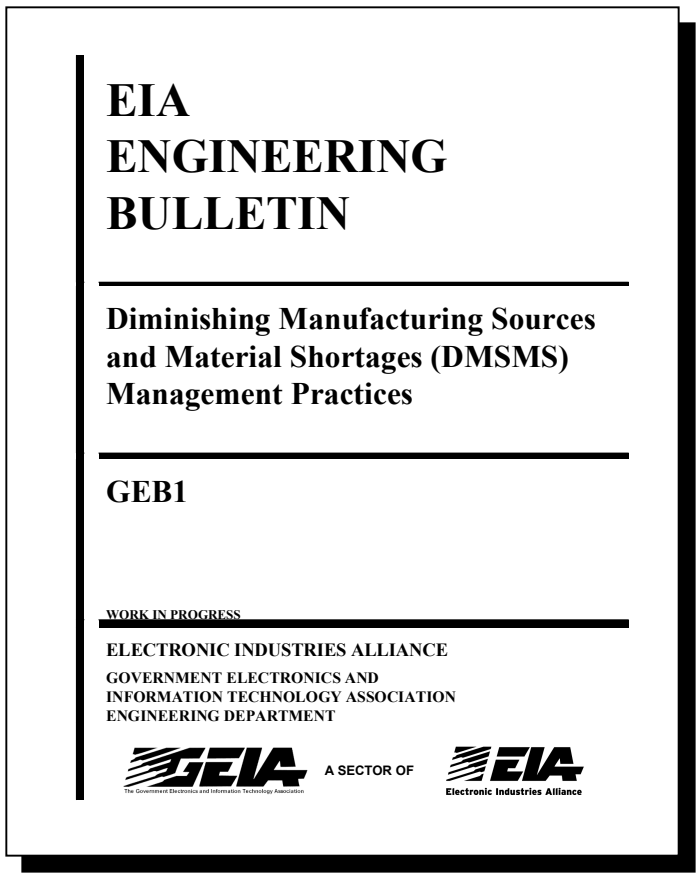
LOCKHEED MARTIN

Scott.A.Hatch@lmco.com

(603) 885-5119

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

EIA GEB1: DMSMS Management Practices



- Provide guidance for Military / Aerospace OEMs
- Incorporate Current Industry Methodologies
- Address DMSMS Mitigation Throughout Equipment Life
- Emphasize proactive DMSMS mitigation approaches

EIA GEB1: DMSMS Management Practices

- Derived from several Industry and Government soruces
- Compiled practices shown to be useful and are used by Industry at large

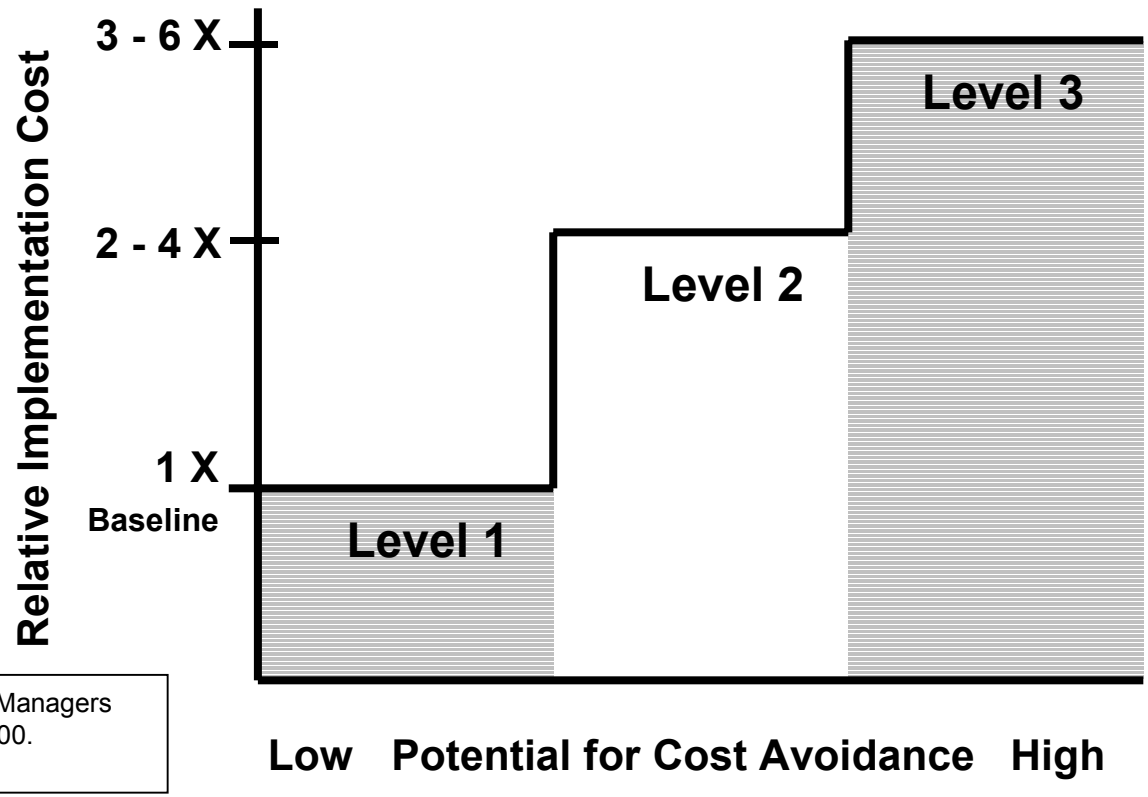
GEB1 Compliments The Program Managers Handbook

