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*Asset-Based PBL for Navy Warships - A  
case study for LCS Class Ships*

*NDIA - 10<sup>th</sup> Annual Systems Engineering  
Conference  
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# Topics

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- *Definitions/PBL scaling*
- *LCS Overview*
- *Asset-Based PBL Key questions*
- *Asset-Based PBL challenges/Obstacles*
- *Asset-Based PBL - keys to success*
- *Path ahead*

# Definitions

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## *What is PBL?*

- *any contract where the primary requirement is to provide products & services based on a pre-determined performance metric.*
- *The performance metric should in some way be a contributing factor to Operational Availability (Ao).*

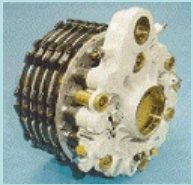
*The Navy today boasts of 150+ PBL contracts; most of these are supply-oriented PBLs issued by NAVICP*

- *Most are lower level component based PBLs*

# Definitions (cont.)

## What is Asset-based?

### Component Level



*Tires*



### System/Eqpt Level



### Asset Level



**Not all assets are equal in terms of achieving asset-based PBL**



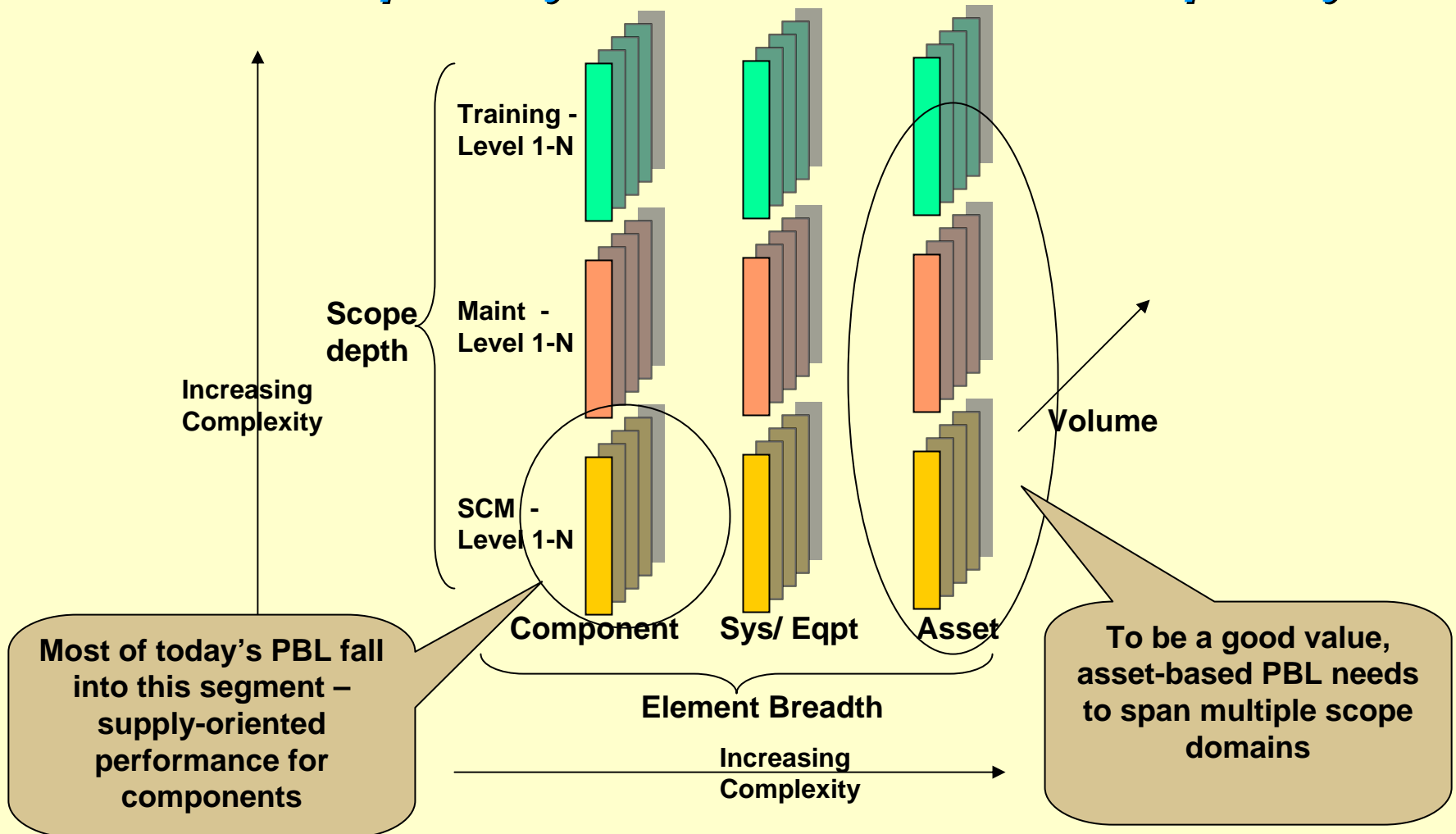
**Easier**

**Complexity is based of number of systems within asset**

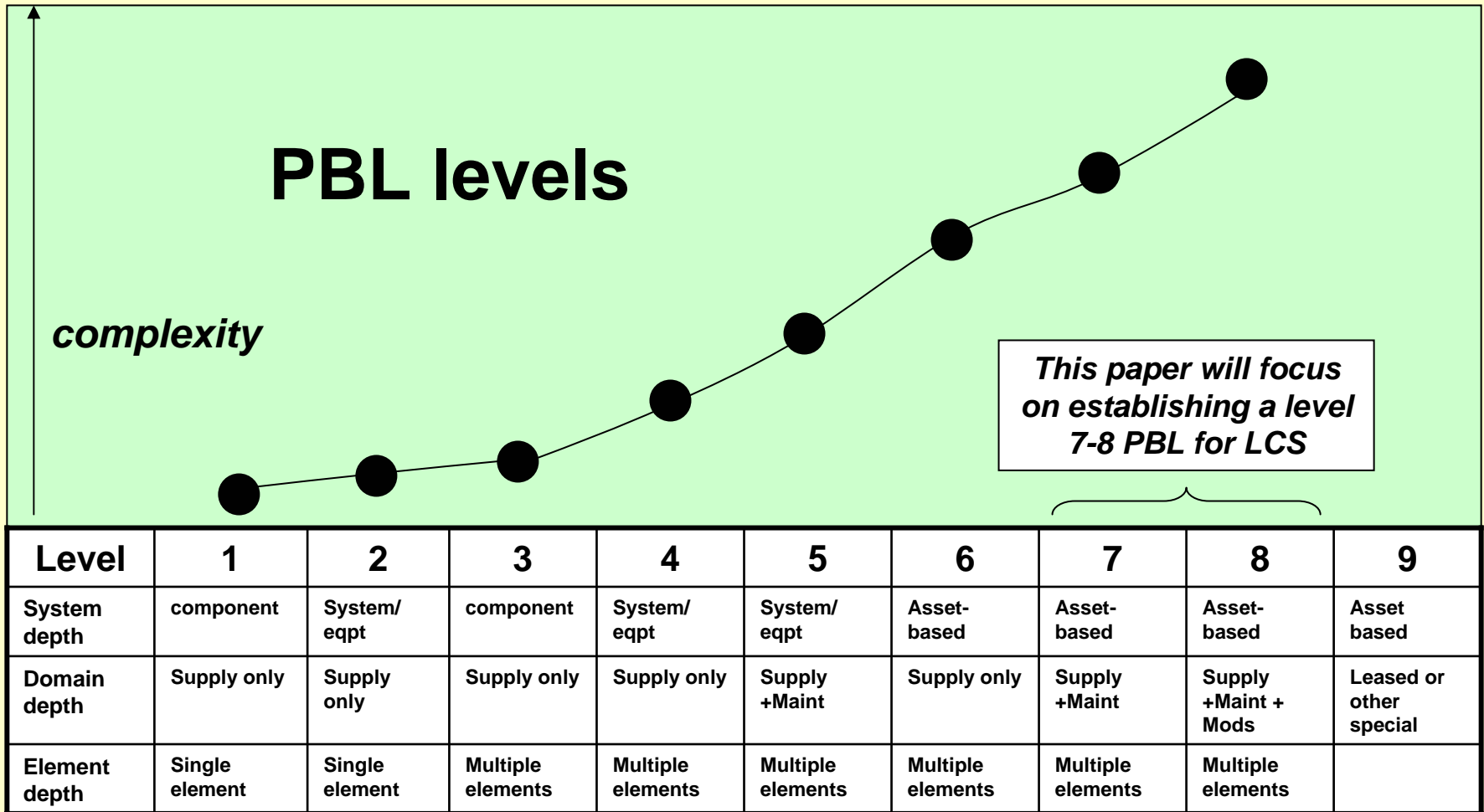
**Harder**

# PBL Complexity

*There are two primary dimensions to PBL complexity.*



# PBL Complexity Scaling





Note: this scale is Mahon developed and not an industry accepted/certified rating system for PBLs

# LCS System of Systems


**LCS consists of core seaframes designed to host mission packages. Three MP are initially planned.**


## MIW


**VTUAV (2)**  


**MH-60S (1)**  


**COBRA (2)**  


**AQS-20A**  



**AMNS**  


**ALMDS**  


**RMS (2)**  


**AQS-20A (2)**  


**SCULPIN**  


**OASIS**  


**RAMICS**  


**USSV (1)**  


**BPAUV (2)**  


## ASW

**VTUAV (1)**  


**MH60R (1)**  


**USV (2)**  


**ALFS**  


**Sonobuoy**  


**MK54 Torpedo**  


**ALFS**  


**Multi-Static Active Source**  



**Lightweight Array**  



**RMV (2)**  



**RTAS**  


**MFTA**  



## ASUW

**VTUAV (1)**  


**MH60 Helo**  


**EO/IR GAU 21 Hellfire Gun**  


**NLOS-LS (4)**  


**30mm Gun (2)**  


# LCS Original Requirements

Requirements	THRESHOLD	OBJECTIVE
Sprint Speed (kts)	40	50
Mission Package Payload (mt)	180	210
Range @ Transit Speed (nm)	3500	4300
Navigational Draft (ft)	20	10
Core Crew manning	50	15

Two Years

\$220M

**Any Mission Package / Any Ship / Any Time**

- Non-traditional hull forms
- Non-traditional materials
- Non-traditional Propulsion
  - CODAG + Waterjet drive (x4)
- Non-traditional construction practices
- Non-traditional system suppliers
- Modular Open Systems Approach
- Open Computing Architecture
- Automation

