

Systems Engineering Opportunities in the Emerging PBL World



October 21, 2009



Michael D. "Bo" Gourley, DML
Logistics Engineering Principal

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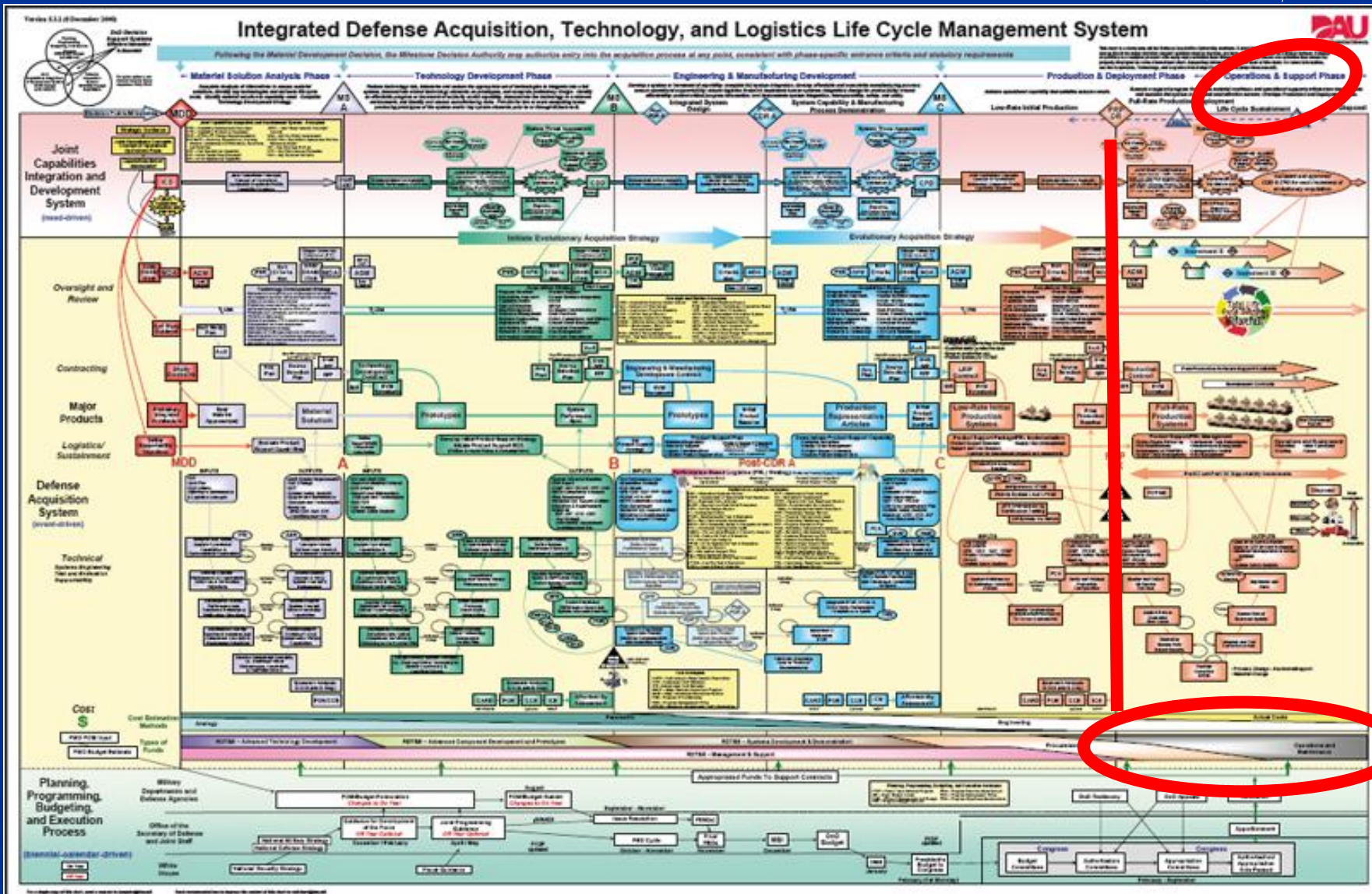


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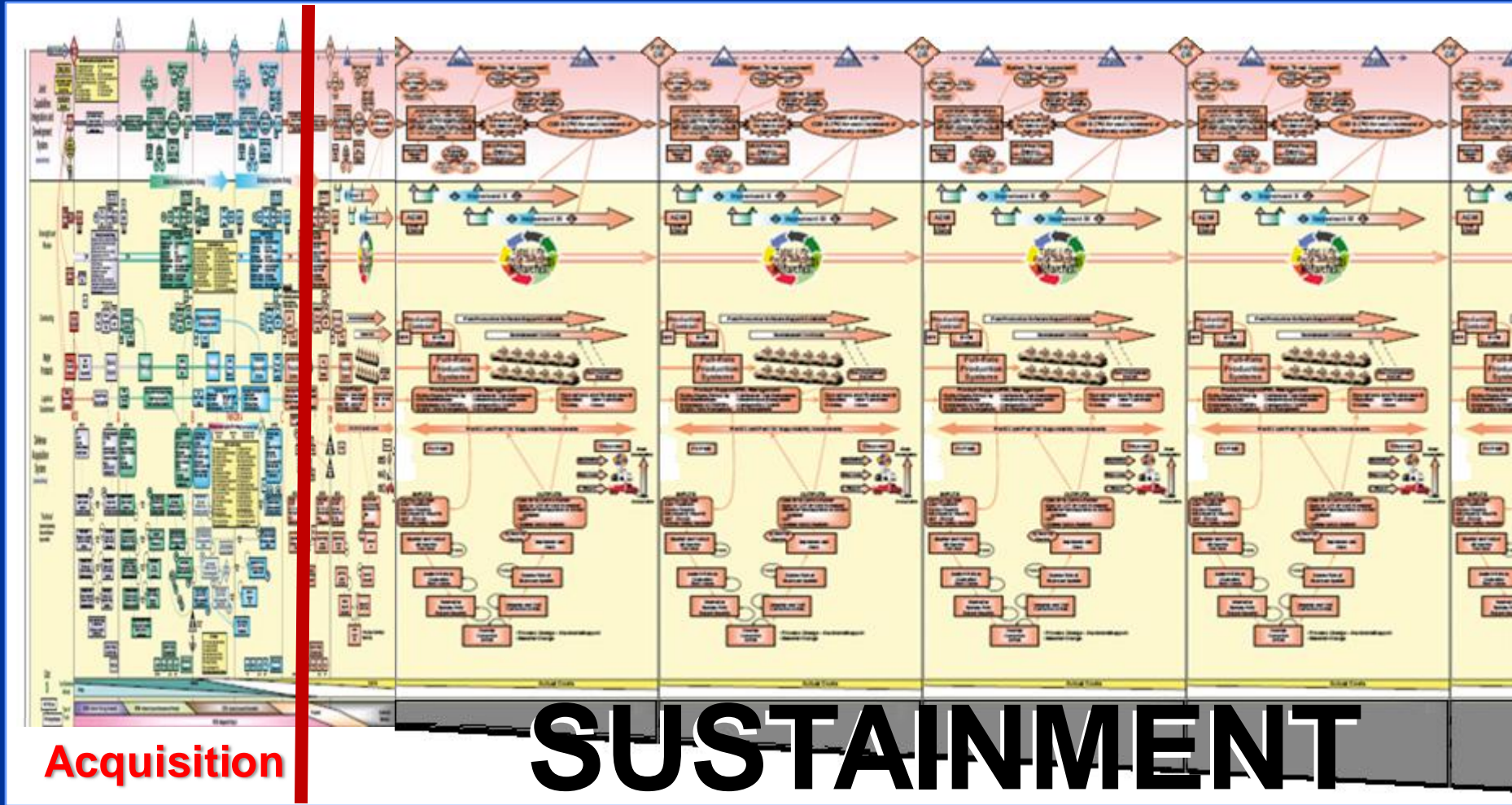