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

DMEA

PROGRAM MANAGERS HANDBOOK

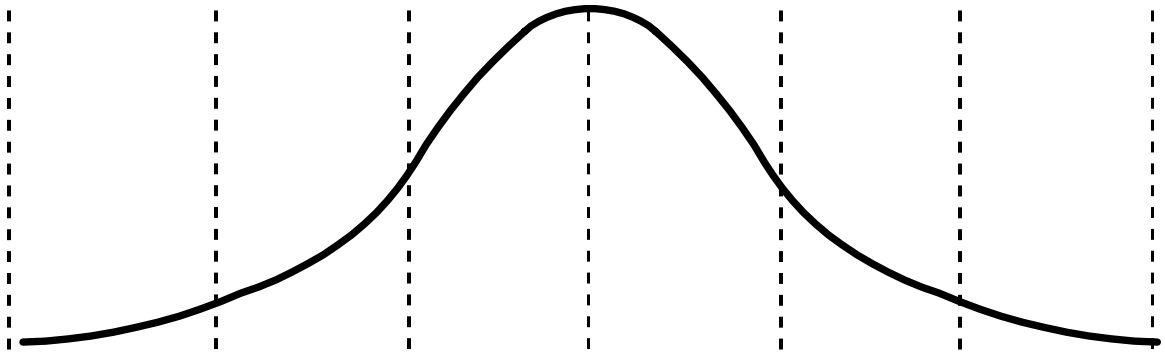
Common Practices to Mitigate the Risk of Obsolescence



Trunnell, W. (DMEA). "A Summary of the Program Managers Handbook." Proceedings of DMSMS Conference 2000. http://smaplab.ri.uah.edu/dmsms2k/ (23 Aug. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

ANSI/EIA-724-97 Product Life Cycle Data Model



	Stage 1 Introduction	Stage 2 Growth	Stage 3 Maturity	Stage 4 Saturation	Stage 5 Decline	Stage 6 Phase-Out
Sales	Slow increase	Increasing rapidly	Stable	Leveling out	Decreasing	Lifetime buys offered
Price	Highest	Declining	Stable	Stable	Rising	High
Usage	Low	Increasing	Stable	Stable	Decreasing	Decreasing
Part Modification[1]	Frequent	Major	Periodic changes	Few	Few or none	None
Competitors	Few	High	Stable number	Decline begins	Declining	Declining
Manufacturer profit	Low	Increasing	Stable	Stable	Reasonable for survivors	Reasonable for survivors (aftermarket)

1. Die shrink, mask change, etc.

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Microcircuit Life Cycles & Introduction Rates

Average Microcircuit Life Span	
Total (all quality ranges)	10 years
Military	> 12.5 years
Commercial	< 8.5 years
Certain Linear	< 14.5 years
Some uP, memories	< 5 years

