

# Framing Assumptions (FAs)

Lunch and Learn, March 8, 2017



Foundational Learning



Workflow Learning



Performance Learning

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# Overview

- Background
- Definition and Guidance
- Why are they Important?
- Exercise
- How Do We Develop FAs?
- How Do We Test FAs
- Summary



# Background

- Framing Assumptions (FAs) fairly new to acquisition lexicon:
  - Introduced by Program Assessment and Root Cause analysis Office (PARCA) in USD AT&L
  - PARCA analyzes root causes of Nunn-McCurdy program breaches
    - Identified false assumptions as cause of significant cost growth that eventually led to cost growth and Nunn-McCurdy breaches
    - Program management failed to recognize invalid assumptions early and did not take actively address disconnect until it was too late to avoid further issues
  - Now recognized as a source of risk that must be managed
  - PMs expected to document FAs early in the program lifecycle and to gather knowledge to validate and/or address changes needed

- Any supposition (explicit or implicit) that is central in shaping cost, schedule, or performance expectations of an acquisition program
- Typically should have a small number (3-5) of FAs with the following attributes:
  - *Critical*: Significantly affects program expectations
  - *No work-arounds*: Consequences cannot be easily mitigated
  - *Foundational*: Not derivative of other assumptions
  - *Program specific*: Not generically applicable to all programs
- PM Owns FAs!
  - Should identify, continuously monitor their validity (and adjust as needed), and use them in assessments



# DoDI 5000.02 Guidance

“At the Milestone A Review: The Program Manager will present the approach for acquiring the preferred materiel solution including: the Acquisition Strategy, the business approach, **framing assumptions**, an assessment of program risk and how specific technology development and other risk mitigation activities will reduce the risk to acceptable levels, and appropriate “Should Cost” management targets...”

“At the Development RFP Release Decision Point, the Program Manager will summarize TMRR Phase progress and results, and review the Acquisition Strategy for the EMD Phase. Specific attention will be given to overall affordability; the competition strategy and incentive structure; provisions for small business utilization; source selection criteria including any “best value” determination; **framing assumptions**; .....”



# Why Are FAs Important?

- Used to help develop cost estimate for the program
- Used to help develop the acquisition strategy, which includes the:
  - Technical Strategy (scope, technical architecture, requirements, testing, etc.)
  - Support Strategy (R&M, maintenance concepts, depot, etc.)
  - Business Strategy (contract type, incentives, payments, etc.)

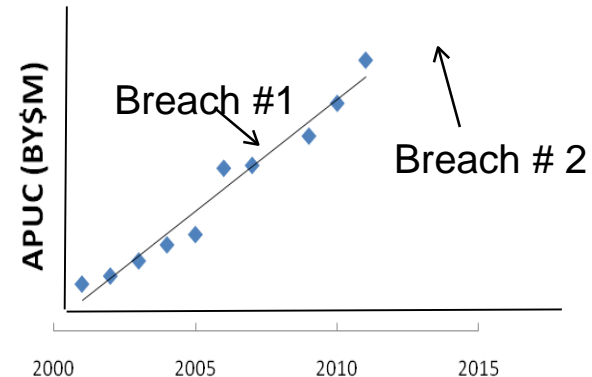
Significant Implications, including Nunn-McCurdy Breaches  
if FAs are invalid



# What is a Nunn-McCurdy Breach?

- Amendment to Title 10 introduced by Senator Sam Nunn and Congressman Dave McCurdy in the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 1982.
  - Requires that Acquisition Category I PMs maintain current estimates of Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC). If the PAUC or APUC increases by 25 percent or more over the current Acquisition Program Baseline (APB) objective, or 50 percent or more over the original APB objective, the program must be terminated unless the Secretary of Defense (SECDEF) certifies to Congress that the program is essential to national security.