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Life Cycle Management System



Life Cycle Management System



Acquisition

SUSTAINMENT

System Life Cycle Costs

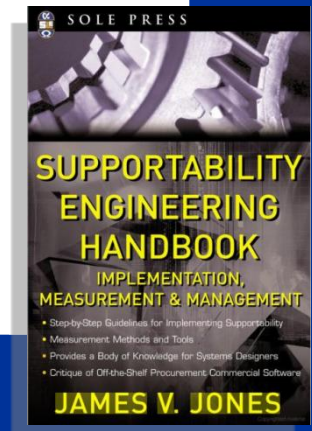
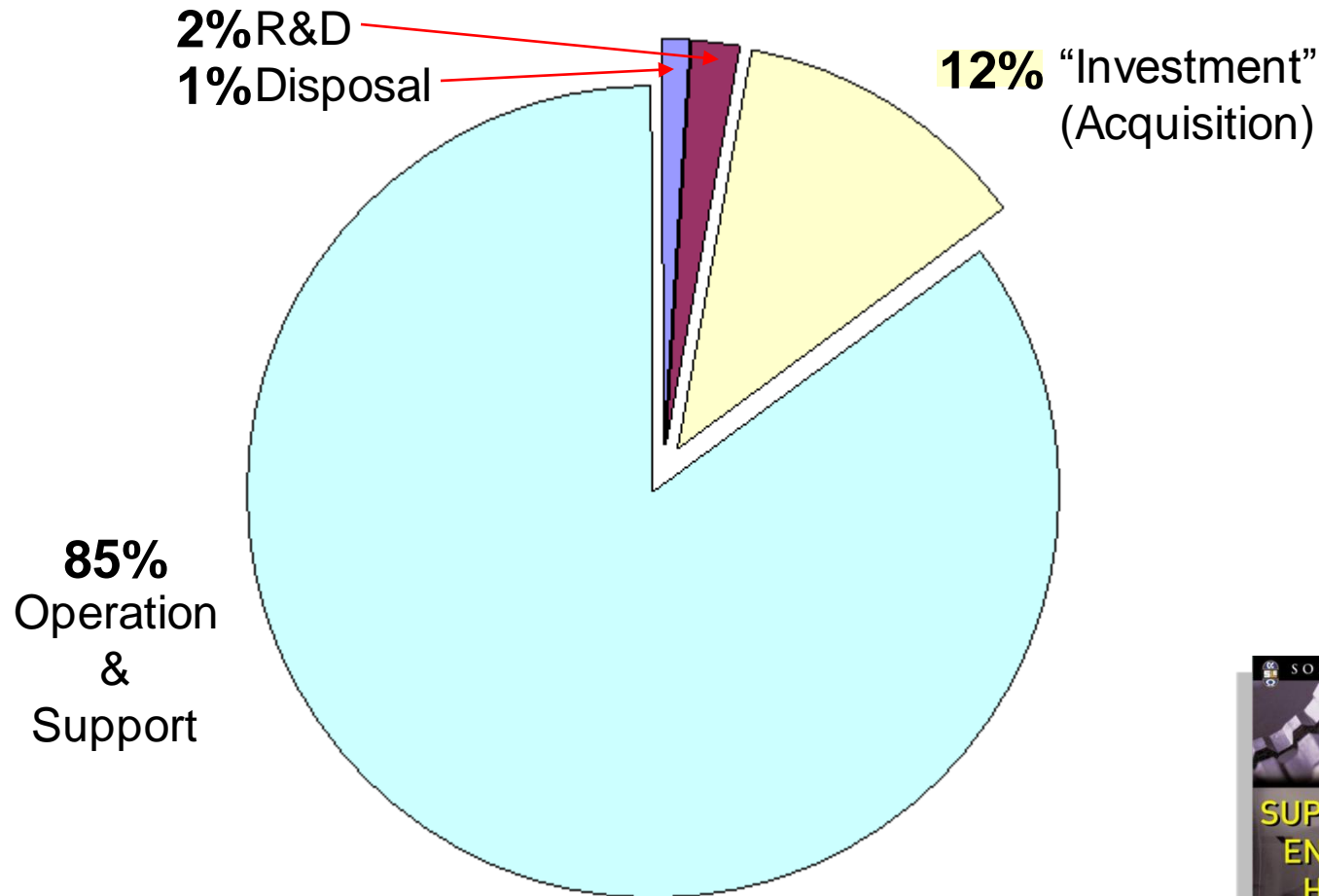