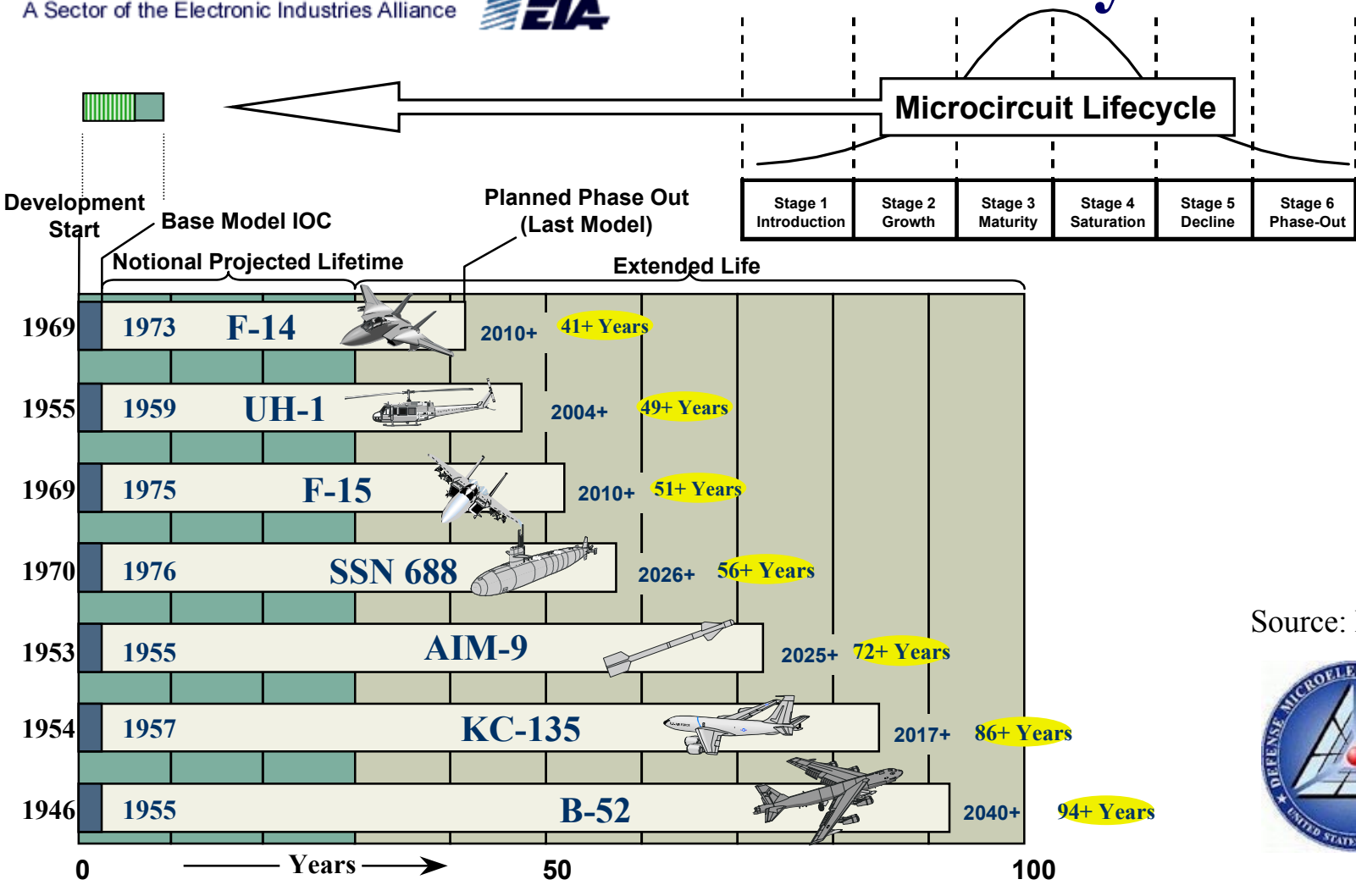
Device Category	Average Introduction Rate
Logic Families	6 years
Memory Families	9 months
Microprocessors	2 years
DSP	3 years
PLD	1 year
Linear Interfaces	8 years
Gate Arrays	2 years

Bick, E. (TACTech Inc.). "New & Improved Life Cycle Codes Updates - Response To AIM Users Regarding The New & Improved LCCs." ebick@tactech.com (20 Jul. 1999).