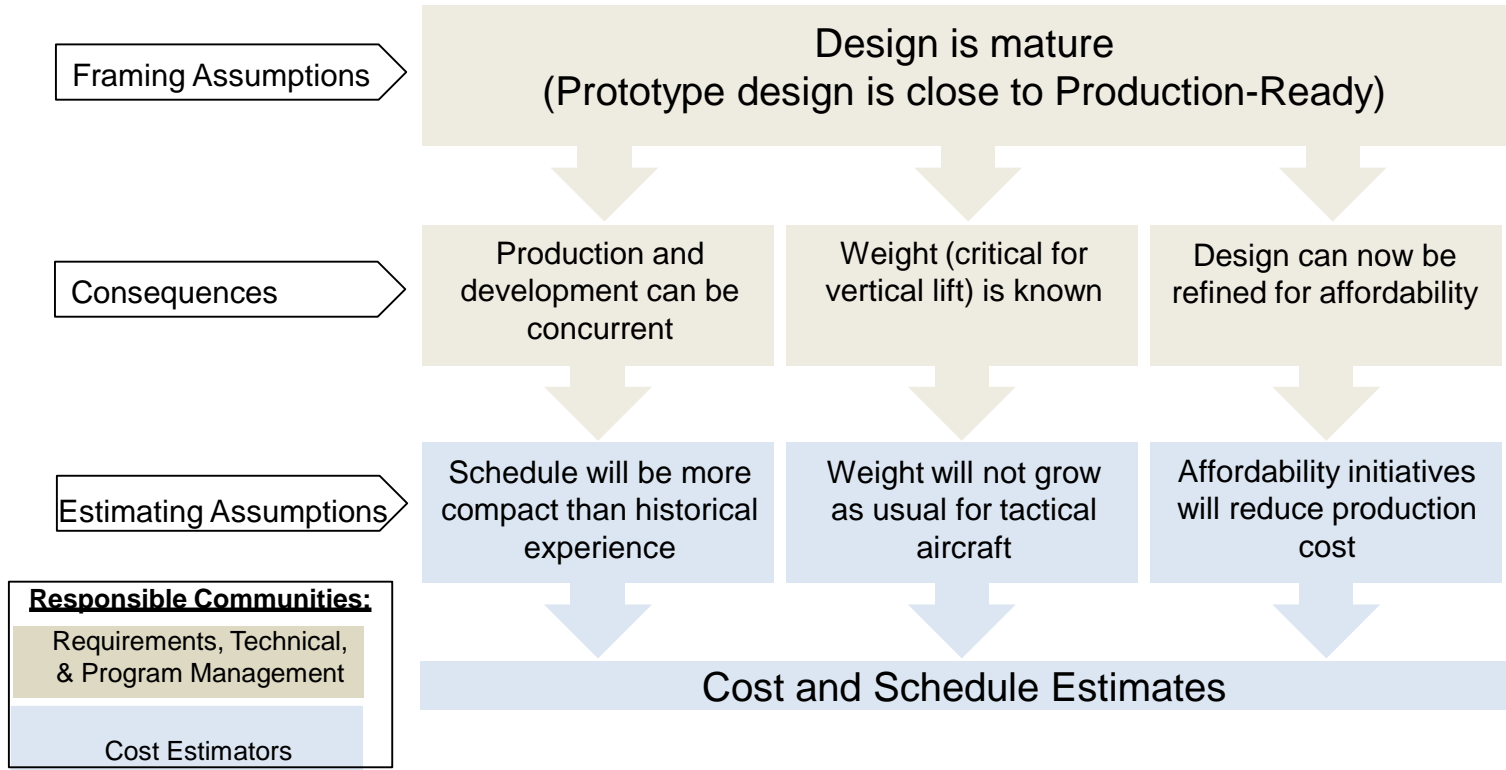
- When an invalid framing assumption is embraced:
  - Evidence of problems will accumulate
  - Cost and schedule estimates will need to be changed
  - But, the amount of growth will depend on
    - How promptly management recognizes the issues
    - How effectively management responds
- Further cost growth if the full implications of the invalid framing assumption are not addressed



