



2012-05-16

Multi-Objective Optimization of System Capability Satisficing in Defense Acquisition

Brian Sauser

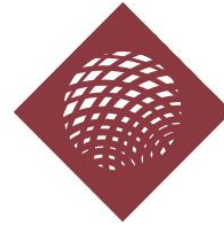
<http://hdl.handle.net/10945/33863>



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SYSTEMS

Development &
Maturity Laboratory

Analyzing Component Importance in Multi-Function Multi-Capability Systems Developmental Maturity Assessment

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STEVENS
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THE INNOVATION UNIVERSITY



School of
Systems & Enterprises



Human Maturity

- Emotional
- Physical
- Intellectual



System Maturity

- Functional
- Physical
- Logical

Emotional-Functional

Indicates how a system responds to the circumstances or environment in an appropriate and adaptive manner.

Physical-Physical

This response is designed (in some instances learned) and not determined by the system's age.

Intellectual-Logical

Encompasses being aware of the correct time and place to deploy and knowing when to operate appropriately according to the situation



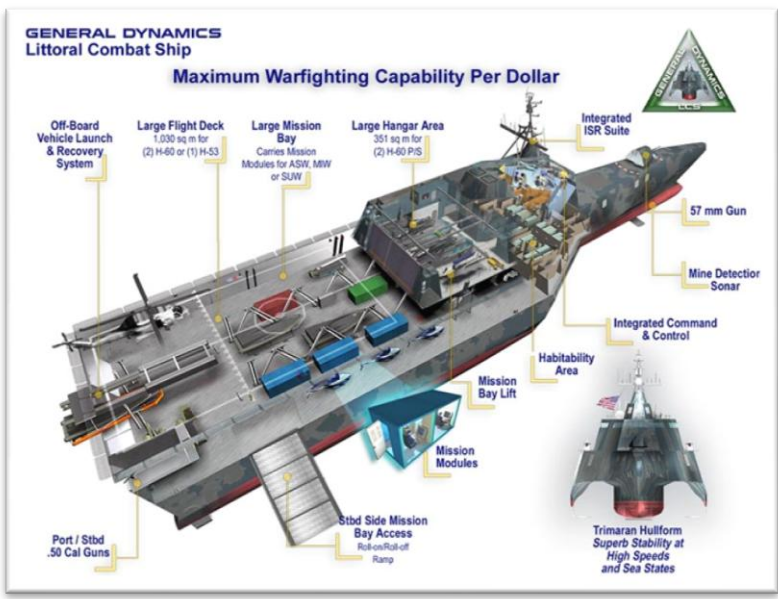
<http://www.talash.com/online-gardening-utilities-store-india>



www.microsoft.com








<http://dailymobile.se/2010/07/28/iphone-4-vs-iphone-2g-3g-3gs-speed-comparison/>



<http://www.defenseindustrydaily.com/the-usas-new-littoral-combat-ships-updated-01343/>