TACTech Inc. "Obsolescence Management In the Year 2000." 28 Oct. 1998. ftp://tactech.com/pub/overview.exe (14 Jun. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Weapon System Life Cycle



Source: DMEA

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

System Life Cycle Vs. Mitigation Approach

Planning for system upgrades in Phase I & II based upon Technology Insertion Solution

Bridge buy to support production until redesign available

Reclamation typically a last resort

		Phase 0	Phase I	Phase II	Phase III
		Concept Exploration	Program Definition and Risk Reduction	EMD / LRIP	Production, Fielding / Deployment, & Operational Support
Proactive DMSMS Mitigation Approaches (4.1)	Technology Road Mapping	X	X	X	X
	Planned System Upgrade$_1$		X	X	X
	Technology Insertion$_1$	X	X	X	X
	Technology Transparency	X	X	X	X
	Life Cycle Analysis / DMSMS Monitoring		X	X	X
Response to DMSMS Events (4.2)	Alternate Source			X	X
	Substitution			X	X
	Emulation				X
	Life of Type Buy$_2$			X	X
	Redesign / Design Modification$_2$			X	X
	Reverse Engineering				X
	Reclamation$_3$				X

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Technology Roadmapping

ITRS

CRITICAL

Serving the Global Semiconductor Industry Since 1964
ICE
INTEGRATED CIRCUIT ENGINEERING

Phase I: Preliminary Activity

1. Satisfy essential conditions
2. Provide leadership/sponsorship
3. Define the scope and boundaries for technology roadmap

Phase II: Development of the Technology Roadmap

1. Identify the "product" that will be the focus of the roadmap
2. Identify the critical system requirements and their targets
3. Specify the major technology areas
4. Specify the technology drivers and their targets
5. Identify technology alternatives and their time lines
6. Recommend the technology alternatives that should be pursued
7. Create the technology roadmap report

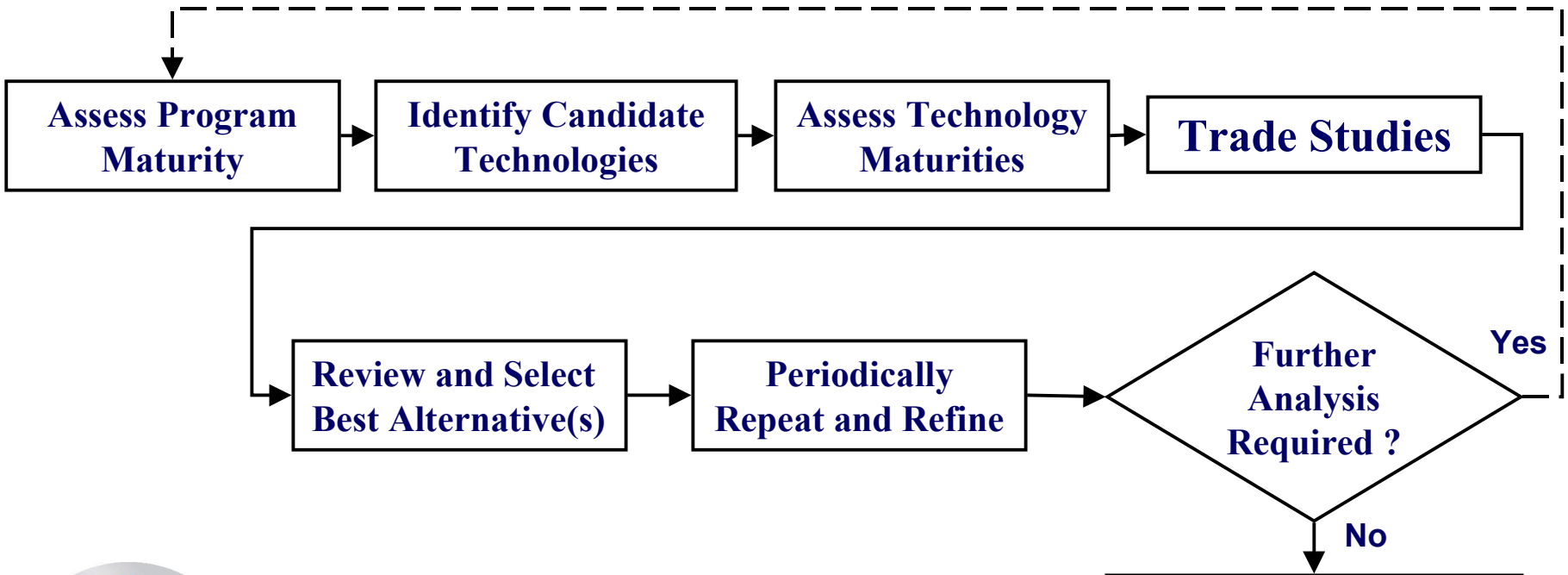
Phase III: Follow-Up Activity

1. Critique and validate the roadmap
2. Develop an implementation plan

Bray, O.H.; Garcia, M.L. "Technology roadmapping: the integration of strategic and technology planning for competitiveness," Innovation in Technology Management - The Key to Global Leadership. PICMET '97: Portland International Conference on Management and Technology, 1997, IEEE, pp.25-28

