

# Digging Out the Root Causes of Nunn-McCurdy Breaches

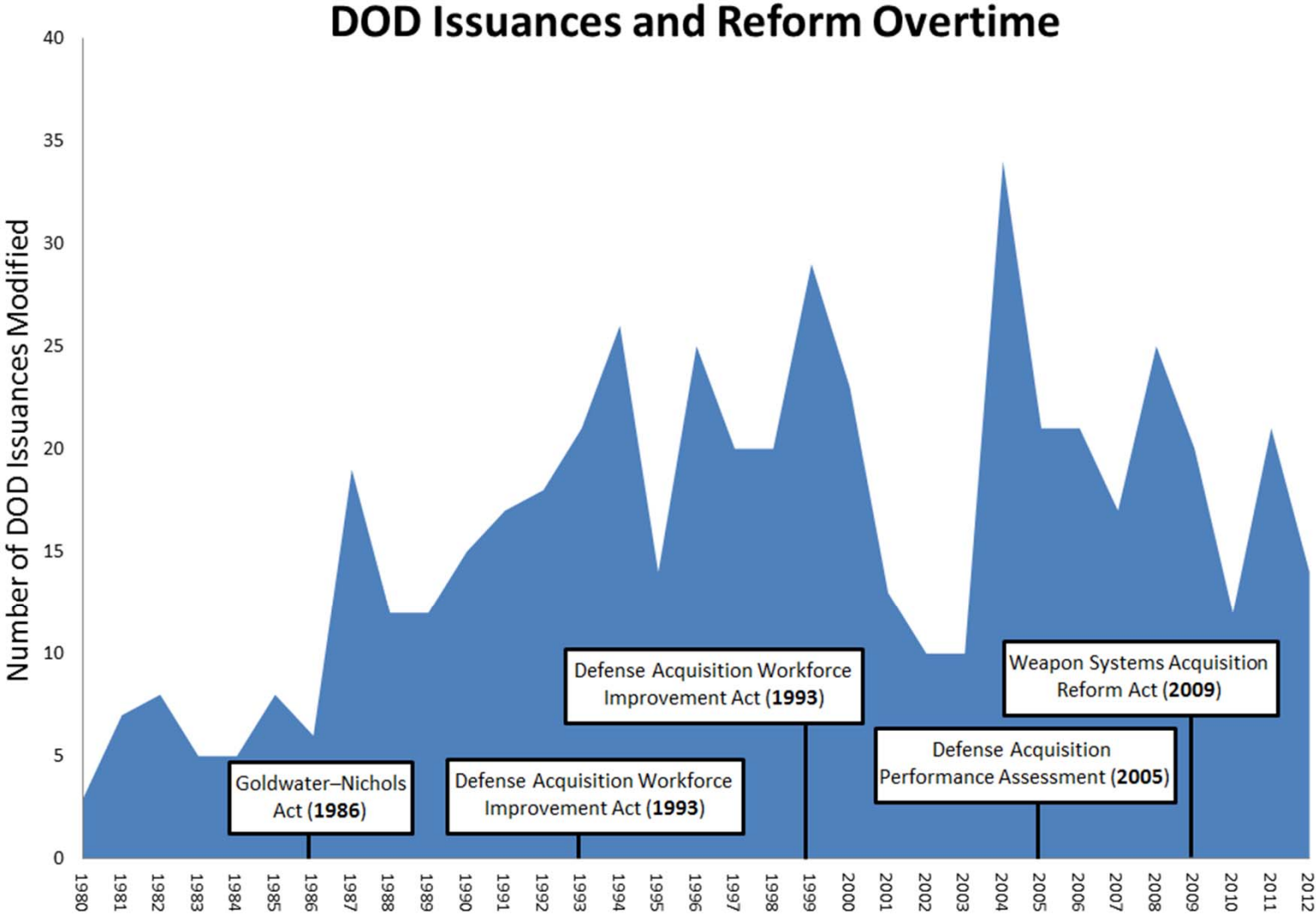
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May 2014



# Congress Has Increased Focus on Cost Overruns



# 1982 Nunn-McCurdy Legislation Focused on Two Types of Cost

$$\text{Program Acquisition Unit Cost (PAUC)} = \frac{\text{Development Funding + Procurement Funding}}{\text{Total \# of Units Procured}}$$

$$\text{Average Procurement Unit Cost (APUC)} = \frac{\text{Procurement Funding}}{\text{Total \# of Units Procured}}$$