*LCS Breaks thru many Traditional Paradigms*



# LCS Flight 0 Acquisition Strategy

**6 Industry Concepts**  
(06 Feb 03)



**3 Preliminary Designs**  
(19 Jul 03)



**2 Final Designs**  
(Contracts Awarded 27 May 04)



**FLT 0 Lockheed  
Martin**  
(15 Dec 04)



**FLT 0 General  
Dynamics**  
(14 Oct 05)

February  
2003

July  
2003

May  
2004

December  
2004

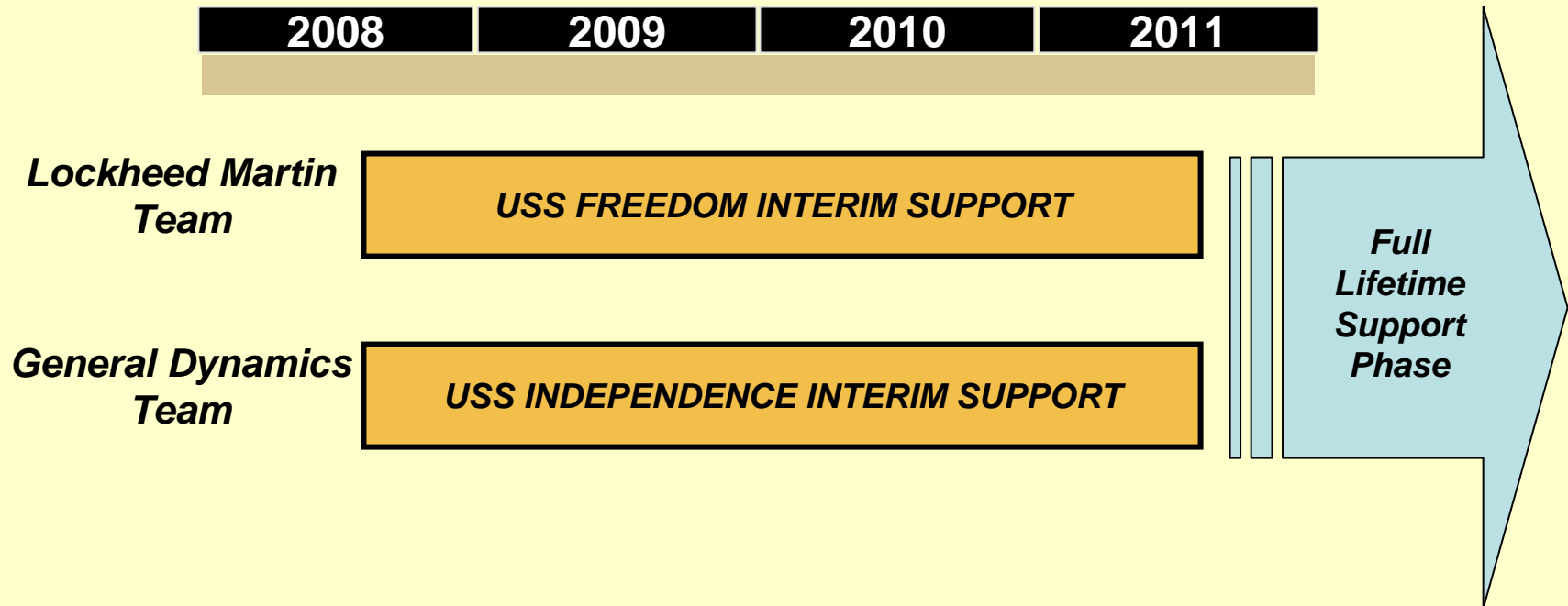
October  
2005

**First Ships Delivers in Summer 2008**

# LCS Flight 0 Sustainment Strategy

**The US Navy approach for LCS sustainment is to establish the lead shipbuilding teams as lead for sustainment for an interim 36-month period.**

- Concept is to leverage knowledge for design/construction for risk mitigation in initial sustainment phase**



# *Asset-based PBL – Key Questions*

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- 1. Will it work? Just because it works at lower levels doesn't mean it's a good thing at a higher level?*
- 2. Will it save money and if so, how much?*
- 3. Can we really put such heavy responsibility for our nations defense in the hands of Industry?*
- 4. What is the fallback if it doesn't work?*
- 5. What will happen to the existing infrastructure that is still required for other ship classes?*

# Asset-based PBL – Challenges/Obstacles

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1. ***Jobs/responsibilities – see attached***
2. ***Risk – all dimensions of risk must be identified and mitigation plans established and funded***
3. ***Colors-of-money (RDT&E, SCN, O&M, etc.)***
  - ***it is difficult securing an extra SCN dollar to save two dollars of OM&N***
4. ***Cost/Business case analyses (BCA)***
  - ***Most transformational concepts require a BCA, yet establishing a baseline for today's warships is difficult at best***
5. ***Interaction with other existing PBLs***
  - ***Need to ensure that upper level, asset-based PBLs can work in harmony with existing, established PBLs***
6. ***Patience (or lack of it)***
  - ***Initial performance will be bumpy/full of glitches – all parties need to be prepared for this and work through it.***