Figure 10-6,
Page 10.6

System Life Cycle Costs

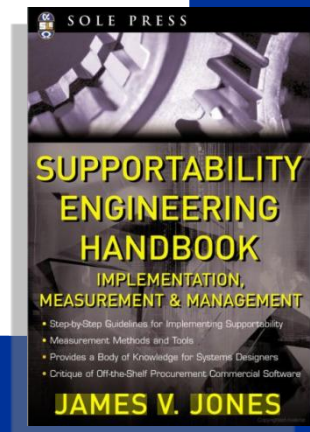
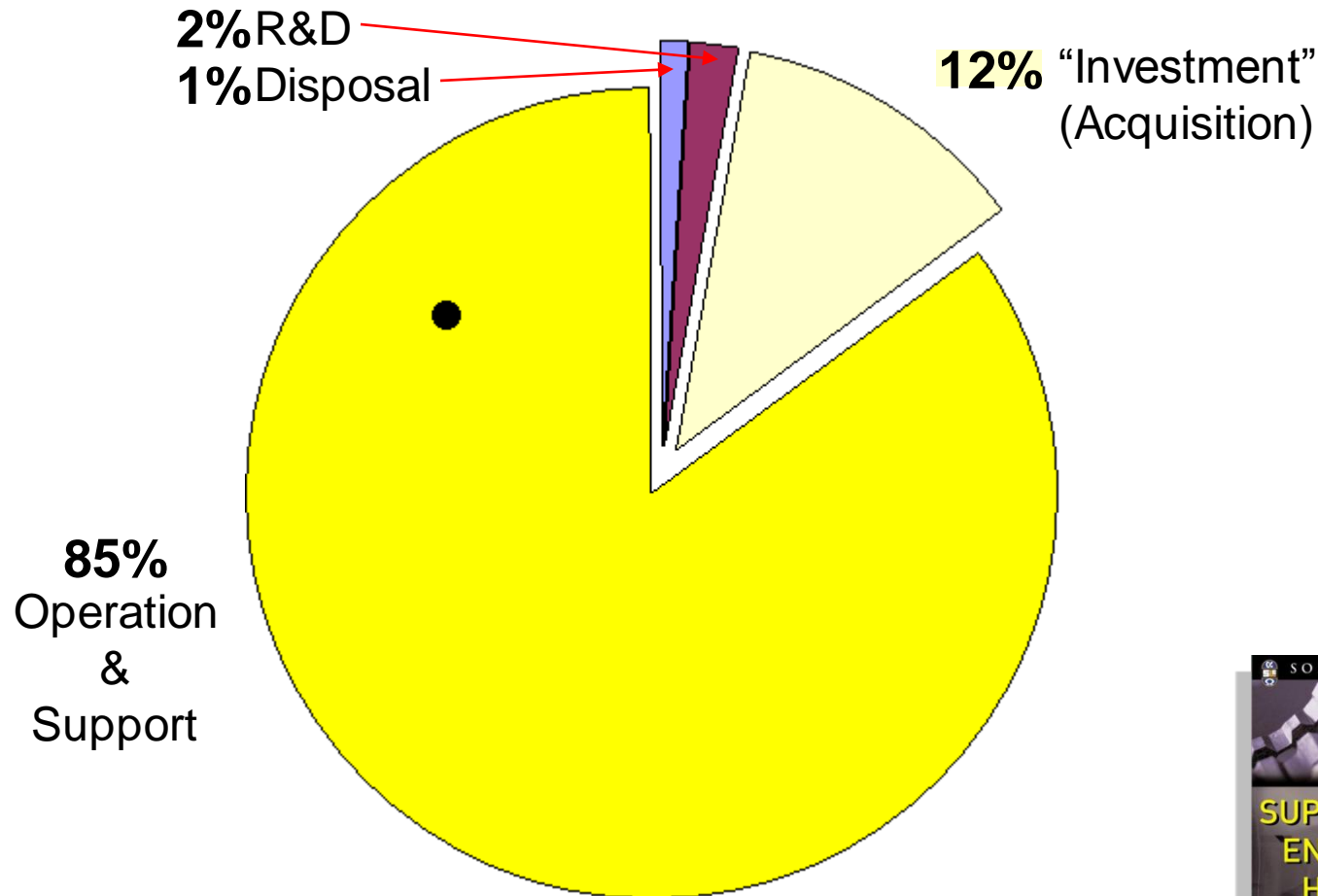
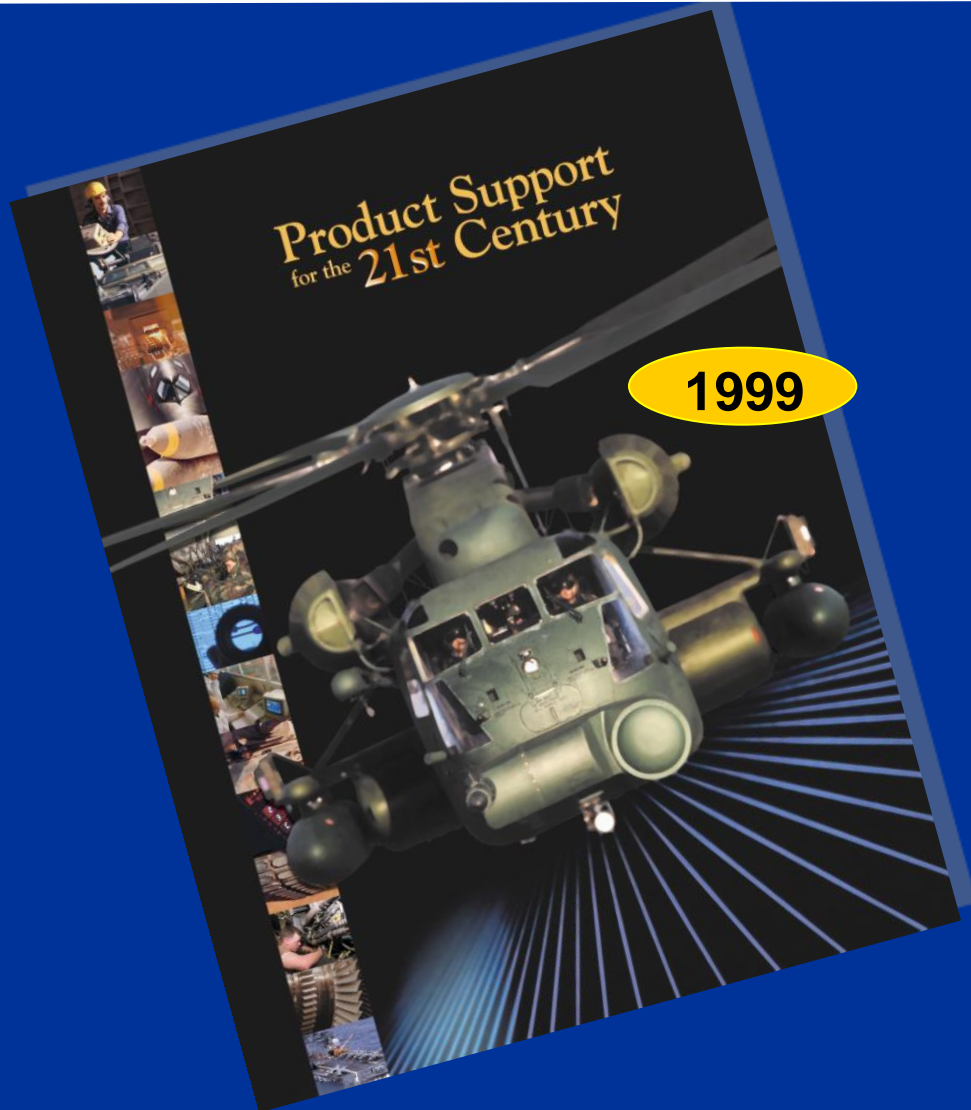


Figure 10-6,
Page 10.6

DoD Product Support Assessments



1999

So, what is PBL?