“It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.” - Mark Twain

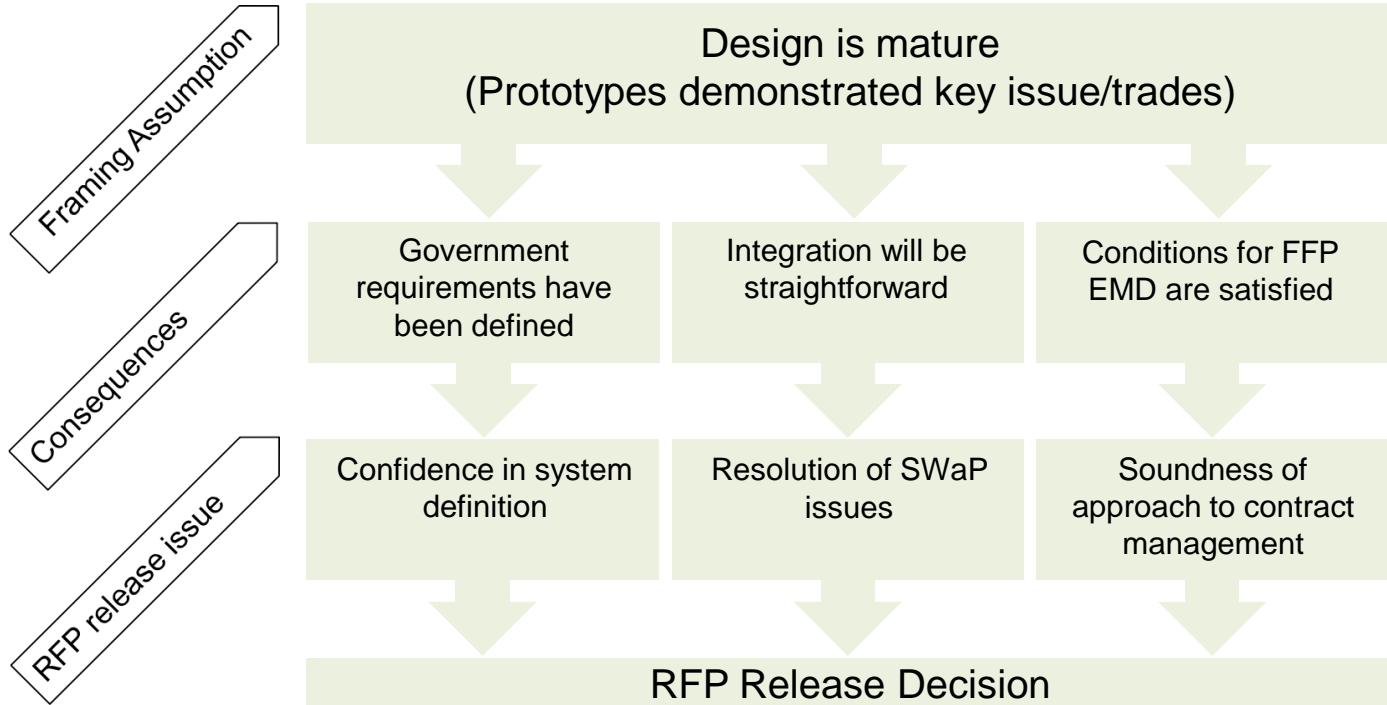


# Cost Estimating Assumptions Flow from Framing Assumptions



Source: PARCA, 11/15/2012

# Assumptions Drive Key Decisions



Not easy to recover without big impacts after RFP is released

# Example of a FA

- The government program office has sufficient knowledge, data, expertise, and resources to execute successfully as the overall system integrator for the sensor upgrade program on the XX-51 armored vehicle program

*Does it meet these criteria?*

1. *Critical:* Significantly affects program expectations
2. *No work-arounds:* Consequences cannot be easily mitigated
3. *Foundational:* Not derivative of other assumptions
4. *Program specific:* Not generically applicable to all programs

- The next chart will provide some sample framing assumptions. Answer the following questions:
  - Is it a good assumption?
  - Why?



