Lead Systems Integrator Role for Government

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Motivation for Government as LSI

- Acquisition Reform Lessons Learned
  - Execution of Contractor “Total Systems Performance Responsibility” (TSPR) did not always result in solutions that were in the best interest of the Government.
  - System design perspective from a vehicle/contract centric view
  - Cost savings of TSPR clauses never realized
    - Major acquisition programs have generally experienced spiraling cost growth as system complexity has increased.
- Legislation developed in the aftermath of USCG Deepwater, Army FCS, Navy LCS, DHS SBINet, others...
- Promulgated through 2008/2009 DoD Appropriations Bills

Legislation Driving SE Change

- As of Jan 28, 2008 (Public Law 110-181) states:
  - "*The Secretary of Defense shall ensure that the acquisition workforce is of the appropriate size and skill level necessary – "*
    - "*to accomplish inherently governmental functions related to acquisition of major systems; and*"
    - "*… to minimize and eventually eliminate the use of contractors to perform lead systems integrator functions*."
  - *"Effective 1 Oct 2010, the Department of Defense may not award a new contract for lead systems integrator functions"…"to any entity that was not performing lead system integrator functions"…"prior to the date of this act."*
    - *The Department of Defense may award a new contract for lead systems integrator functions in the acquisition of a major system only if:*

      a) the major system has not yet proceeded beyond LRIP, or

      b) the Secretary of Defense determines in writing that it would not be practical to carry out the acquisition without continuing to use a contractor to perform LSI

Develop the workforce, lead systems engineering, and don't give away government trade space

LSI Definitions

- "A lead systems integrator…executes a large, complex, defense-related acquisition program, particularly a so-called system-of-systems (SOS) acquisition program."[1]

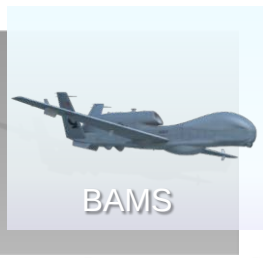
- 2008 NDAA Sec 802: The term "lead systems integrator" means—

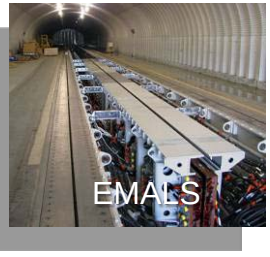
  A) a prime contractor for the development or production of a major system, if the prime contractor is *not expected at the time of award to perform a substantial portion of the work on the system* and the major systems; or

  B) a prime contractor under a contract for the procurement of services the primary purpose of which is to perform acquisition functions closely associated with inherently governmental functions with respect to the development or production of a major system.

[1] Grasso, "Defense Acquisition: Use of Lead Systems Integrators (LSIs) – Background, Oversight Issues, and Options for Congress", Congressional Research Service, 10 Feb 2009

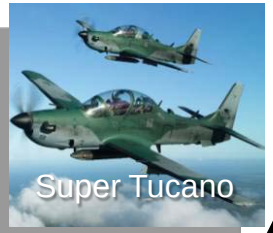
Major Programs of Record





Unmanned and Legacy Systems

Irregular Warfare



Rapid Prototyping

Increasing LSI Complexity, Time and $$

Case Studies Reviewed

Case Study Type	Platform/SoS	Description of Effort	Program Scope Cost/Gov't Team Size
Gov't Led Integration of Subsystem	F-14 DFCS	Analog to digital conversion of the flight control system. Gov't as integrator and control law developer, GEC Marconi responsible for digital computers and SW coding, Grumman responsible for redundancy and air data management.	$116M/40
	CH-53E Cockpit	Steam gauge conversion to integrated glass cockpit	$6M/20
	H-1 Upgrades Missionization	Following first OT, major subcontracts pulled back from Bell and gov't directly contracted with 3 major suppliers (LM, Thales, FSI)	/<10
	VH-60N Cockpit	Rockwell Collins responsible for software development. SAC responsible for initial kit installs	$24M/21
	VH-3D LIP	Ducommon responsible for manufacture of MR blade upgrade; SAC responsible for certification	$68M/10
	AN/SPN-35C	Upgrade of the analog AN/SPN-35B system to state of the art config aboard L-Class ships.	$30M/80

Case Studies (Cont'd)