- **Performance Based Logistics**

Traditional Contract for Support - Transactional



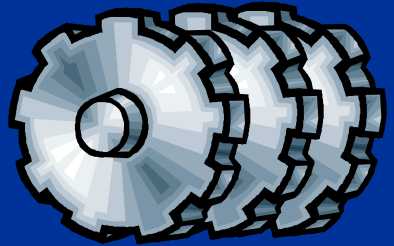
Customer Responsibilities

- Forecast requirements
- Specify
- **More Risk**
- on a Unit Price basis
- Assume all risk for:
 - right parts
 - right repairs
 - right time
 - right quantities

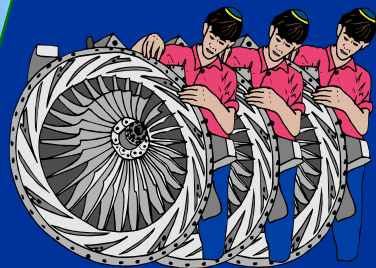
The more I sell, the more profit I make!



Contractor



Parts



Repairs



Technical Support

PBL Fixed Price Contract



Customer Responsibilities

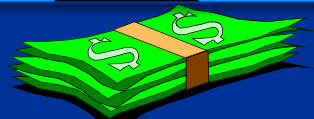
Less Risk

Specify Performance Outcomes

The less I use, the more profit I make!



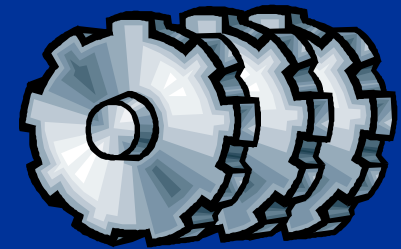
More Risk



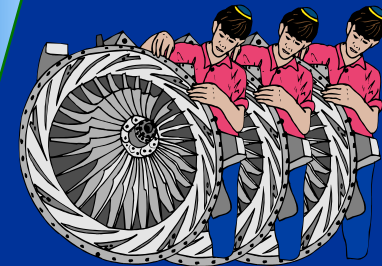
Product Support Integrator

Motivated to:

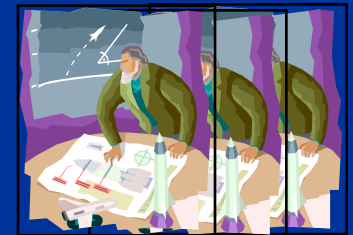
- *Improve Reliability*
- *Improve Repair processes*



Parts



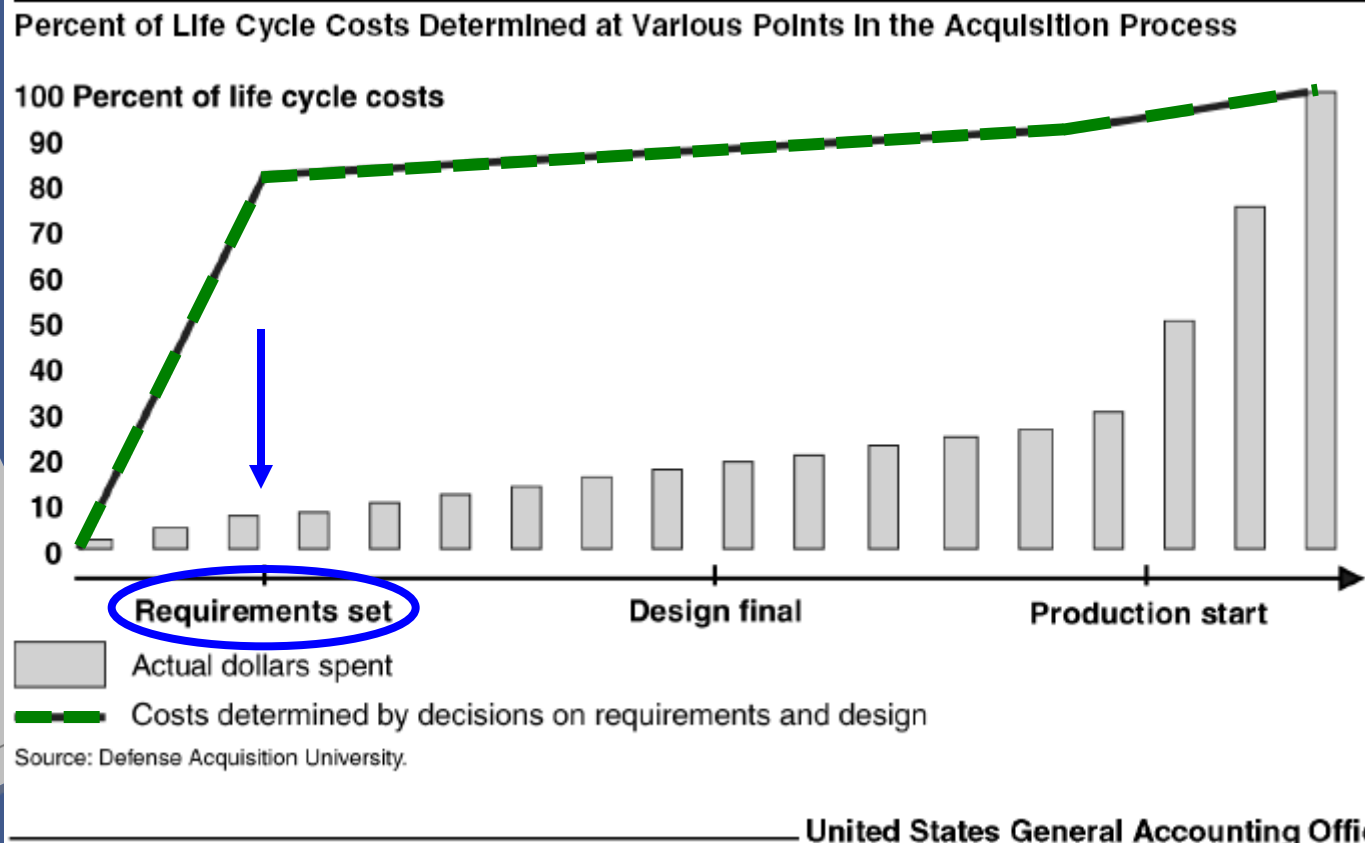
Repairs



Technical Support

- Forecast requirements
- Specify buy quantities
- Pay for each on a Unit Price basis
- Assume all risk for:
 - ✓ right parts
 - ✓ right repairs
 - ✓ right time
 - ✓ right quantities