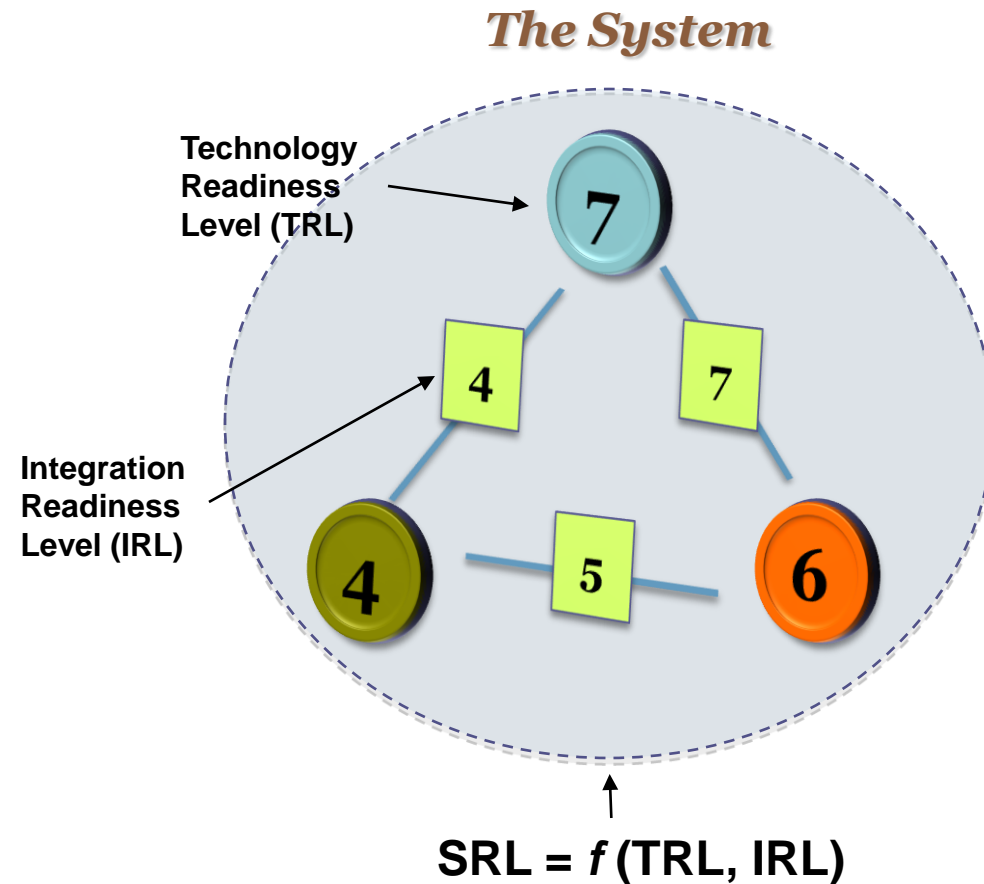
iPhone Evolution

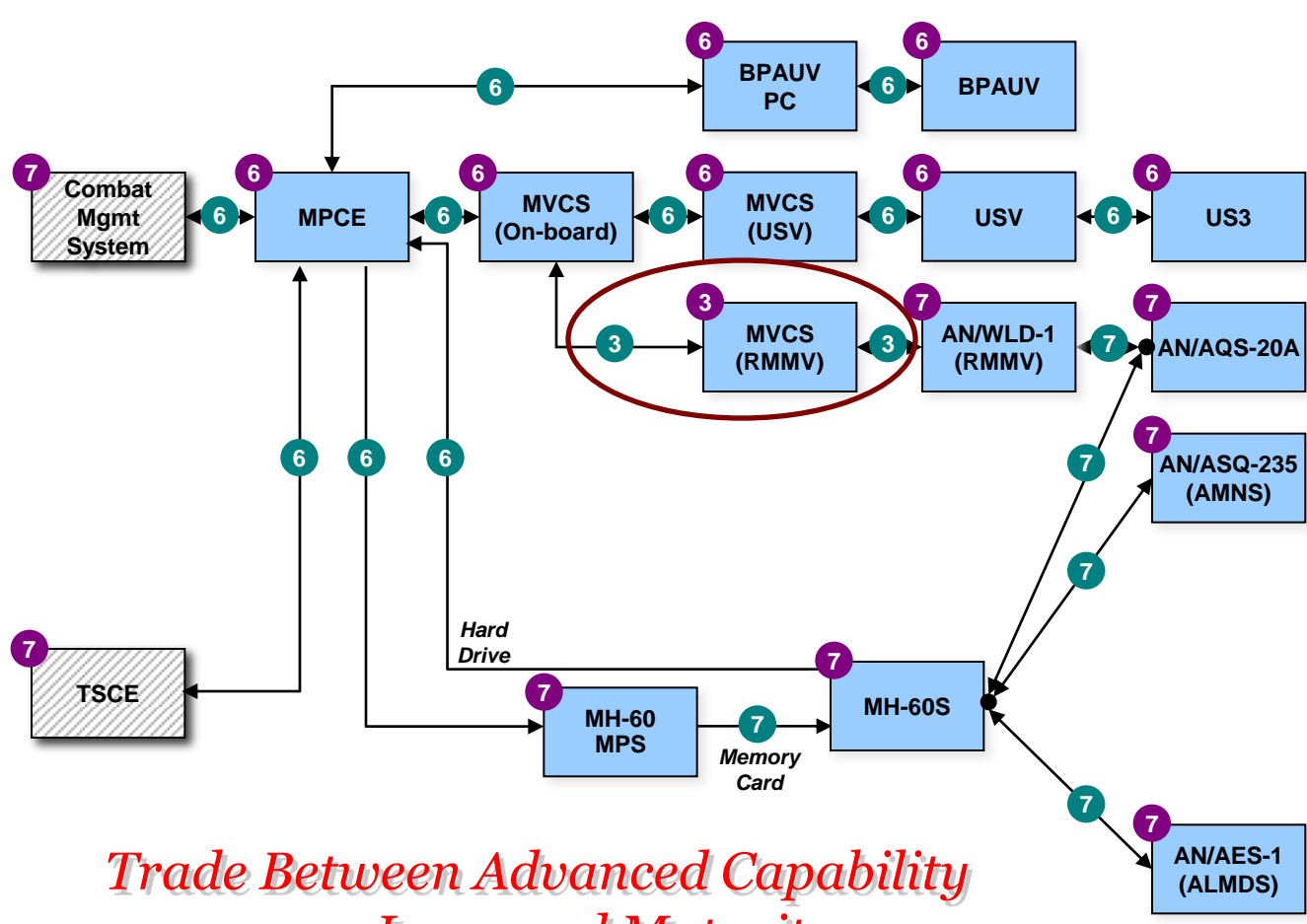
Launch Time	2007, Jun	2008, Jul	2009, Jun	2010, Jun	2011, Oct
Generation	<p>2G</p> 	<p>3G</p> 	<p>3GS</p> 	<p>4G</p> 	<p>4GS</p> 
New Features (not exhaustive)		<ul style="list-style-type: none"> • 3G connectivity • GPS 	<ul style="list-style-type: none"> • Video recording • Voice control • Nike+ support 	<ul style="list-style-type: none"> • Face time • Retina Display • Front and back cameras 	<ul style="list-style-type: none"> • Siri • iCloud • Video stablization • Face detection