# *Asset-based PBL – Keys to Success*

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- 1. Support from DoD/Customer community***
- 2. A Good approach that manages Risk***
  - ‘stair-step’ approach that progresses to full asset-based PBL incrementally***
  - Initially costs more to have parallel paths in case of failure***
  - Integrated industry-Govt processes***
- 3. Solid team Structure***
  - Embraces/uses competition for optimal value***
- 4. Good performance metrics***

# Path Ahead

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- 1. Build the team and the processes for the three year Interim Sustainment timeframe.***
- 2. Establish initial metric set***
- 3. Do NOT accept PBL from initial suppliers - risk/cost will be too high. Instead use the 3yr period to understand the ship and operational caps and lms – measure everything!***
- 4. Build alternate suppliers – keep competitive environment***
- 5. Establish transition plan for full life-time support (Also build plan to fallback to traditional approach if reqd)***

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*Back-ups*

# *Job/Responsibilities*

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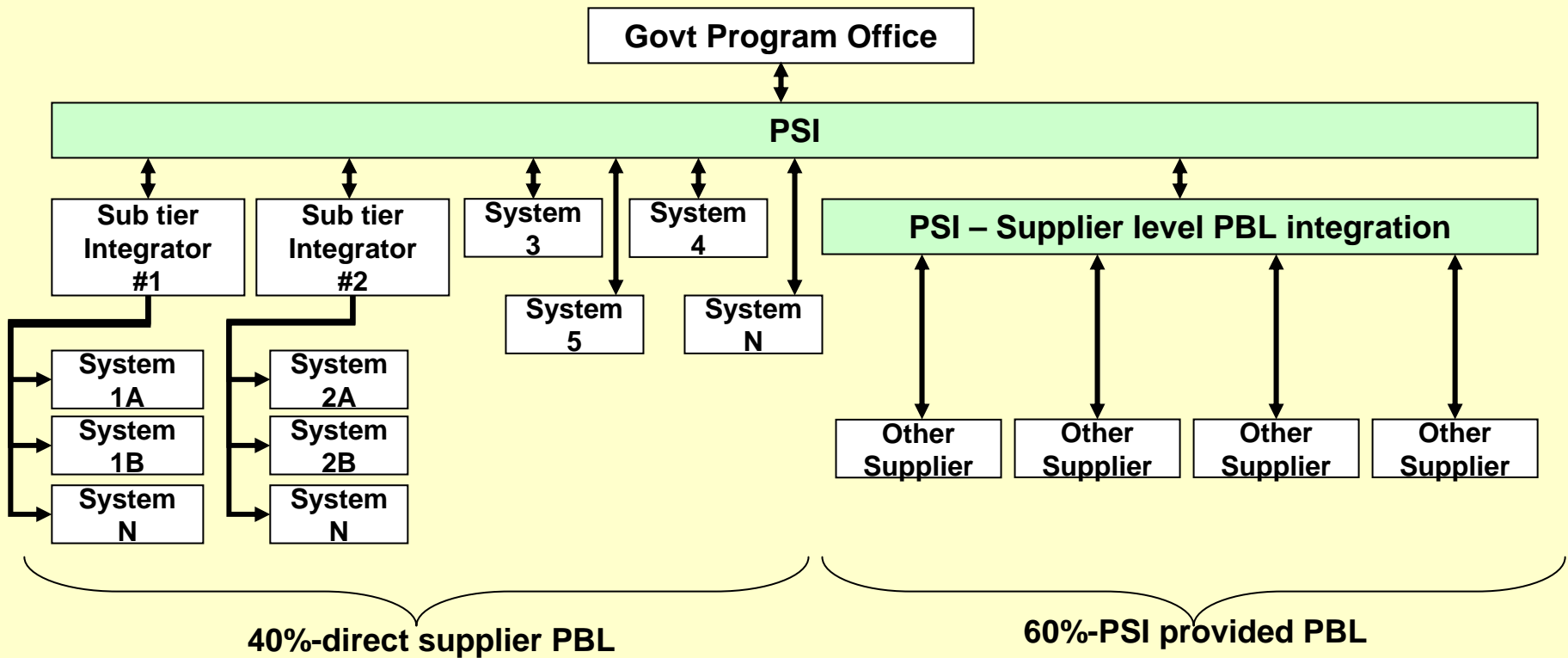
- *The biggest obstacle to asset-based PBL (or FSC or CLS) will be from the organic support infrastructure who's very livelihood is threatened by this initiative*
- *Unlike component based PBL (which never shifted who did the work but how it was contracted), asset-based PBL transitions organic responsibility to industry*
- *And yet, industry must work with these very same organic activities to develop and operate the Asset-based PBL*
- *Many people/organizations will be very happy to see asset-based PBL fail and may even work to help it fail.*