# 2009 WSARA Defined Two Types of Nunn-McCurdy Breaches

Congressional notification by the military department is required if any of these thresholds are exceeded

## Significant

Unit Cost	Current Budget	Original Budget
PAUC	15%	30%
APUC	15%	30%

## Critical\*

Unit Cost	Current Budget	Original Budget
PAUC	25%	50%
APUC	25%	50%

\* Assumes termination unless Secretary of Defense certifies:

- Program is essential necessary for national security and no lesser cost alternative exists
- New total program cost estimates are reasonable
- Management structure is adequate to control costs

# 2009 WSARA Also Established PARCA in OSD

- Set up to do **P**erformance **A**ssessments **R**oot **C**ause **A**nalyses of major acquisition programs
- Small office and tight reporting deadlines (45-60 days for RCAs) meant PARCA needed help—primarily FFRDCs
- To date RAND has analyzed 9 programs and studied several management topics for PARCA

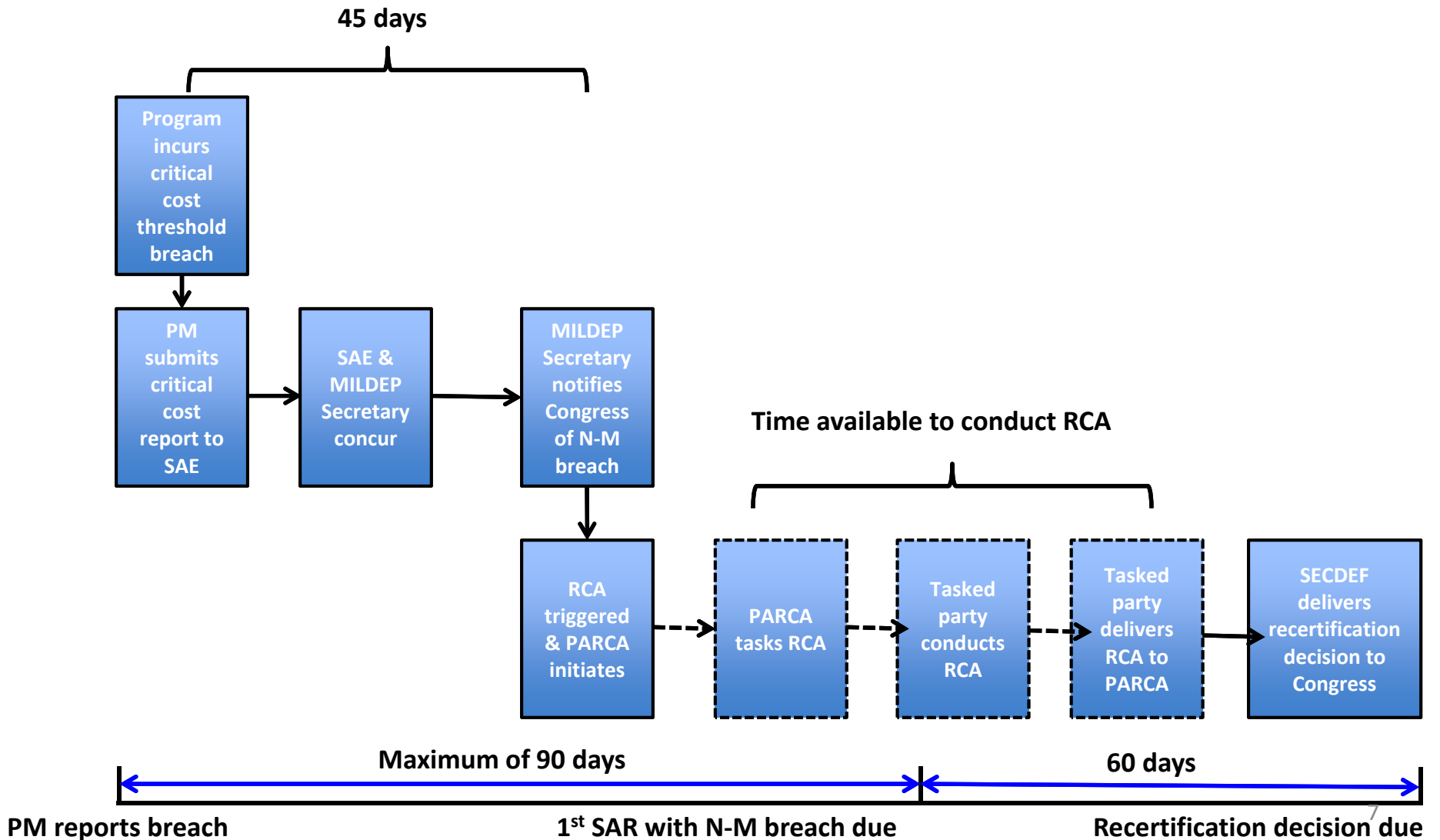
# Outline

- **RCA methodology**

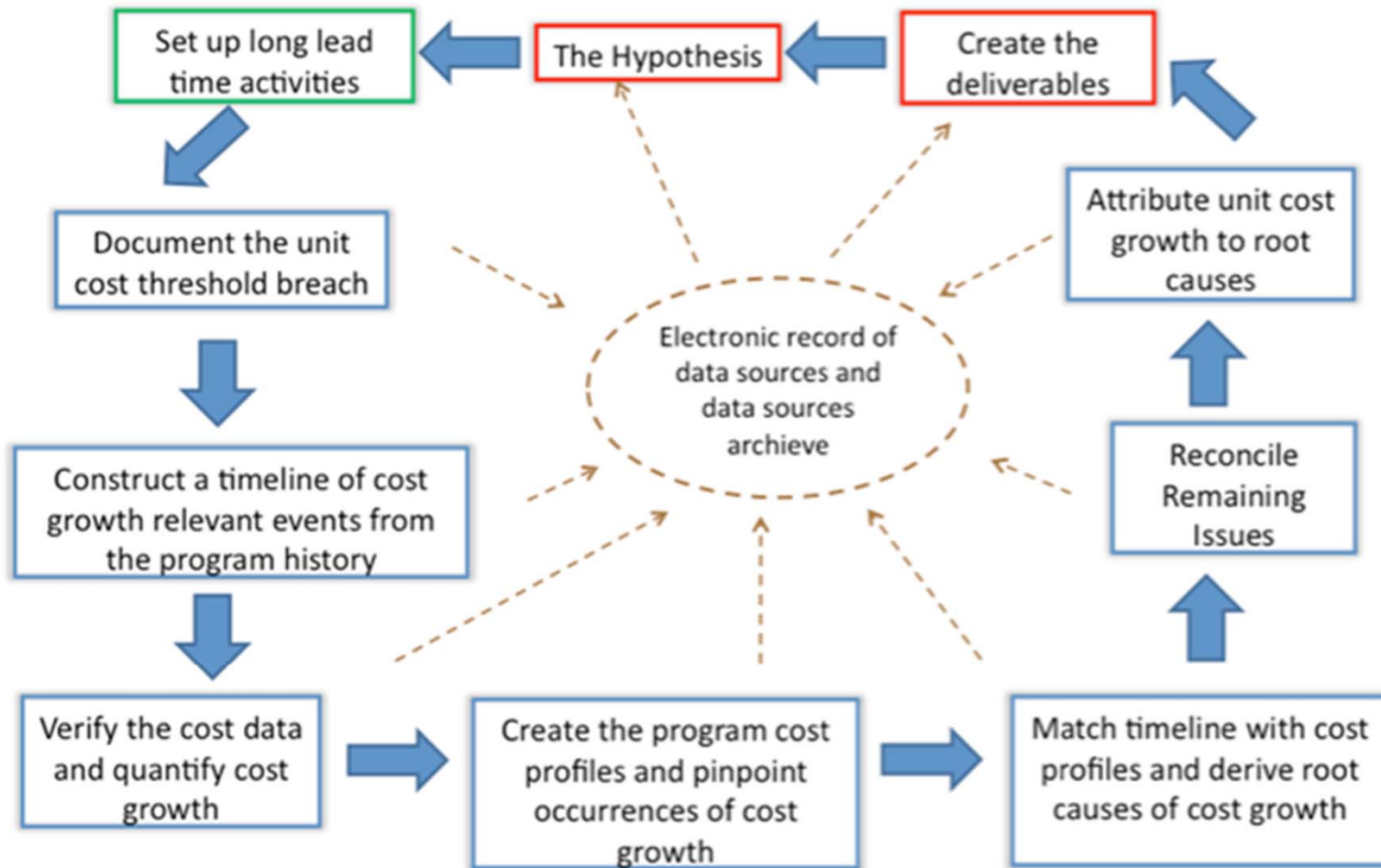