Systems Evolution and Lifecycle Management

Value Proposition:

- To provide a systemic view of development maturity with opportunities to drill down to element-level contributions
- To allow managers to evaluate system development to take proactive measures
- To create highly adaptive methods, processes, and tools to use on a wide array of system engineering development efforts





	MP SRL	MP SRL w/o Sea Frame
MP 1	0.60	0.57

LEGEND

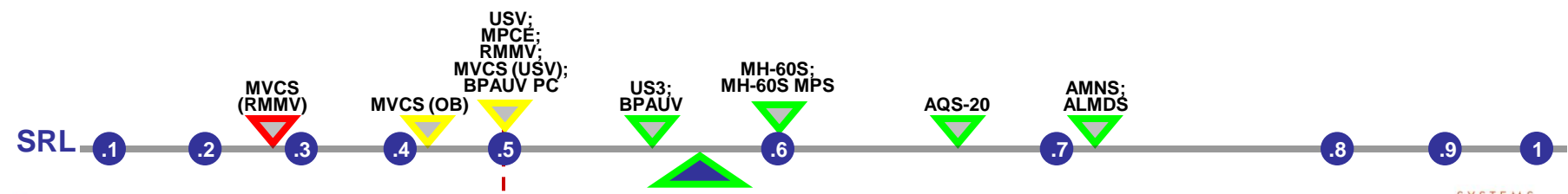
- MP Technology
- Sea Frame System
- Current Mission Package SRL Status
- Previous Mission Package SRL Status
- Current Mission System SRL Status
- 1 Technology Readiness Level
- 1 Integration Maturity Level
- 1 System Readiness Level Demarcation
- Scheduled Position