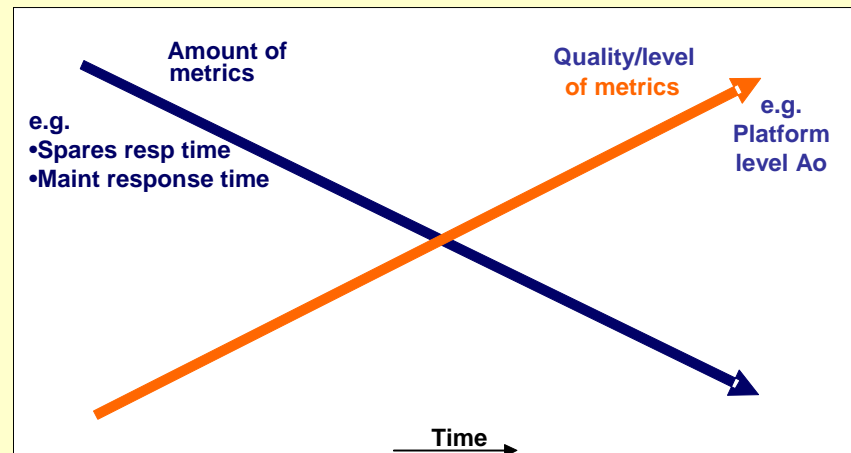
# Asset-Based PBL - Org structure

- The business structure of an asset-based PBL for a warship can be very complex. It consists of many suppliers and varying levels



# Performance Metrics

SCM	Maintenance	Training
<ul style="list-style-type: none"> <li>•Inventory management</li> <li>•Demand forecasting</li> <li>•Transportation</li> <li>•Requisition processing</li> <li>•Parts Repair</li> <li>•Parts replenishment</li> <li>•SCM management</li> </ul>	<ul style="list-style-type: none"> <li>•Casualty response time</li> <li>•Remote monitoring</li> <li>•Condition-based Maint.</li> <li>•Distance support</li> <li>•‘O’ level maint. PM/CM</li> <li>•‘I’ level Maint. PM/CM</li> <li>•‘D’ level Maint</li> <li>•Maintenance Mgt</li> </ul>	<ul style="list-style-type: none"> <li>•Train-to-qualify (T2Q)</li> <li>•Embedded training</li> <li>•Initial&amp; replenishment crew training</li> <li>•Computer based training &amp; sim</li> <li>•Trainer site ops</li> <li>•Team training</li> <li>•Training management</li> </ul>



- **Measuring performance is critical**
- **Samples metrics include:**
- **To achieve asset-based PBL – in time metric quantity lessens but the metric ‘quality’ grows**