Case Study Type	Platform/SoS	Description of Effort	Program Scope Cost/Peak Team Size
Prime Contractor as LSI with Gov't Directed GFE	H-60S	SAC Prime, LM cockpit and GE engines provided GFE	$96M/108
Dual Prime with Gov't as LSI	H-60R	SAC Prime for A/V, LM Prime for Mission suite, LM cockpit and GE engines provided GFE	$1.8B
	Firescout/Tactical Control Station	NGC responsible for A/V control station hardware, Raytheon responsible for CS software	$584M
SoS – Weapons System Integration	Harpoon Blk III*	Upgrade the Harpoon Blk III air and ship launched weapons with a new GNU, update the command launch system and Link-16 data link	$300M*/100
	AIM-9M	Product improvement program of AIM-9L for a new GCS and a new rocket motor	
SoS – Air Ship Integration	UCAS-D	Gov't lead air ship integration efforts for first unmanned aircraft landing aboard a carrier. Team responsible for 19 HW/SW elements, interactions with other PMAs and external agencies. NG responsible for A/V development	$1.3B For ASI: $200M/70

* Program cancelled

Case Study Lessons Learned and Recommended Actions for Successful LSI (1)

- Perform up front planning, identifying roles and responsibilities
  - Establish organizational team structure
    - LSI as a prime IPT (with cost and schedule accountability)
  - Define plans and processes (CM, Systems Engineering, Risk Management, Staffing)
  - Develop detailed government IMS & EVM metrics that are integrated with contractor IMS
  - Define data content and interfaces prior to system design
  - Define system from the interfaces in (data centric) rather than from the air vehicle out (especially for SoSs)

- Obtain/develop management tools that allow for seamless integration of Government and contractor efforts, dependencies and critical path visibility
  - Requires Integrated Data Environments
  - Requires agreement with Industry partners on LSI–centric tools
  - Reqts/Architecture Mgmt Tools (e.g. DOORS, Rhapsody, System Architect...)
  - Scheduling and Cost Tracking tools (e.g. MS Project, Primavera, SureTrak...)

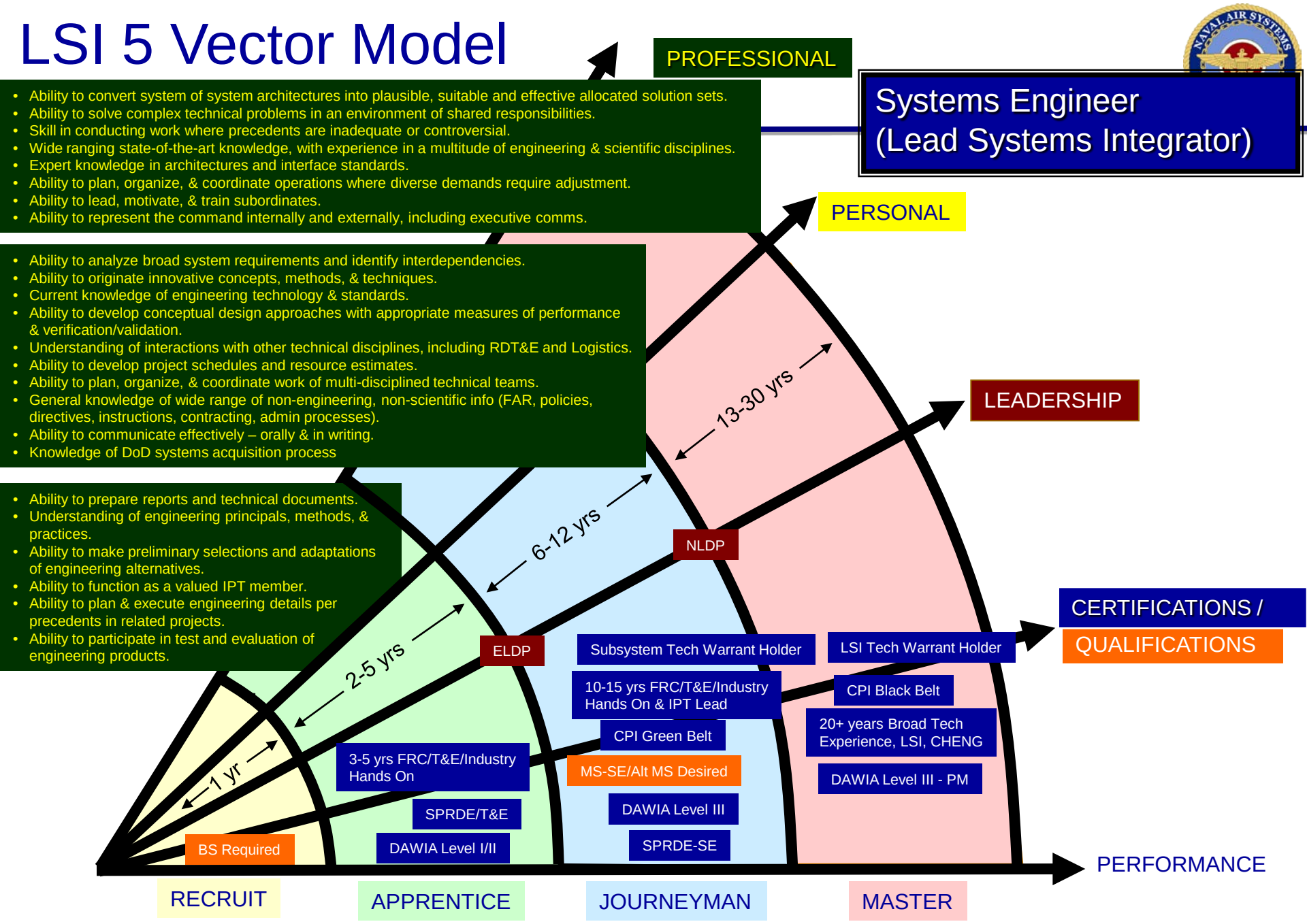
Case Study Lessons Learned and Recommended Actions for Successful LSI (2)