Requirements in the Life Cycle



United States General Accounting Office



The Acquisition Logistician is responsible for:

- **Influencing the system's design**
- **Preparing logistics support documents**
- **Coordinating the system support package**
- **Coordinating the materiel fielding agreements**

Operational Availability



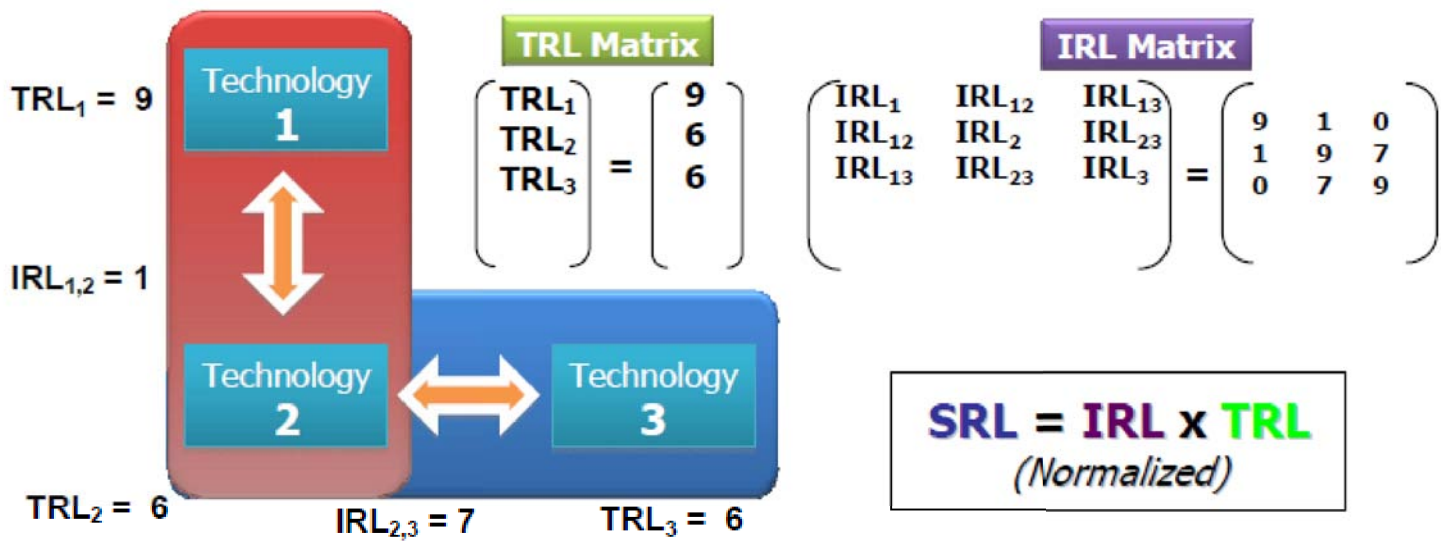
A_o

$$\frac{\text{Uptime}}{\text{Uptime} + \text{Downtime}}$$

MTBF

$$\text{MTBF} + \text{MTTR} + \text{MLDT}$$

System Readiness Levels



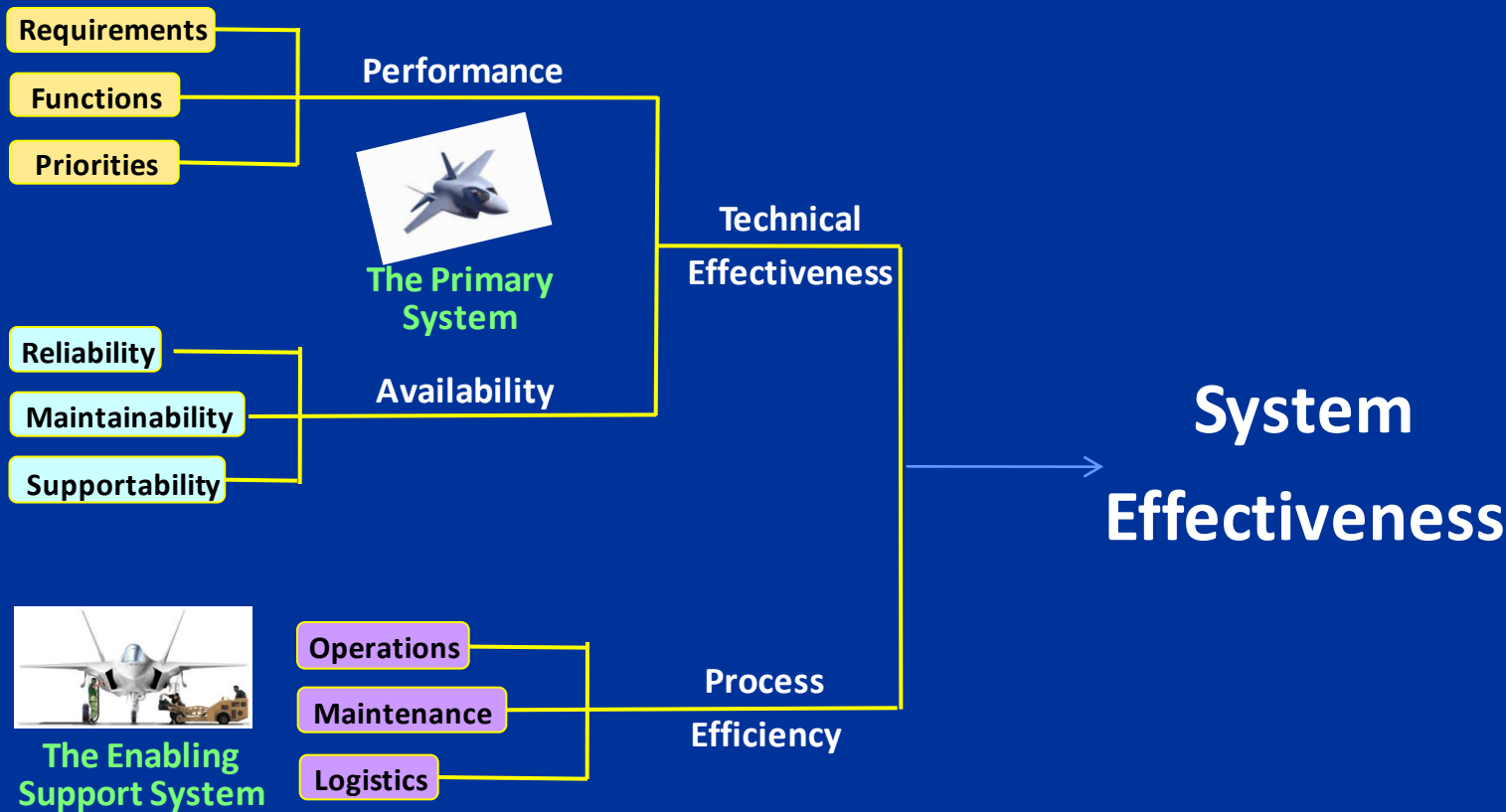
Component SRL = $\begin{bmatrix} \text{SRL}_1 & \text{SRL}_2 & \text{SRL}_3 \end{bmatrix} = \begin{bmatrix} 0.54 & 0.43 & 0.59 \end{bmatrix}$
 Component SRL_x represents Technology "X" and its IRLs considered