1. Cost (or Affordability), schedule, and/or performance goals can be achieved with minimal risk
2. The contractor and government program office will perform well
3. System deficiencies will be identified and fixed during testing
4. The system will be effective, suitable, and survivable
5. The program office has the resources it needs
6. Software development will stay on track because we plan to use a CMMI level IV company

What, if anything is wrong with these?



# Are These Good Examples?

- X, Y or Z sub-systems (or other integral components) can be developed independently
- The prototype design is very close to production ready and will require few changes
- Commonality between variants will be at least X%.
- Significant purchases by joint, interagency, or international customers will reduce unit cost.
- Production at contractor's facility will not drop below X% of current levels, keeping overhead costs manageable
- Open system architecture and available technical data rights allow for competition

# How do FAs Get Identified?

- No cookbook approach but consider reviewing the following as a starting point:
  - Operational environment and interfaces
  - System dependencies and inter-relationships of other programs
  - Industrial capabilities
  - Technology Maturity
  - Organizational landscape
  - Deliverables needed for program success
  - Existing plans and documents
- Use seed questions to examine program beliefs

# How do we Develop FAs?

- Start by examining both explicit and implicit beliefs about your program
- The next set of charts contain examples of seed questions to help with this assessment
  - Technical, Management, Requirements, Schedule, and Cost Questions
  - Answering yes indicates a possible FA for the program in that area. These questions should be tailored to the program
- General questions to help identify assumption and questions to help assess criticality





# Sample Technical Questions

- Have the technologies planned for the system been demonstrated successfully in a similar application or environment?
  - Is there commercial technology that is being used for the first time in a military application? Who has the data rights?
  - Has the technology worked successfully under the same operating conditions?
- Does the system depend on COTS solutions, other commercial technologies and services, or a non-developmental item?
  - Is this a novel integration of standard systems?
  - Will these systems require modification for environment?
  - How long might the manufacturer support such an item?
- Is the commercial availability stable? Have all the technologies been demonstrated or successfully operated at the scale planned (e.g., power density, number of sensors, bandwidth)?

- Novel management structures
  - Is the government acting as system integrator?
  - Are multiple PEOs/PMs involved?
  - Do industry partners participate through new commercial partnerships or JVs?
- Is the program dependent on the progress of other programs?
- Are there unique legal, diplomatic, or security issues?
- Does the program have an experienced workforce? Will there be issues retaining this workforce?

# Sample Requirements Questions

- Is there joint/foreign involvement?
  - Are the program requirements compatible between the stakeholders?
  - Does each participant require a customized version?
  - Is there uncertainty with respect to quantities for partners?
- Are the requirements stable, well defined, and unambiguous?
- Will capability be met through an evolving design or series of upgrades?
- Are there unknown major areas of scope, e.g., facilities locations, operational availability, support equipment/infrastructure?
- Could another system substitute for this one?
- Can some of the requirements be deferred or met at a lower level?



# Sample Cost and Schedule Questions

- Does the program rely on sole source(s)? Are there known cost drivers?
- Have the intellectual property and data rights been resolved?
- Are there workforce supply or demand issues? Are key workforce skills/trades in short supply? Can we hire at the rate based in our plans?
- Is the stability of the supplier base understood? Are there key suppliers who are at risk?
- Has the prime contractor executed a similar program (either in complexity or system/commodity type) before?



# How Can We Test FAs?

- Does information exist that:
  - Disconfirms or is contradictory to the FA?
  - Was previously dismissed but might now be relevant?
  - Is new and could change the FA? Has it been properly adjusted?
- How accurate and reliable is information upon which the FA is based?
  - Was incomplete, imprecise, or ambiguous information used?
- Could certain circumstances (e.g., social, technological, economic, environmental, political, organizational) affect the FA?
  - Does the judgment account for these circumstances? How sensitive is it to these circumstances?
  - Could circumstances proceed differently than expected?
  - For what circumstances would this judgment be abandoned?
  - Have all plausible but unpredictable circumstances been considered?