- Develop acquisition strategy that accommodates Government LSI role
  - ***Trust and solid team dynamics are critical to success***
  - Incentivize contractors to work together; establish working relationships and written agreements between contractors
  - Use simulation and test beds early and often to reduce risk
  - Government LSI contracting approaches must be adaptable to unknown, unknowns associated with external factors (especially SoS efforts). Make plans robust to failure discovery
- Use acquisition strategy that plans for scalability and spiral development
  - Allow for dedicated time to iterate requirements, cost, and schedule early; then lock requirements and execute, with plans for future spirals

LSI Opportunity Assessment

- Developing LSI Personnel
- Analysis Tasks
- Nesting in the 4-Phase Process

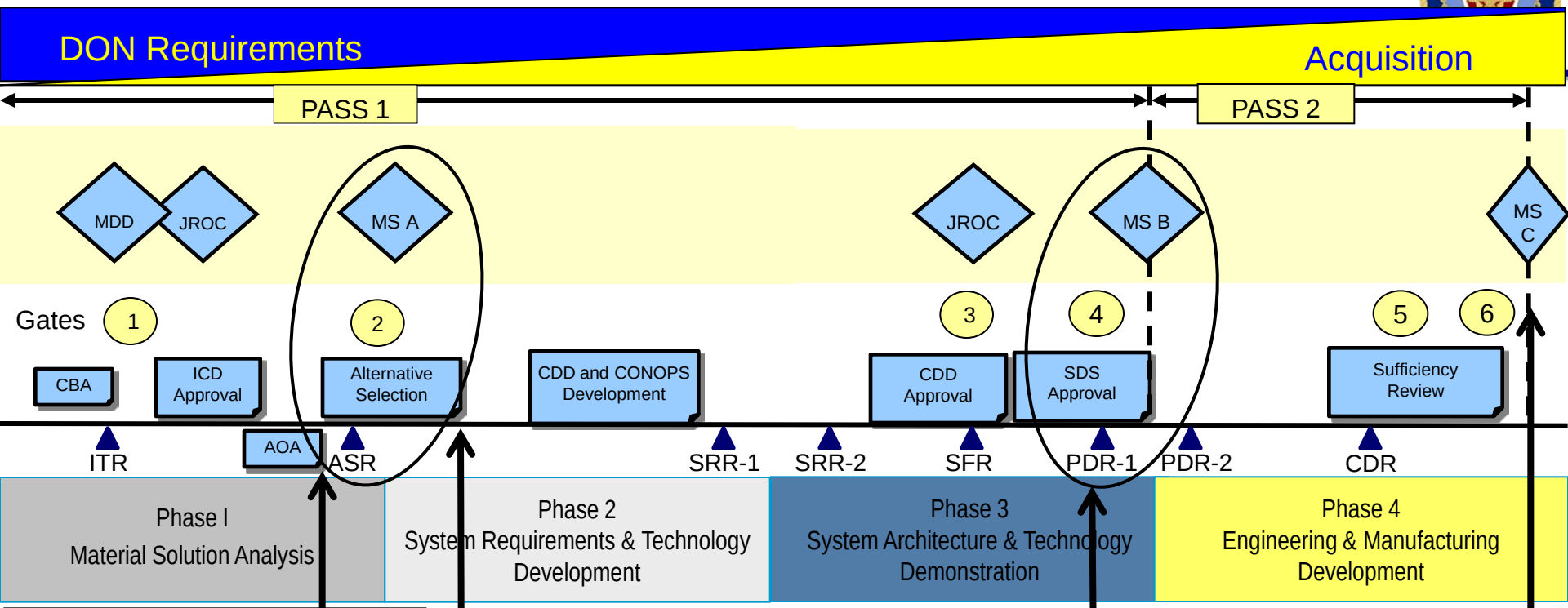
LSI 5 Vector Model



Analyzing and Assessing LSI Opportunities

- Perform a cost/benefit analysis to evaluate potential Prime subcontracting costs versus government-led efforts on key subcontracts. Include:
  - Understanding of amount and type of subcontracting planned
  - Place particular scrutiny on those approaches where the majority of the work would be subcontracted
  - Bottoms up review of Government team size and skills needed
- Perform risk assessment of Government taking on LSI work to include:
  - Ability to obtain government team at size and skill level necessary
  - If significant government team, assess priority of program within the command
  - Assessment of collective industry past performance
- Assess criticality of need for Government to control trade space, especially for SoS efforts
  - Compelling need for Government LSI may exist independent of cost analysis
  - Assess contractor's ability to control/influence known trade space (e.g. Air/ship integration, classified trade space)

ACQUISITION GOVERNANCE AND DEVELOPMENT PHASES OVERVIEW



AOA Product and ASR Entry Criteria