- Wideband Global Satellite Example

- Common trends in RCAs

# Time Available for RCAs Is Short



# RAND Has Developed an RCA Methodology That Meets Timelines





# Understanding Framing Assumptions Helps RCAs

- **A Framing Assumption (FA) is any supposition central to shaping cost, schedule, or performance expectations**
- **FAs have these characteristics:**
  - **Critical: Significantly affects program expectations**
  - **No work-arounds: Consequences are not easily mitigated**
  - **Fundamental: Not derivative of other assumptions**
  - **Program Specific: Not generically applicable to all programs**

Source: Husband, OSD/AT&L/PARCA, Sep 13

# Outline

- RCA methodology

- **Wideband Global Satellite Example**

- Common trends in RCAs

# **Wideband Global Satellite Meets Military Need for Military SATCOM**

- **Consists of three “blocks”**
  - **Block I is 3 satellites (now in orbit)**
  - **Block II is also 3, but one is for Australia**
  - **Block II<sub>f</sub> is 2 satellites**
- **Total buy planned is 12 satellites**
- **A procurement gap occurred between blocks I and II and between II and II<sub>f</sub>**

# WGS Costs Increased Substantially and Incurred N-M Breach

- Block II was about 50 % more expensive than Block I
- Block II was about 50 % more expensive than Block I—breach occurred here

Source: Secretary of the Air Force briefing charts

	Original Budget	Current Budget	Current Estimate (Dec 09 SAR)	% Change Current Budget	% Change Original Estimate
PAUC	\$326M	\$358M	\$424M	18	<30
APUC	\$268M	\$294M	\$374M	27	40



Source: WGS SAR, December 2009

# Why Did the Program Breach?

	Component of Increase	Block Iif Cost
1	Boeing price (BY 2007\$)	\$355M (Block II cost)
2	3% Cost overrun	\$11M
3	Actual unit costs (BY 2007\$)	\$366M
4	Four years' inflation at 3.5% per year	\$54M
5	Expected unit cost ~ 2011	\$420M
6	Extra tests	\$2M
7	Higher component prices for 3 items	\$35M
8	Higher component prices overall	\$25M
9	Subtotal	\$482M
10	15% risk premium	\$555M

First level WGS overrun

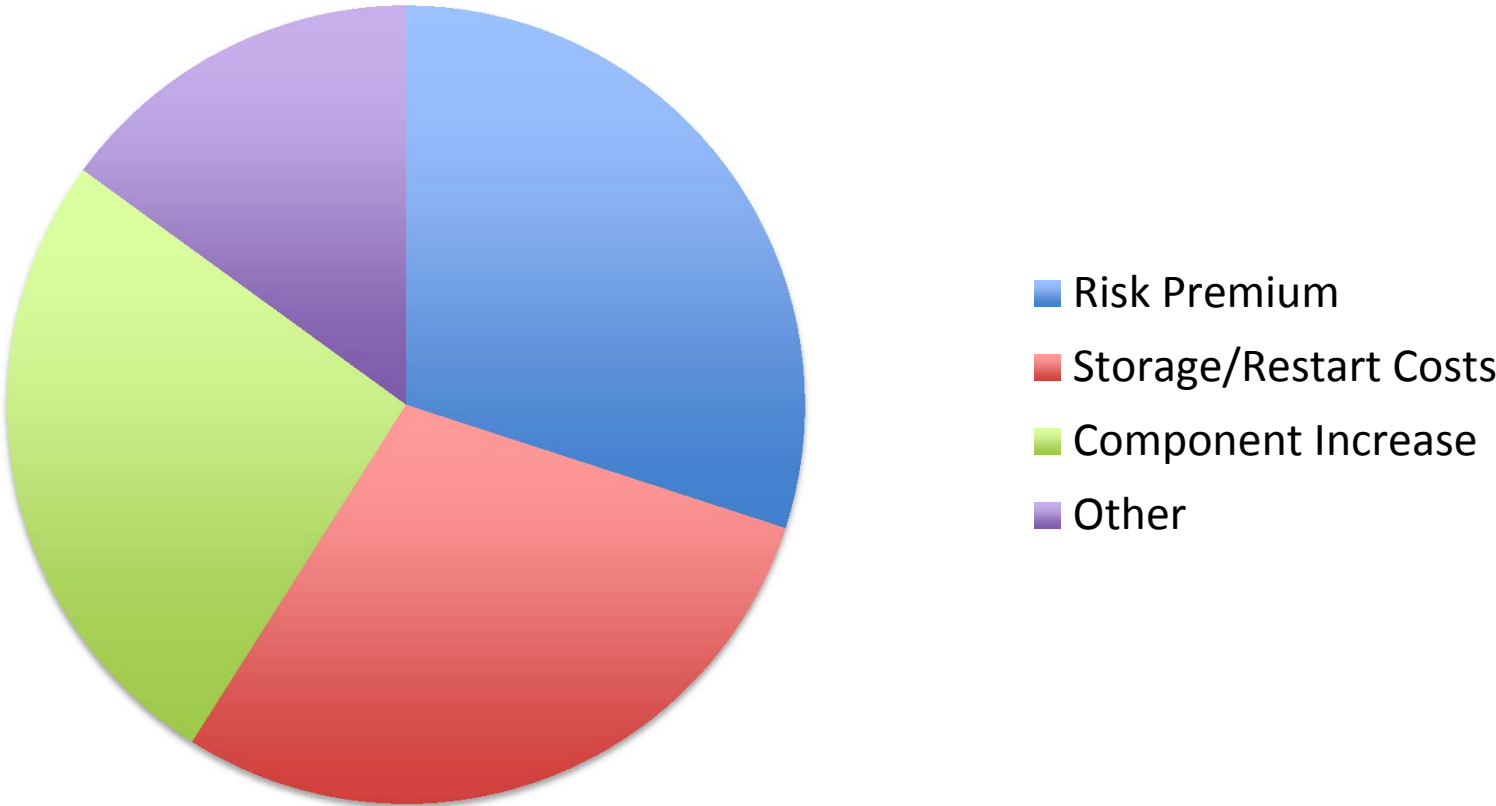
Historic experience (component & manufacturing)