Composite SRL = $1/3 (0.54 + 0.43 + 0.59) = 0.52$

The Composite SRL provides an overall assessment of the system readiness

Figure 1. SRL Calculation

Components of System Effectiveness



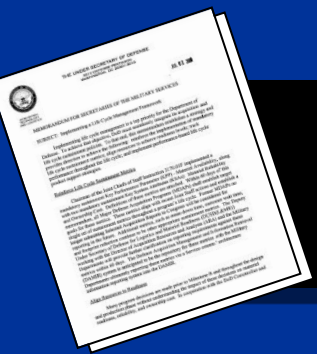
Based on the SOE Model
Verma and Gallois, 2001

Mandatory Life Cycle Sustainment Metrics



- Materiel Availability (Fleet Metric or Operational Readiness Metric – A_o)
 - *Key Performance Parameter*
- Materiel Reliability (MTBF)
 - *Key System Attribute*
- Ownership Cost (defined CAIG O&S cost elements)
 - *Key System Attribute*
- Track performance throughout the Life Cycle
 - **LCS Metrics will be reported at Program Milestones & Reviews, including post-IOC reviews**

Available
Reliable
Affordable

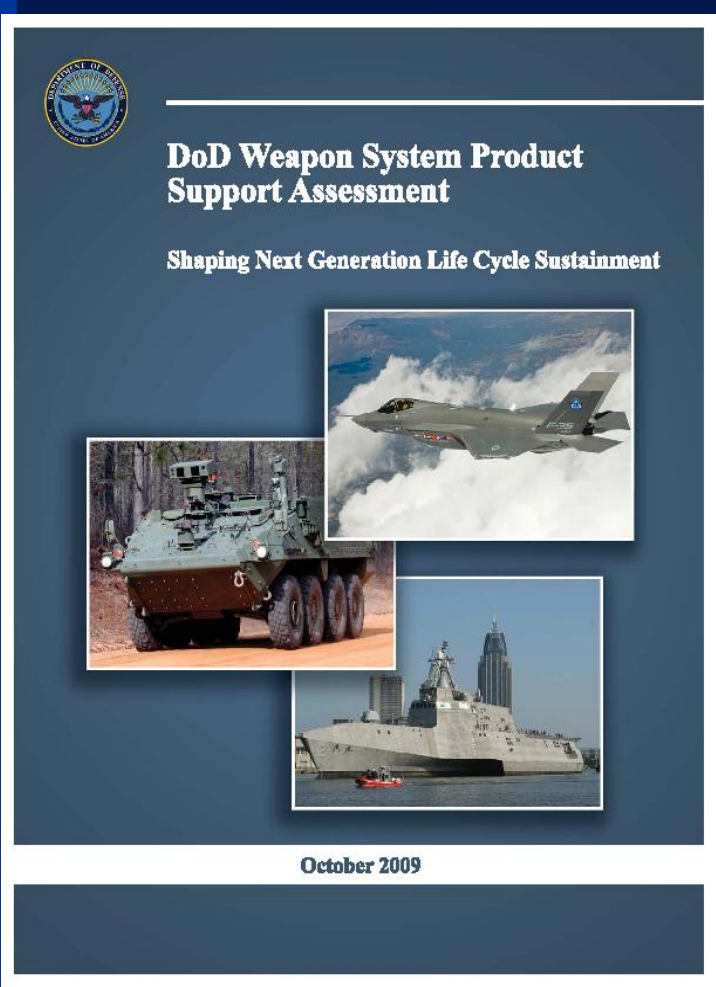
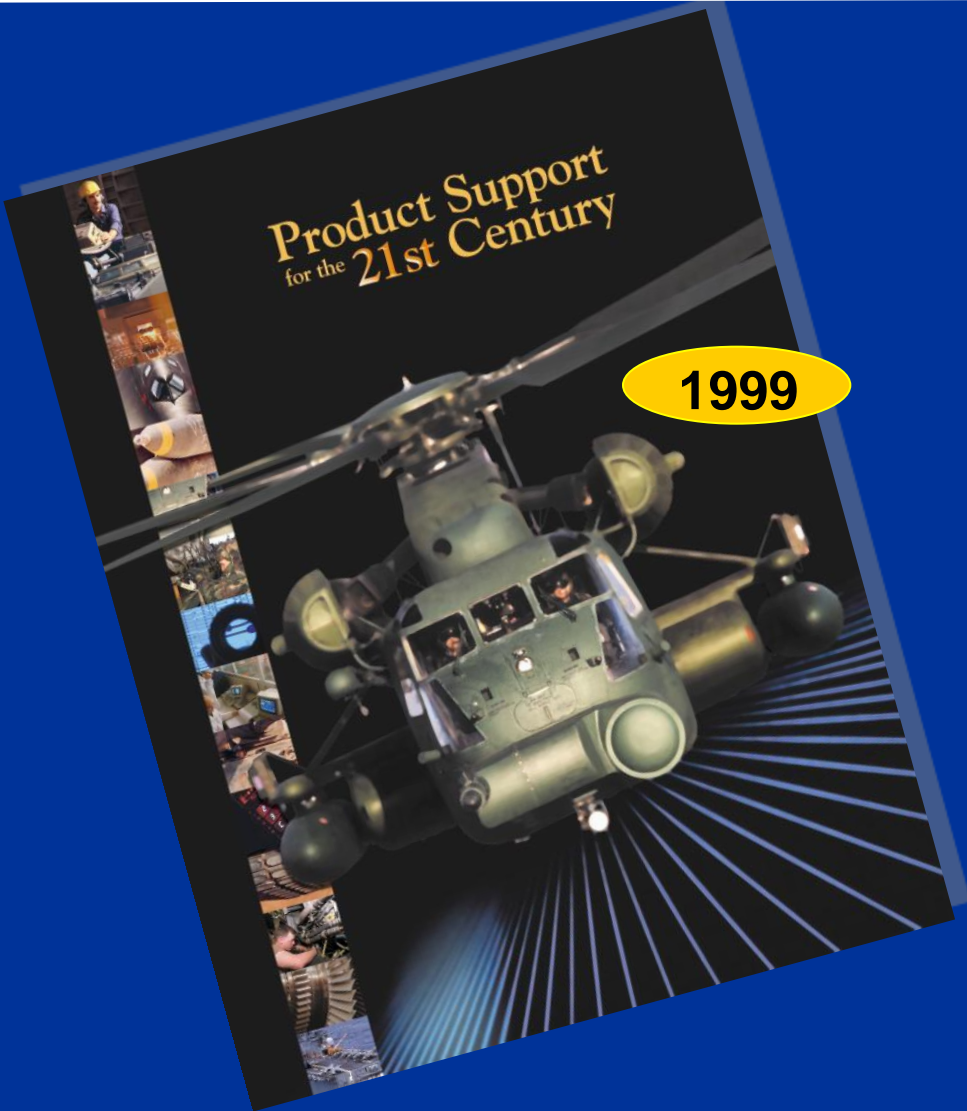