- *Review acquisition strategy*
- *Cost/benefit and risk analysis for Gov't as LSI*
- *Criticality analysis of govt controlled trade space*

ASR/Gate 2/MS A
- *RFP aligns with emerging CDD and AOA options in play*
- *Acquisition strategy for TD phase established*
- *Role of government as LSI analyzed and Govt or contractor path chosen for TD phase*

PDR-1/Gate 4/MS B
- *Government role as LSI reassessed prior to EMD RFP release with refined requirements, cost & schedule information*
- *If Contractor LSI, plan for transition to Govt LSI at MS C requested in EMD RFP package*

Gov't LSI? Yes / No

Pursue Waiver
- *Written explanation why using Government workforce not practical*
- *Plan developed for "phasing out the use of contracted LSI functions over the shortest period of time consistent with the interest of national defense"*
- *USD(AT&L) determination that this is acceptable*
- *Determination provided to Committees on Armed Services of the Senate and House of Representatives at least 45 days prior to contract award*

Summary

- Opportunity exists to leverage skills gained in prototyping, irregular warfare and non-ACAT efforts to spark world class LSI capabilities on major programs of record.
- Sound acquisition strategies, strong industry partnering, and time-phased building block approach are necessary.
- Government must plan for a LSI-skilled workforce, facilities, and tools, and align with DoD/service/command strategies.

Mind the workforce, lead systems engineering, and don't give away government trade space

Questions?

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(301) 757-2328

BACKUP

LSI Legislation – 2008 NDAA Section VII

(a) Prohibition on the use of Lead Systems Integrators

1. Prohibition on New lead system integrators

"Effective 1 Oct 2010, the Department of Defense may not award a new contract for lead systems integrator functions"…"to any entity that was not performing lead system integrator functions"…"prior to the date of this act."