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Technology Insertion

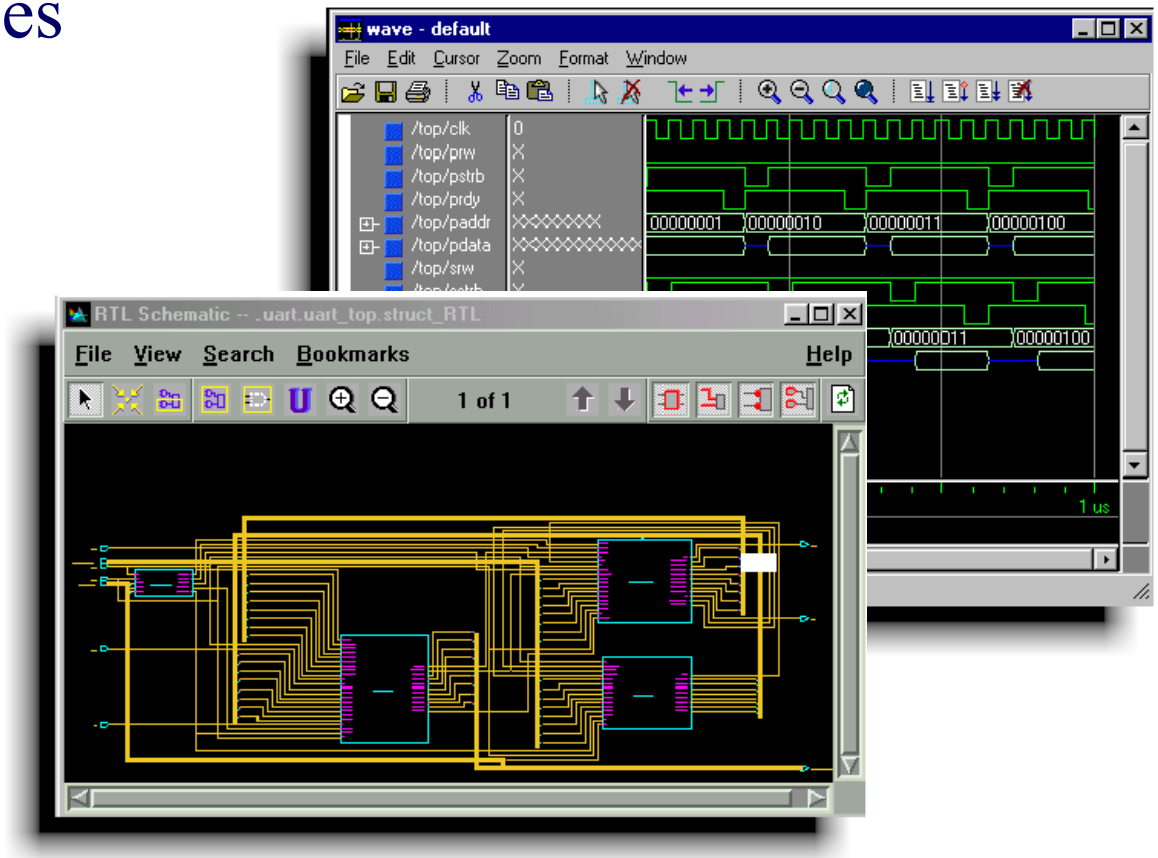


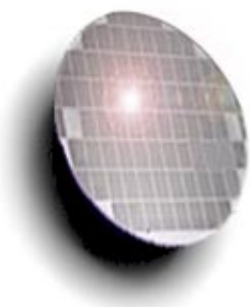
Minter, C. (Best Manufacturing Practices Center of Excellence). "Diminishing Manufacturing Sources and Material Shortages (DMSMS) in the Systems Engineering Process." Proceedings of DMSMS Conference 1999. http://smaplab.ri.uah.edu/dmsms98/papers/minter.pdf (14 Jun. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Technology Transparency