Risk to Cost and/or Schedule

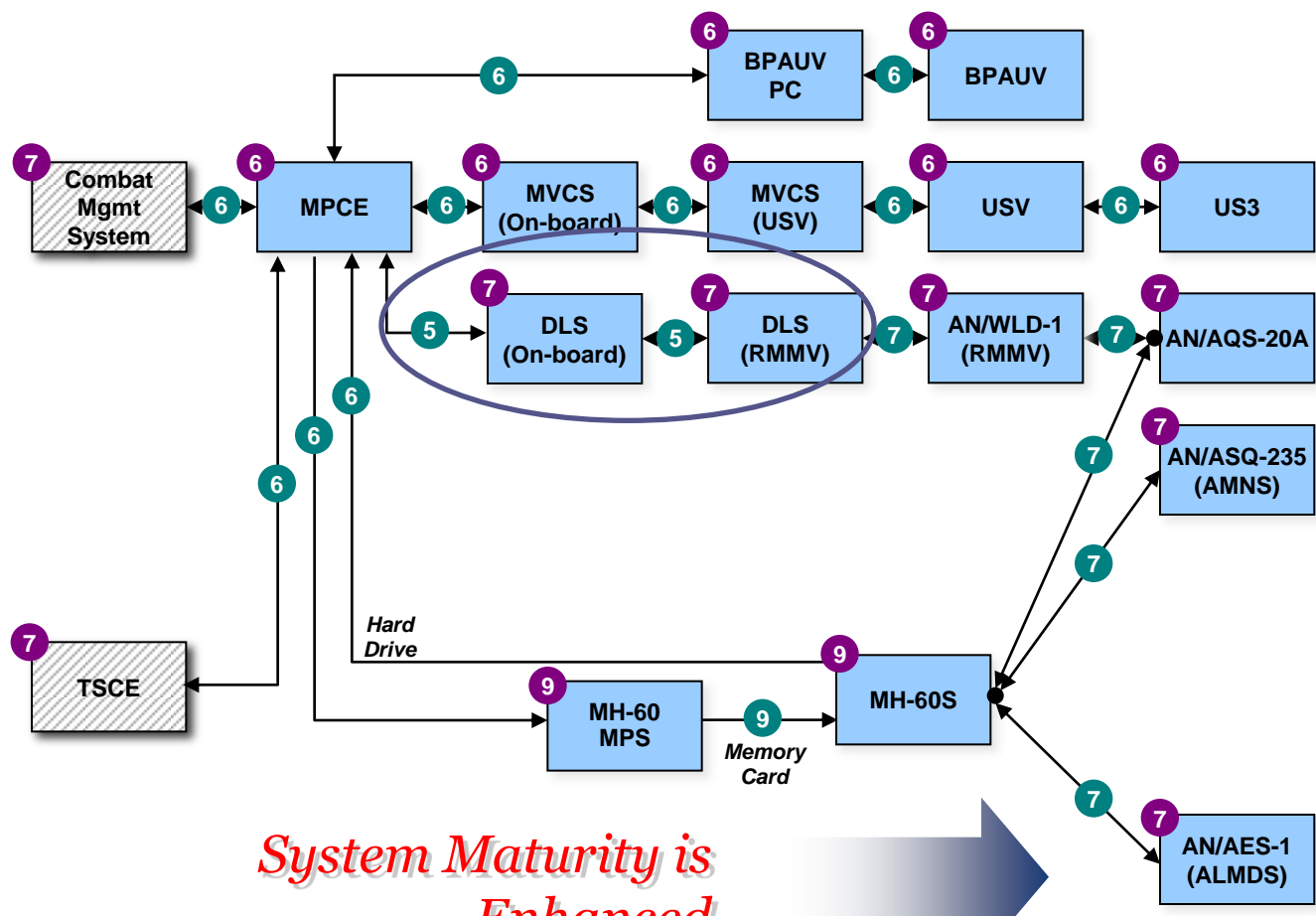
- Low
- Medium
- High

All Data is Notional

Trade Between Advanced Capability or Increased Maturity



Example provided by Northrop Grumman in support of the US Navy PMS 420 Program



	MP SRL	MP SRL w/o Sea Frame
MP 1	0.64	0.67

LEGEND

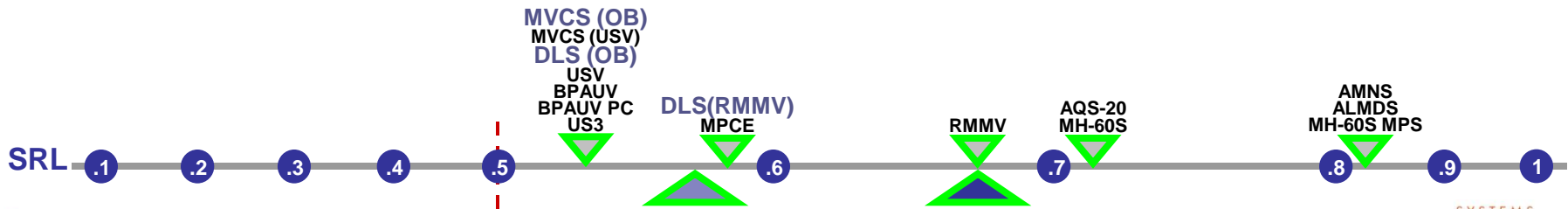
- MP Technology
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- Current Mission Package SRL Status
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- Current Mission System SRL Status
- 1 Technology Readiness Level
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- 1 System Readiness Level Demarcation
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Risk to Cost and/or Schedule