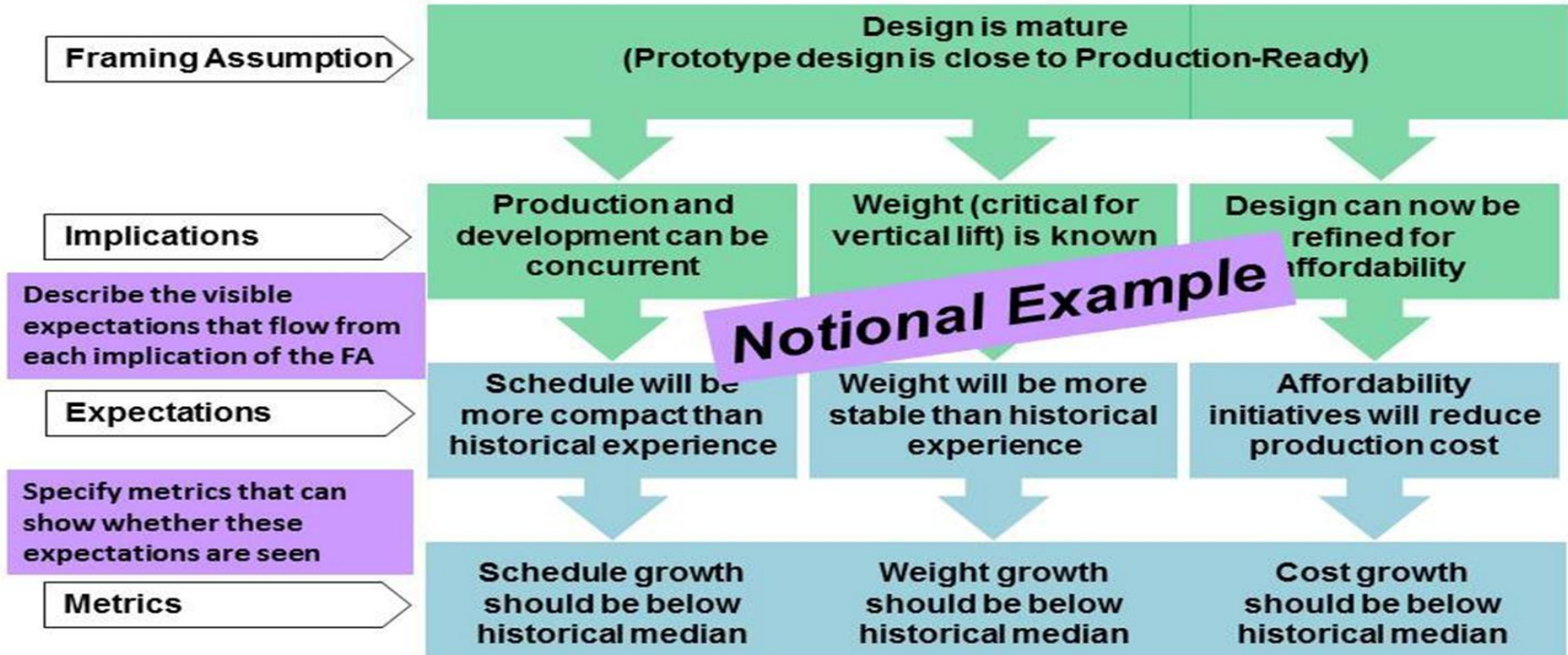
# Framing Assumptions Template

Candidate Assumption	Program Specific?	No Work-arounds?	Foundational?	Priority	Metrics to Monitor
FA 1					
FA 2					
FA 3					
FA 4					
FA 5					

# Framing Assumptions

The PM and PMO team should develop the program's Framing Assumptions, generally prior to MS B, and track the validity of the FAs by assessing relevant program metrics.

Show implications, expectations and metrics for each key framing assumption (FA). There should only be few FAs (3-5); each should have these properties: cause major consequences, have no simple work-around, be uncertain at this point, be program-specific (not generic, like funding stability or good contractor performance), and be a fundamental assumption that affects management decisions.