USD/ATL Memo

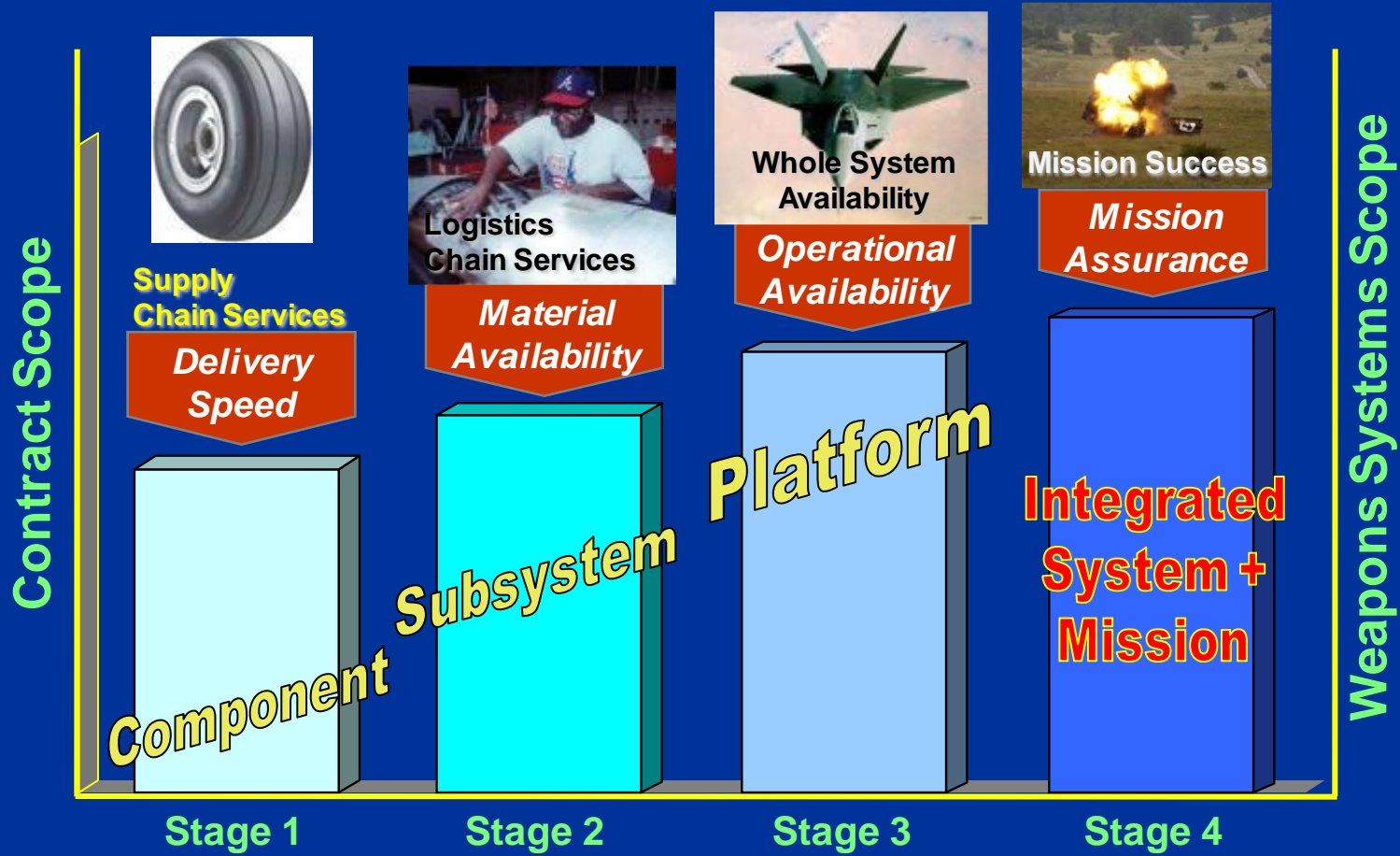
“Implementing a Life Cycle Management Framework”