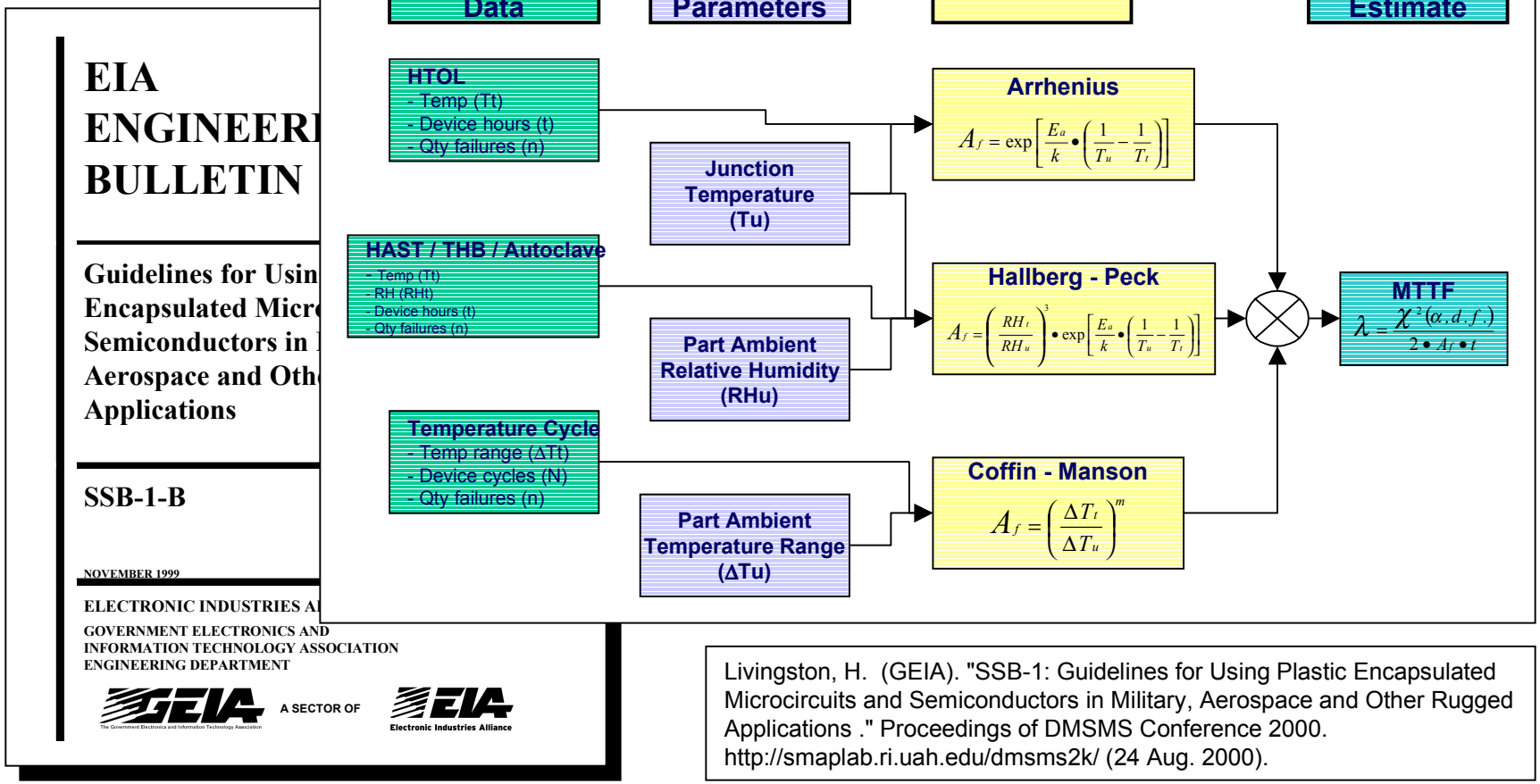
- Standard Interfaces
- VHDL
- Programmable Logic Devices





GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

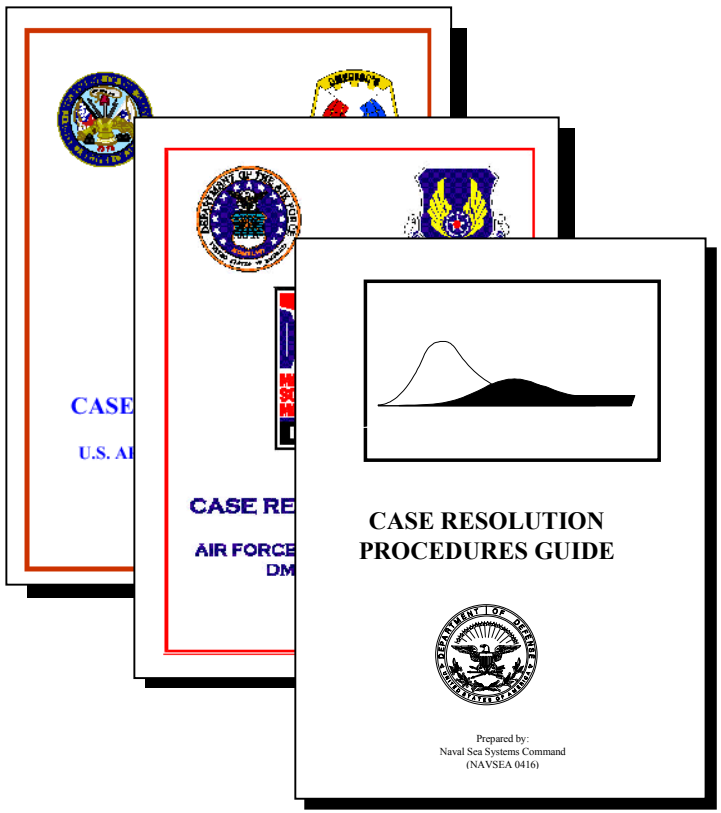
EIA SSB-1 Guidelines for Using PEMS

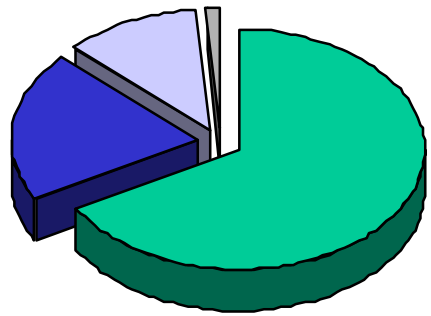


Livingston, H. (GEIA). "SSB-1: Guidelines for Using Plastic Encapsulated Microcircuits and Semiconductors in Military, Aerospace and Other Rugged Applications ." Proceedings of DMSMS Conference 2000. http://smaplab.ri.uah.edu/dmsms2k/ (24 Aug. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Responses to DMSMS Events





- Replacement Part (67%)
- Life-of-Type Buy (20%)
- Bridge Buy / Redesign (12%)
- Emulation (1%)

BOEING

Porter, G.Z. (Boeing Commercial Aircraft Company) "Strategies for Obsolescence Management in the New Millennium." Proceedings of DMSMS Conference 1999. http://smaplab.ri.uah.edu/dmsms98/presentations/porter.pdf (14 Jun. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Nonrecurring Engineering Resolution Cost Factors

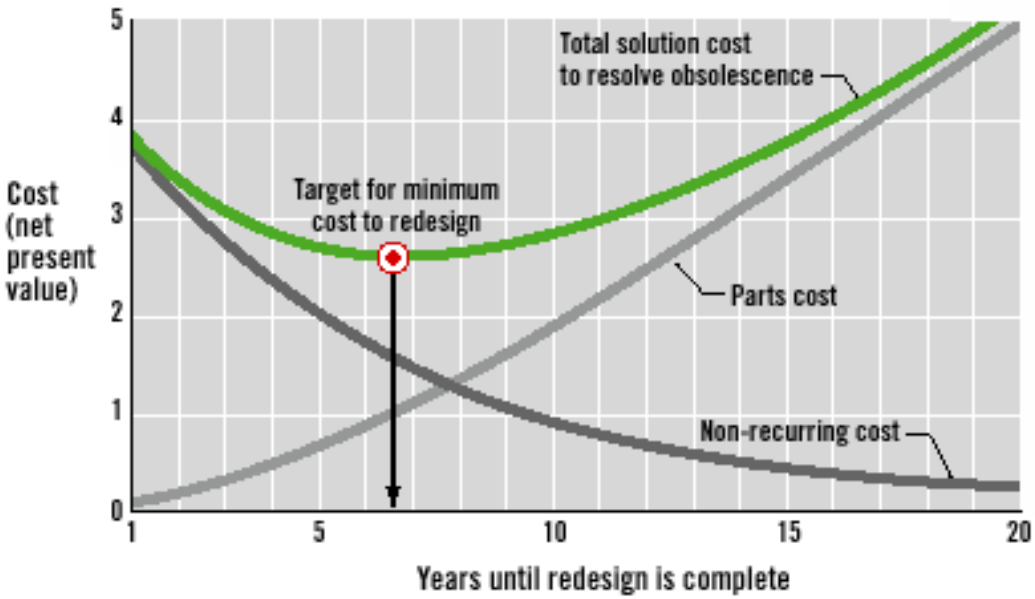
Resolution	Low	Average	High
Existing Stock	$ 0	$ 0	$ 0
Reclamation	$ 629	$ 1,884	$ 3,249
Alternate	$ 2,750	$ 6,384	$ 16,500
Substitute	$ 5,000	$ 18,111	$ 50,276
Aftermarket	$ 15,390	$ 47,360	$ 114,882
Emulation	$ 17,000	$ 68,012	$ 150,000
Redesign— Minor	$ 22,400	$ 111,034	$ 250,000
Redesign— Major	$ 200,000	$ 410,152	$ 770,000
Life of Type (LOT) Buy	*	*	*