- Low
- Medium
- High

All Data is Notional

System Maturity is Enhanced



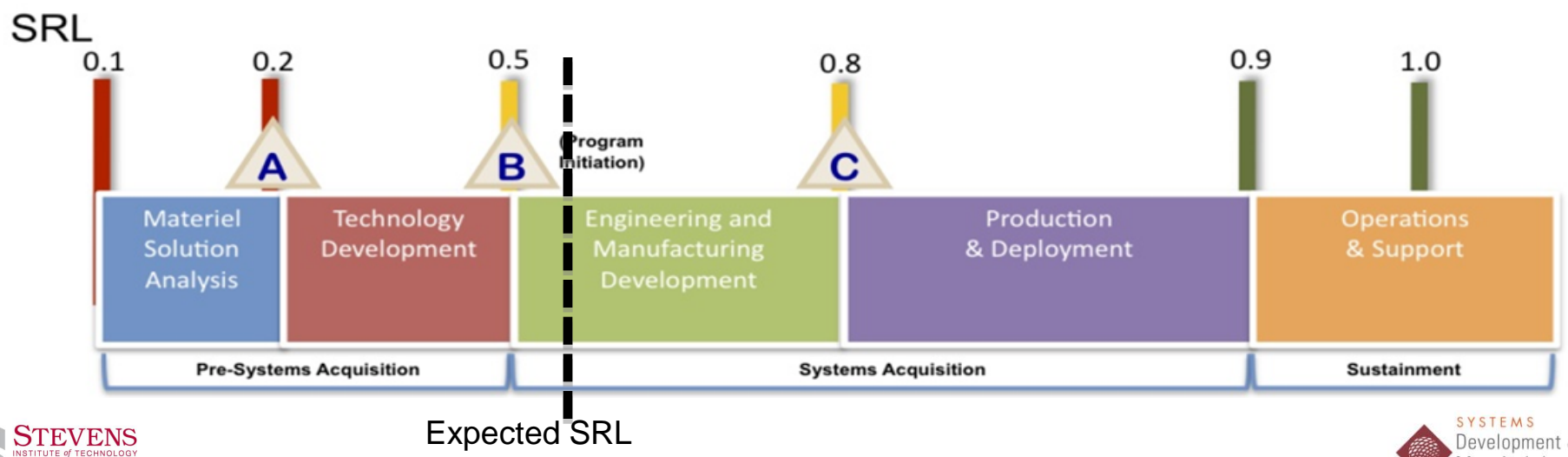
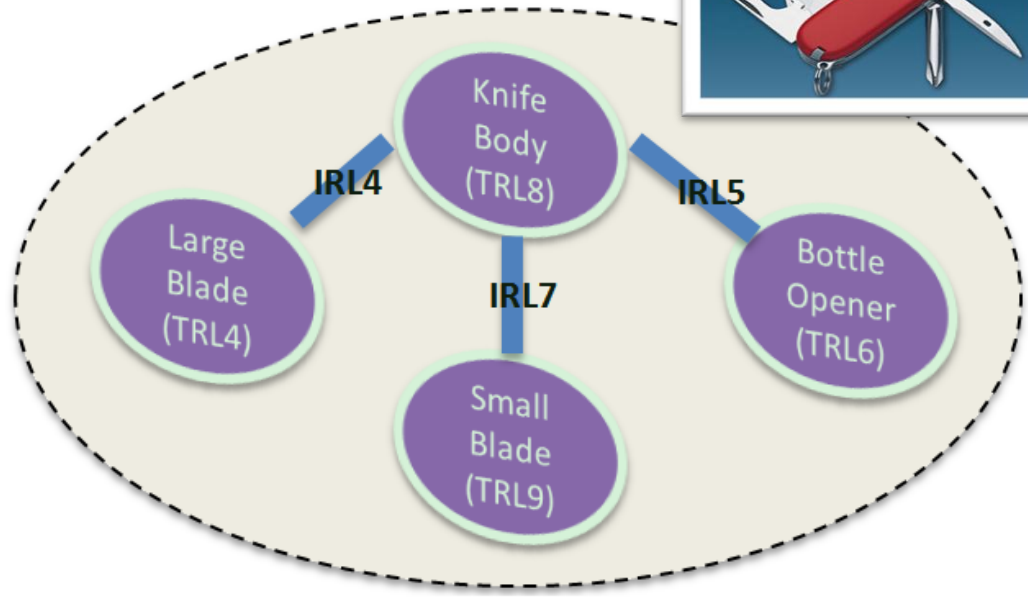
Example provided by Northrop Grumman in support of the US Navy PMS 420 Program