31 July 2008

DoD Product Support Assessments



PBL Levels of Implementation



Risk of Suboptimization



PBL

SYSTEM

Subsystem 1

Component 1a

Component 1b

Component 1c

Component 1d

Subsystem 2

Component 2a

Component 2b

Component 2c

Component 2d

Subsystem 3

Component 3a

Component 3b

Component 3c

Component 3d

Component 3e

Subsystem 4

Component 4a

Component 4b

Component 4c

How to Enable SE



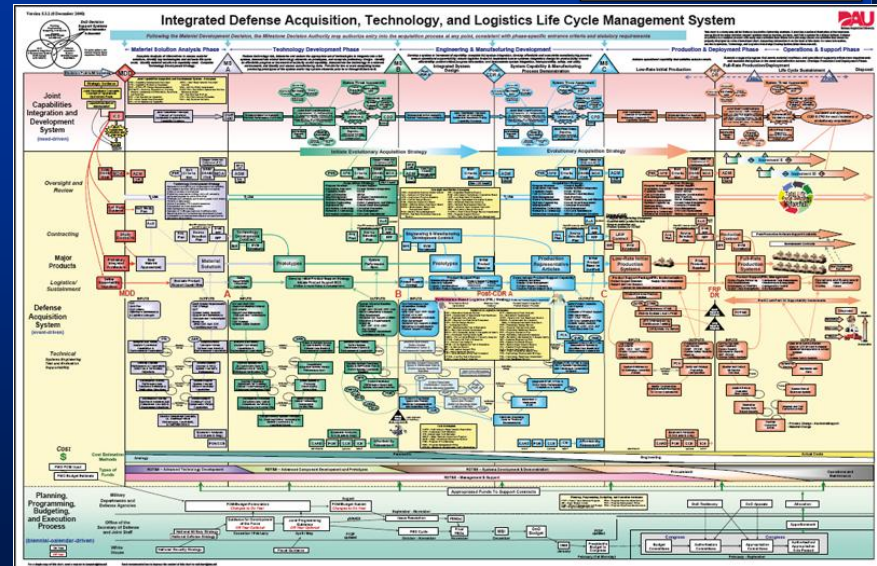
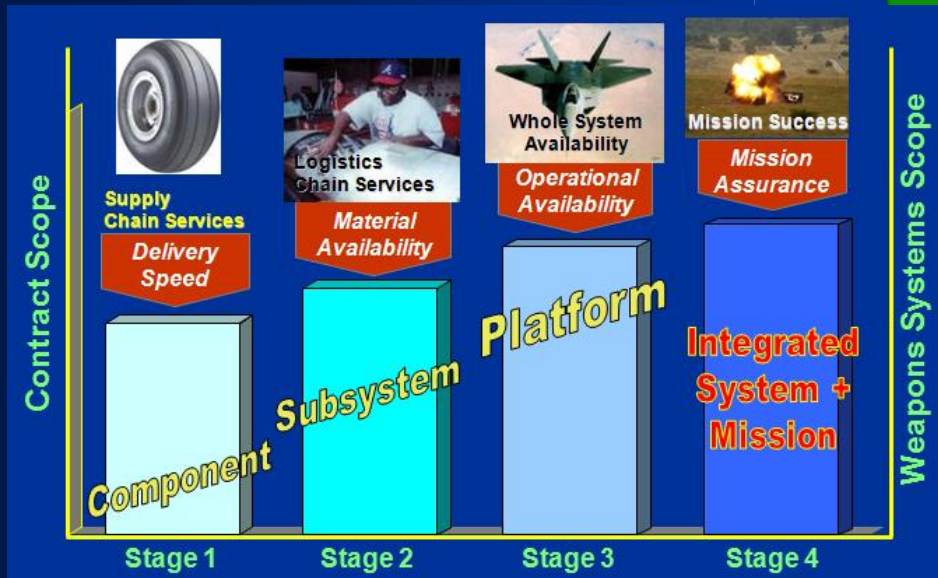
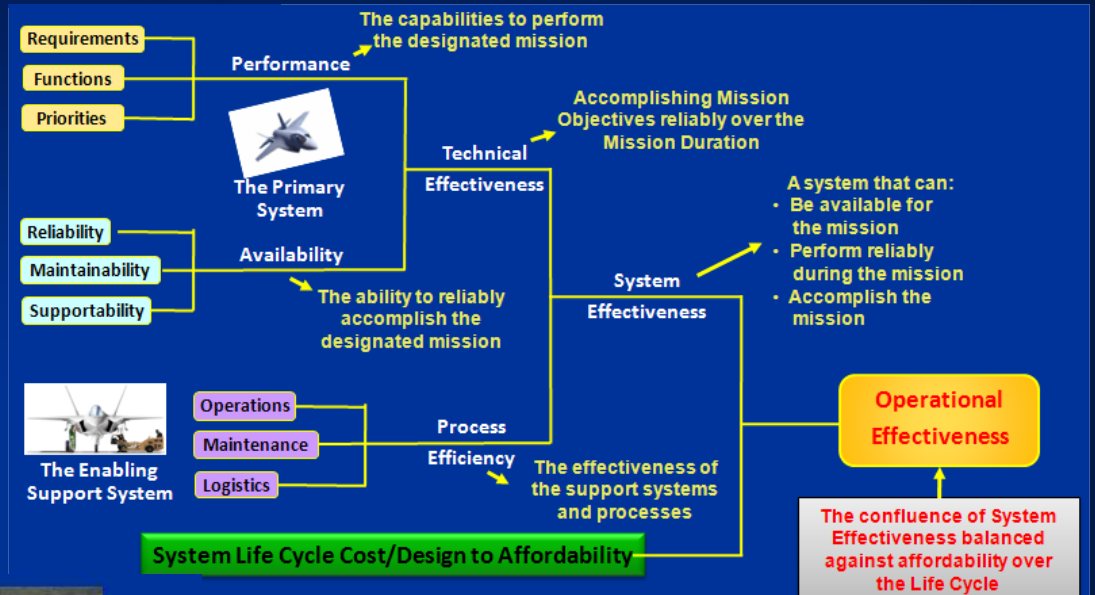
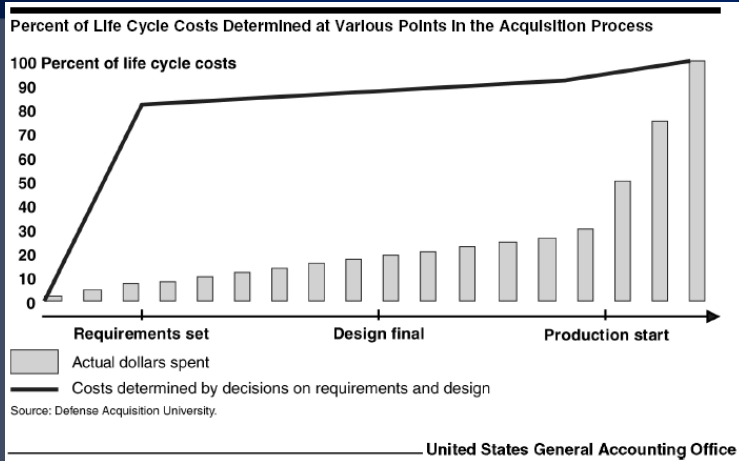
The answer:

(1) Motivate the life cycle Program Manager

- PM must impart a life cycle view to the SE community**
- This life cycle view must EMPHASIZE, not just INCLUDE, sustainment as a vital part of LCC**

(2) SE self-motivate to encourage the REAL system view life cycle, to include “design for sustainment”

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Thank you!

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LOCKHEED MARTIN



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How to Enable SE