# Evolution of Expectations for Navy's Littoral Combat Ship (LCS)

	Early program	Updated program
<b>QTY &amp; Cost</b>	<ul style="list-style-type: none"> <li>• 55 seaframes</li> <li>• \$220 million per seaframe</li> <li>• 64 mission packages, \$2.3 billion total cost</li> </ul>	<ul style="list-style-type: none"> <li>• 40 seaframes (includes 12 frigates)</li> <li>• \$478 million per seaframe</li> <li>• 64 mission packages, \$5.8 billion</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Ships rapidly fielded, IOC in 2007, 3 years after initiation</li> </ul>	<ul style="list-style-type: none"> <li>• IOC (partial capability) in 2013, 9 years after program initiation</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Leverage existing designs to enable a low-cost, rapidly fielded platform</li> </ul>	<ul style="list-style-type: none"> <li>• Designs required considerable change and were under revision throughout the first several ships built</li> </ul>
<b>Seaframe capability</b>	<ul style="list-style-type: none"> <li>• Sprint speed: 40-50 knots</li> <li>• Range: 4,300-nautical-mile range when operated at speed of 16 knots and 1,000-nautical miles at 40 knots</li> </ul>	<ul style="list-style-type: none"> <li>• Speed: Freedom variant can meet speed reqts but Independence variant did not meet speed reqts; frigate will have reduced speed</li> <li>• Range: In 2009, endurance requirement reduced to 3,500-NM range at a speed of 14 knots. Freedom variant cannot meet these reduced reqts—with a 2,138- NM range at a speed of 14 knots and 855 nautical miles at 43.6 knots; Independence variant can meet range requirements</li> </ul>
<b>Mission packages capability</b>	<ul style="list-style-type: none"> <li>• New capabilities would be rapidly fielded as the Navy would integrate existing technologies on to the three types of mission packages—mine countermeasures, surface warfare, and anti- submarine warfare</li> </ul>	<ul style="list-style-type: none"> <li>• Some technologies ultimately less mature than envisioned, leading to significant difficulty developing mission capabilities</li> <li>• Only 1 of 3 packages (surface warfare) has demonstrated required performance. However, IOC achieved at a temporarily reduced minimum capability requirement</li> </ul>

Source: GAO-17-279T

# Summary

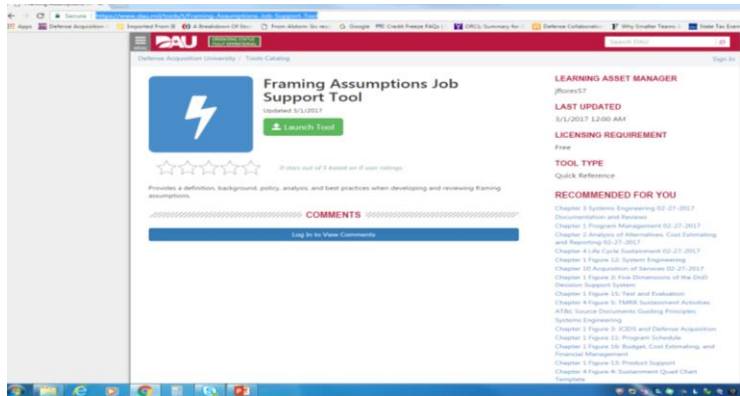
- Development of valid framing assumptions is critical to establishing sound program parameters such as cost estimates, schedule baselines, contracting strategy, and performance expectations
- The PM owns these assumptions and thus, must ensure these assumptions are properly formulated and tested for realism periodically
- Ensure information used to base assumptions is relevant, recent, and accurate
  - Adjust program plans as soon as possible when FAs change or are determined to be invalid



## Resources:

- Framing Assumptions Job Support Tool:

<https://www.dau.mil/tools/t/Framing-Assumptions-Job-Support-Tool>



- WSM 014 Acquisition Strategy Development Workshop

Please complete end of event survey: Link provided in chat area