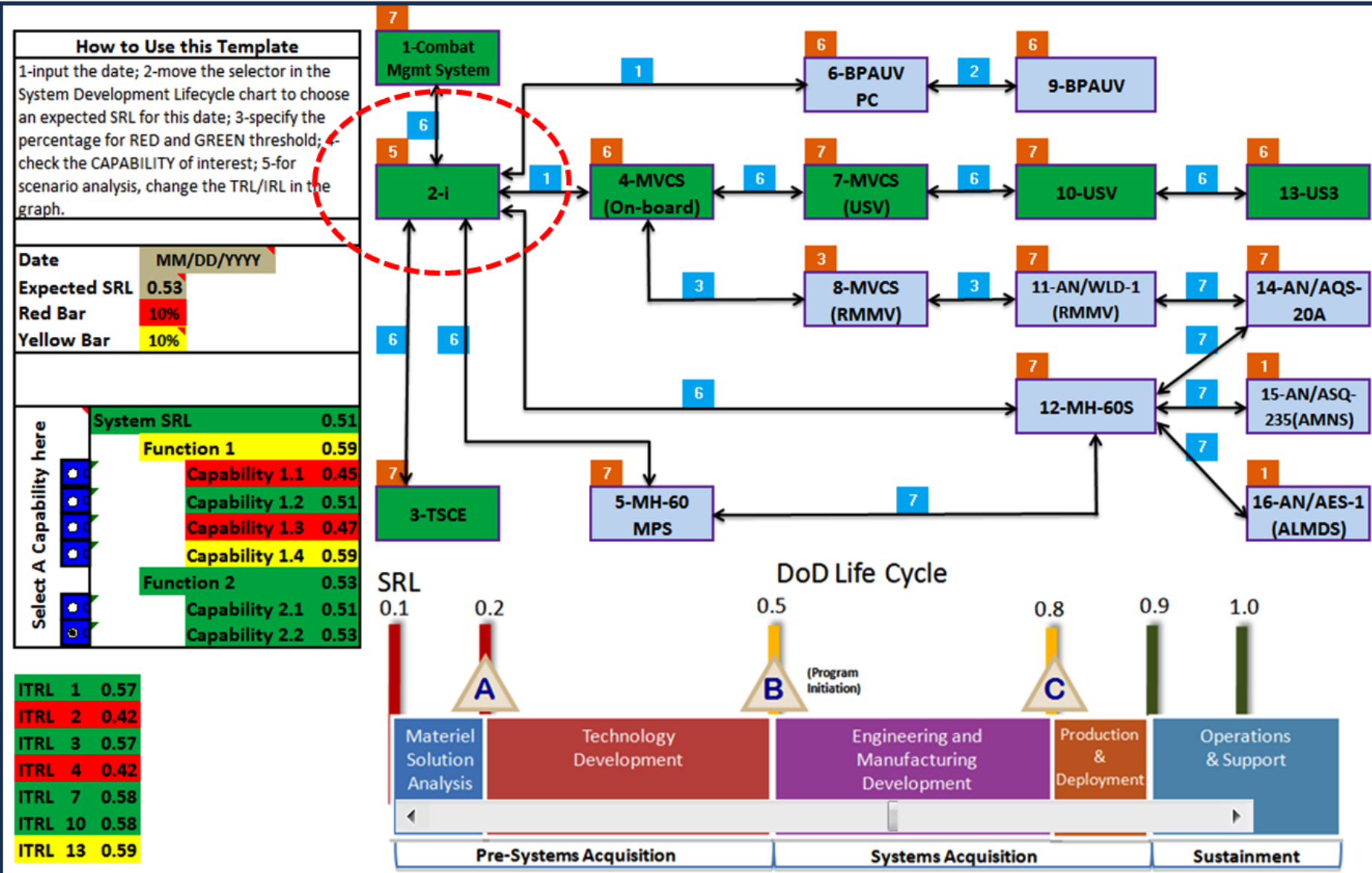
Multifunction Multicapability System Maturity Assessment