Components at risk in the supply chain

Difference between Block II target cost and Block Iif ceiling cost

# Risk Premium Was Largest Contributor to the Breach

% of Breach



# Key Conclusions from WGS Breach

- **Storage and re-start costs go up when the commercial market no longer supplies components**
- **Acquisition costs of components also go up when not available in the commercial market**
- **Root causes of the breach are changes in the commercial market without corresponding changes in the WGS design and procurement, and obsolescence**

*FA: Commercial market would support military technology needs and economies of scale*

# Outline

- RCA methodology
- Wideband Global Satellite Example
- **Common trends in RCAs**



# Based on Past Research We Divided Root Causes into Three Categories

<b>This category...</b>	<b>Includes these issues...</b>
<b>Planning</b>	<b>Baseline cost estimates, ambitious schedules, poor contract incentives, contract delays, not enough RDT&amp;E, poor manufacturing processes, unrealistic performance expectations</b>
<b>Changes in Economy</b>	<b>Increases in component and labor costs, decreased private sector demand (component or technology), quantity changes (+/-), inflation, production delays</b>
<b>Program management</b>	<b>Unforeseen design, manufacturing, technology integration issues, poor government oversight or contractor performance, inadequate or unstable funding, accounting artifacts</b>

# Root Causes Spread Across the Six Programs Evaluated

Category	Root Causes	Significant Root Causes
Planning	21	3
Change in Economy	18	5
Program Management	11	2
	50	10

## Root and Significant causes by program:

1. Wideband global satellite - 11
2. Apache - 9
3. DDG-1000 - 14
4. Joint Strike Fighter - 13
5. Excalibur – 5
6. Navy ERP - 8

## Significant Root Causes:

- Poor contractor incentives (1)
- Immature technologies (2)
- Increase in component costs (1)
- Production delays (2)
- Quantity changes (2)
- Unanticipated design, manufacturing, integration (2)

# Key Takeaways

- Programs reveal some common characteristics, BUT also important differences—policymakers need to understand causes do not stem from common source
- Quantity changes happen a lot, but they are *rarely* the root cause of a breach; typically reflect some other cause
  - All six programs analyzed had quantity changes
  - Typically, quantity change was a symptom, not a cause
- DoD should:
  - Understand early testing regimes and number of test articles required
  - Stipulate cost methodologies that relay on commercial production
  - When a program depends on product improvements, ensure clear understand of time in inventory, ongoing R&D, and periodic program upgrades

**Questions?**