2. Prohibition on lead system integrators beyond LRIP

The Department of Defense may award a new contract for lead systems integrator functions in the acquisition of a major system only if:

a) the major system has not yet proceeded beyond LRIP, or

b) the Secretary of Defense determines in writing that it would not be practical to carry out the acquisition without continuing to use a contractor to perform LSI

LSI Legislation – 2008 NDAA Section VII (cont'd)

(a) Prohibition on the use of Lead Systems Integrators

3. Requirements relating to determinations – A determination under paragraph (2)(b)

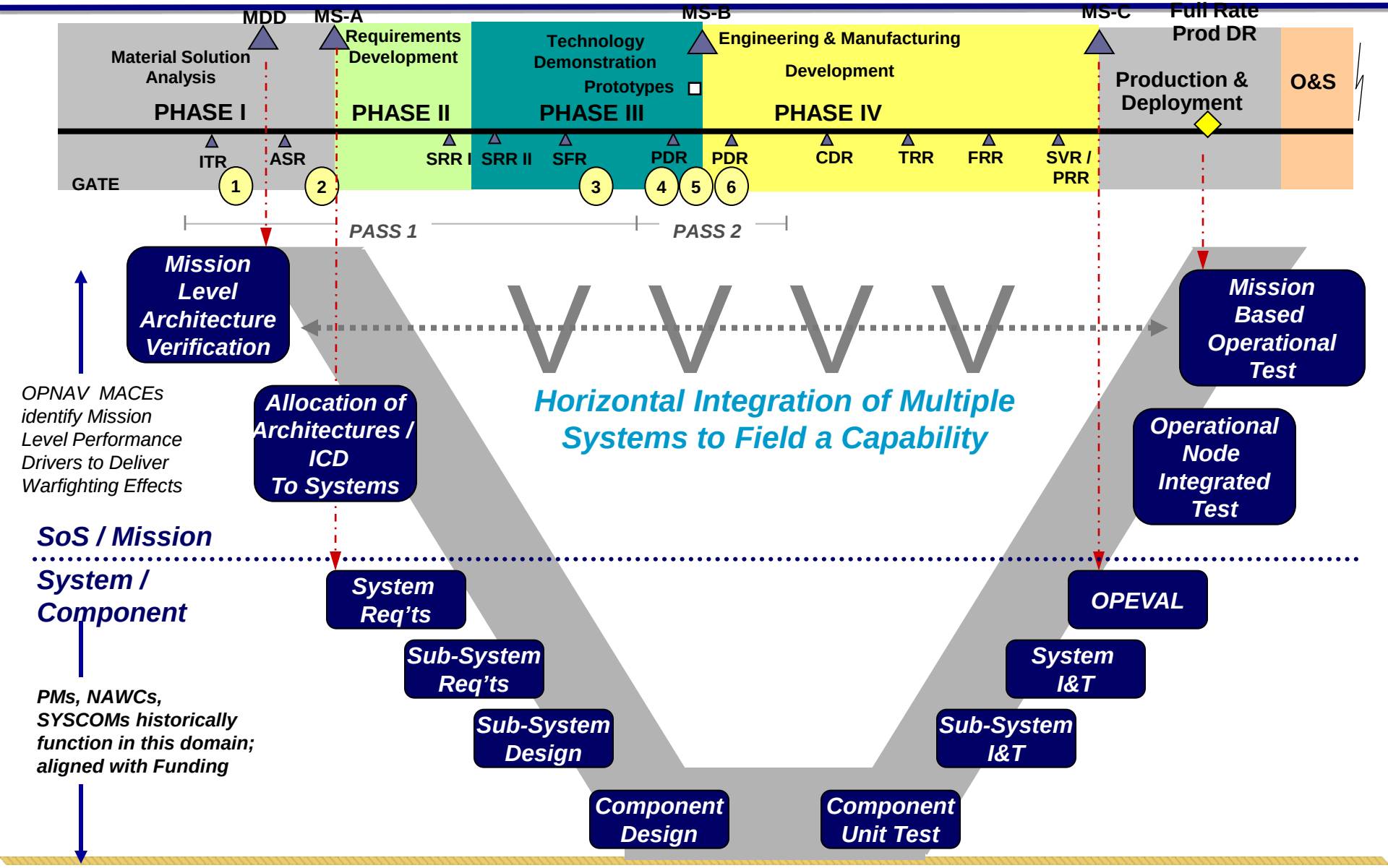
a) shall specify the reasons why it would not be practical to carry out the acquisition without continuing to use a contractor to perform lead systems integrator functions (including a discussion of alternatives, such as the use of the Department of Defense workforce**,** or a system engineering and technical assistance contractor);

b) shall include a plan for phasing out the use of contracted lead systems integrator functions over the shortest period of time consistent with the interest of national defense

c) may not be delegated below the level of Under Secretary of Defense for Acquisition, Technology, and Logistics; and

d) shall be provided to the Committees on Armed Services of the Senate and House of Representatives at least 45 days before the award of a contract pursuant to the determination