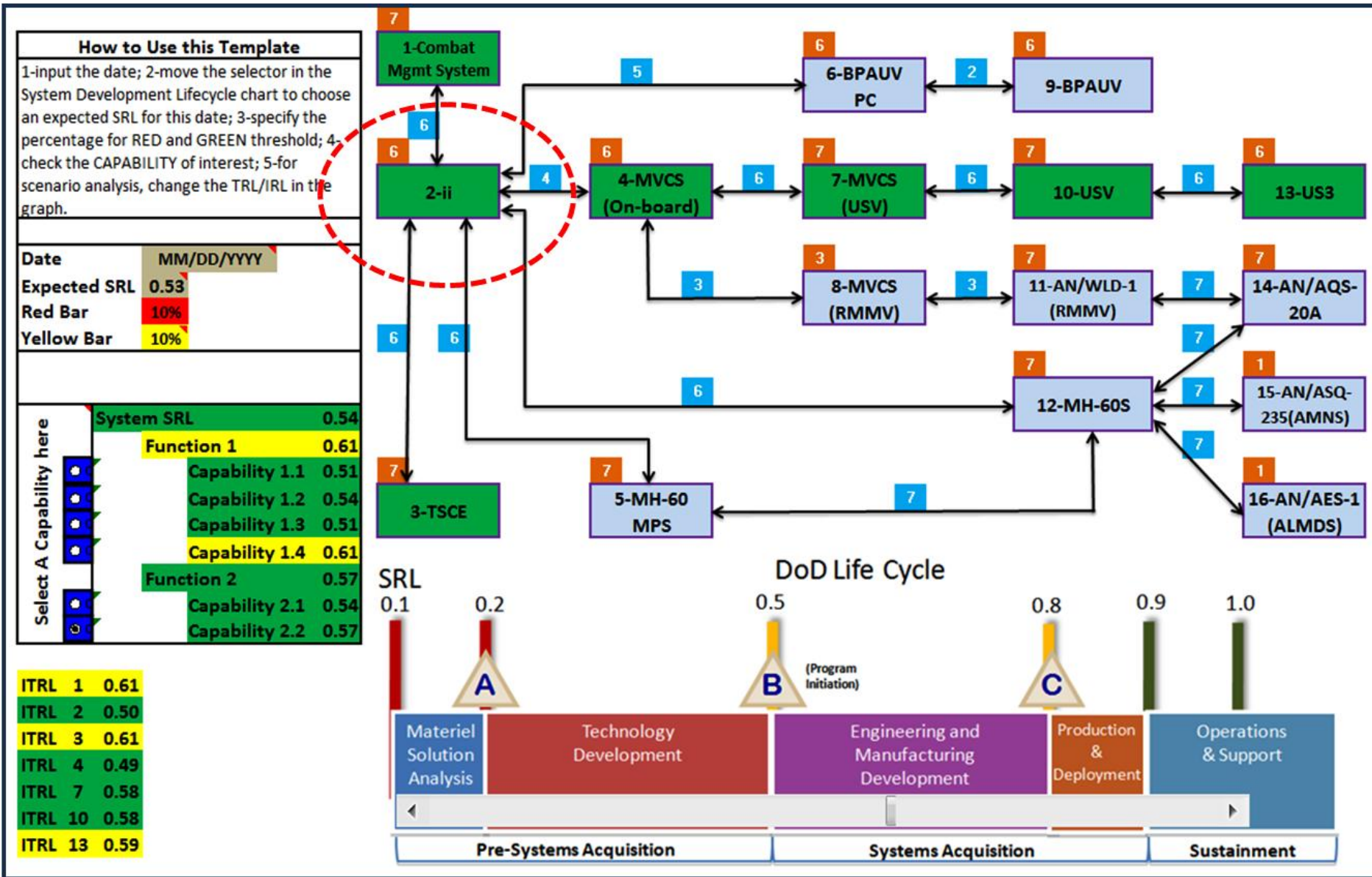


Date MM/DD/YYYY
Expected SRL 0.55

System SRL 0.64







WARNING
WARNING
WARNING
WARNING

This is RESEARCH...

- *Component importance is significantly dependent on interest: component importance should be situation-dependent*
- *Discernibility in components importance determination: difference between important components is very small, largely due to the inconsistency of estimates across all technologies*
- *Technologies that have more integration rank relatively higher than those having less integration when all other factors are the same: With out a proper weighting of component importance, intergration will drive risk*
- *Maturity of one system is not the same as maturity for another system: SRL for one system cannot be compared to the SRL of another system unless they are the same system.*