* The LOT buy resolution is program-specific and should be calculated by the individual DoD programs.

Defense Microelectronics Activity (DMEA). "Resolution Cost Factors For Diminishing Manufacturing Sources And Material Shortages." May 1999. http://www.dmea.osd.mil/dms_area.html (14 Jun. 2000).

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Economic Method for Evaluating DMSMS Solutions



- **"Redesign Cost"**
  If the redesign can be deferred to a future year, the net present value of the redesign cost decreases.
- **"Parts Cost"**
  As redesign is deferred, more parts need to be purchased to support production and repairs of the current design.
- **"Total Solution Cost"**
  The sum of the two curves is the Total Solution Cost for a redesign in a particular future year.

BOEING®

Porter, G.Z. (Boeing Commercial Aircraft Company). "An Economic Method for Evaluating Electronic Component Obsolescence Solutions." May 1998. http://www.gidep.corona.navy.mil/dmsms/library/zell.pdf (14 Jun. 2000).

EIA ENGINEERING BULLETIN

Diminishing Manufacturing Sources and Material Shortages (DMSMS) Management Practices

GEB1

WORK IN PROGRESS

ELECTRONIC INDUSTRIES ALLIANCE

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
ENGINEERING DEPARTMENT

GEIA The Government Electronics and Information Technology Association A SECTOR OF EIA Electronic Industries Alliance

Feedback with narrative content is welcome:

- **Working draft iterations through October**
- **Ballot GEB1 through GEIA in November**
- **Complete GEB1 for release in January 2001**

Contact ...

Henry Livingston

Henry.C.Livingston@lmco.com

(603) 885-2360

or

Scott A. Hatch

Scott.A.Hatch@lmco.com

(603) 885-5119

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

G-12 Solid State Devices Committee

The G-12 Committee develops solutions to technical problems in the application, standardization, and reliability of solid state devices. This is implemented by evaluation and preparation of recommendations for specifications, standards, and other documents, both government and industry, to assure that solid state devices are suitable for their intended purposes. The G-12 Committee holds three regular meetings a year in conjunction with JEDEC JC-13.

For more information, see …

http://www.geia.org/eoc/G12/

GOVERNMENT ELECTRONICS AND INFORMATION TECHNOLOGY ASSOCIATION
A Sector of the Electronic Industries Alliance

Task Group Members

Henry Livingston	Sanders, a Lockheed Martin Company (Chair)
Tom Dean	Boeing ISDS
Kevin Rankin	Defense Microelectronics Activity
Ron Shimazu	Defense Microelectronics Activity
Mike Jones	Defense Supply Center Columbus
Jack Tarsa	General Dynamics Defense Systems
Bahig Tawfellos	Honeywell International Defense & Space Systems
Lee Mathiesen	Lansdale Semiconductor
Paul Kelley	Litton Aero Products
Vernon Singleton	Lockheed Martin Federal Systems
Frances Crull	Northrop Grumman, ESSD
Keith Meyer	NWSC DMS Technology Center
Wes Hubbell	Raytheon
John Nirschl	Rockwell Collins
Scott Hatch	Sanders, a Lockheed Martin Company
Justine Corby	Sarnoff Corporation