SE 'Vee" Extended to Mission / SoS



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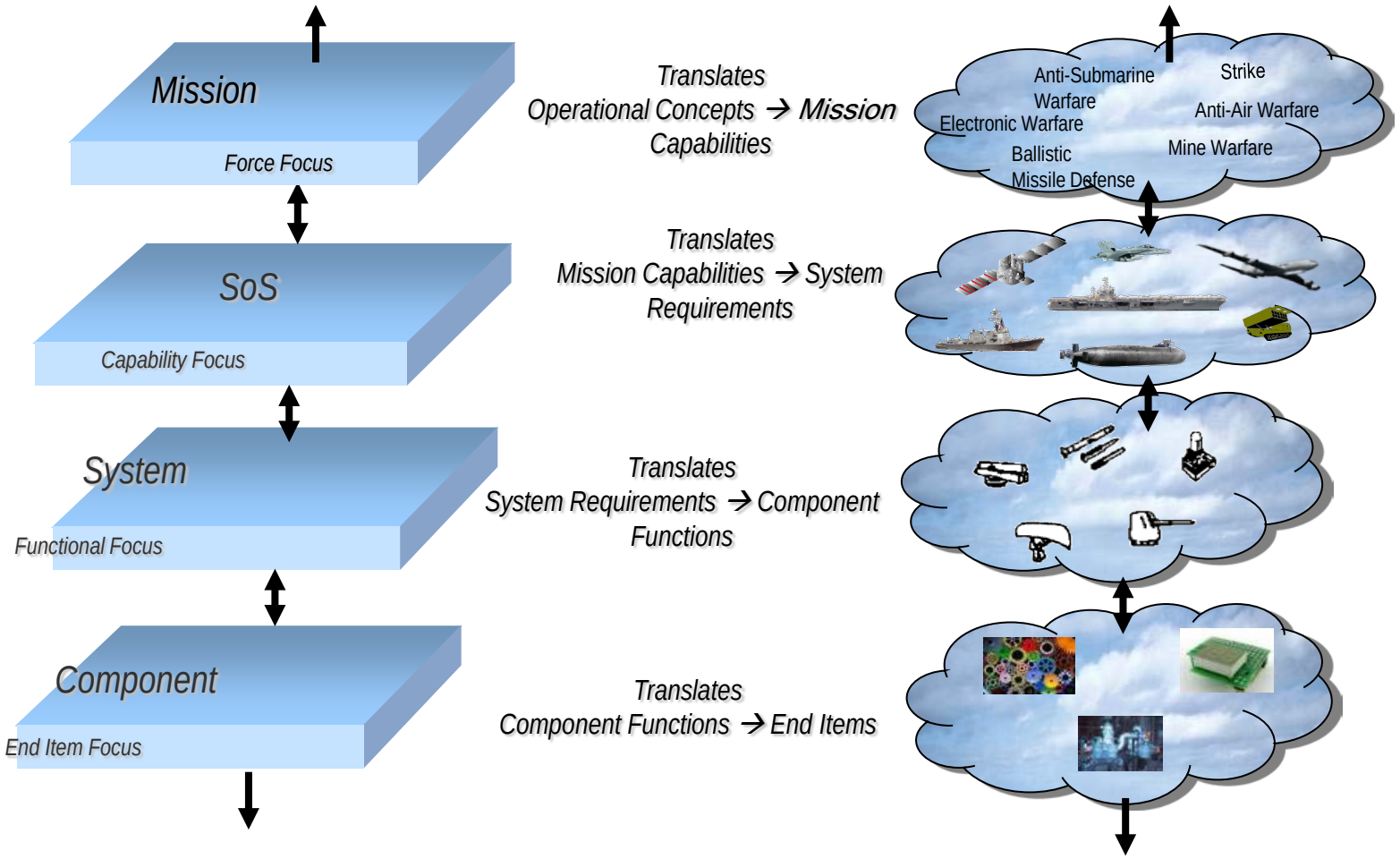
DoN Engineering of Systems
(a spectrum of Systems Engineering levels)



Systems Integration takes place at each level of the hierarchy and requirements are passed between levels of the hierarchy