



A Suggested Approach to Should Cost



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OSD(AT&L) Better Buying Power Initiative



DEPARTMENT OF DEFENSE
Better Buying Power
Acquisition, Technology and Logistics

BBP PROGRAM SUCCESSES

Stryker

The Army generated considerable savings in the Stryker program by combining FY12 buys of 292 Double V-Hulls and 100 Nuclear BioChemical Reconnaissance vehicles into a single contract, gaining economies of scale, and is estimating up to 5 percent savings in its production of JTRS Handheld radios through incentives to incorporate commercial components and technologies.



F-22

The F-22 System Program Office realized a 15 percent efficiency during Increment 3.2A negotiations using Should Cost analysis. The Air Force successfully identified and implemented specific cost saving initiatives to address areas in the software development process that were above industry benchmarks. This effort resulted in a 15 percent reduction and \$32 million savings in cost for Increment 3.2A.



THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

OCT 7 2011

ACQUISITION TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR ACQUISITION, TECHNOLOGY AND LOGISTICS WORKFORCE

SUBJECT: Initial Guidance from the Acting Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L))

USD(AT&L) Guidance

Summary of Guidance from the Acting Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L))

in the defense area, in or out of uniform and in or out of government, it is a great honor for me to have the opportunity to serve with and lead the men and women, military and civilian, who work daily to equip and support our Warfighters, address future threats, and ensure that the American taxpayers' interests are always protected. I have total confidence in our workforce's ability to implement and continuously improve on the initiatives Dr. Carter and I started, and to adapt to the challenging fiscal environment we confront.

As Dr. Carter's Principal Deputy, I worked closely with him on all of our initiatives, and you can expect continuity in our purposes and objectives. The need for Better Buying Power, realized through affordable and well-executed programs and improved efficiency in all that we do, is even greater in the budget environment we are now experiencing. My priorities as Acting USD(AT&L) are tightly aligned with the principles Secretary Panetta has expressed – maintain the best military in the world, avoid a hollow force, take a balanced approach to achieving efficiencies, and keep faith with our men and women in uniform – and they are unchanged from those priorities Dr. Carter and I have articulated consistently, with one addition brought on by

...ces who are engaged in Overseas Contingency
...ent needs, timely and reliable logistics support,
...efficient operational energy solutions are some of
...e support our Warfighters.

...ams. The Department cannot continue the practice
...able. We will work with the requirements and
...e we start have firm cost goals in place, appropriate
...de to keep our programs within affordable limits.

...s the essence of the Better Buying Power initiative,
...pon. We will continue the never-ending quest to
...products and services that provide the highest

- USD(AT&L) launched BBP 1.0 in 2010 to restore affordability and productivity to Defense spending.
- BBP 2.0 builds on this beginning to further instill a culture of cost consciousness and increase procurement efficiencies.
- BBP 3.0 continues that approach with a shift in emphasis toward achieving dominant capabilities through innovation and technical excellence.



Better Buying Power 1.0

Target Affordability and Control Cost Growth

- Mandate affordability as a requirement
- Will Cost / Should Cost
- Eliminate redundancy within warfighter portfolios
- Achieve Stable and economical production rates
- Manage program timelines

Incentivize Productivity & Innovation in Industry

- Reward contractors for successful supply chain and indirect expense management
- Increase Use of FPIF contract type
- Capitalize on progress payment structures
- Institute a superior supplier incentive program
- Reinvigorate industry's independent research and development

Reduce Non-Productive Processes and Bureaucracy

- Reduce frequency of OSD level reviews
- Work with Congress to eliminate low value added statutory requirements
- Reduce the volume and cost of Congressional Reports
- Reduce non-value added requirements imposed on industry
- Align DCMA and DCAA processes; ensure work complementary
- Increase use of Forward Pricing Rate Recommendations (FPRRs) to reduce administrative costs

Promote Real Competition

- Emphasize competitive strategy at each program milestone
- Remove obstacles to competition
 - Allow reasonable time to bid
 - Require non-certified cost and pricing data on single offers
 - Enforce open system architectures and set rules for acquisition of technical data rights
- Increase small business role and opportunities

Improve Tradecraft in Acquisition of Services

- Assign senior managers for acquisition of services
- Adopt uniform services market segmentation (taxonomy)
Address causes of poor tradecraft
 - Define requirements and prevent creep
 - Conduct market research
- Increase small business participation

Blue - PM has primary/lead responsibility; Green – PM has shared/partnering responsibility; Purple - Services/OSD have responsibility



Better Buying Power 2.0

Achieve Affordable Programs

- Mandate affordability as a requirement
- Institute a system of investment planning to derive affordability
- Enforce affordability caps

Control Costs Throughout the Product Lifecycle

- Implement “should cost” based management
- Eliminate redundancy within warfighter portfolios
- Institute a system to measure the cost performance of programs and institutions and to assess the effectiveness of acquisition policies
- Build stronger partnerships with the requirements community to control costs
- Increase the incorporation of defense exportability features in initial designs

Incentivize Productivity & Innovation in Industry and Government

- Align profitability more tightly with Department goals
- Employ appropriate contract types
- Increase use of Fixed Price Incentive Contracts in Low Rate Initial Production
- Better define value in “best value” competitions
- When Lowest Price Technically Acceptable is used, define Technically Acceptable to ensure needed quality
- Institute a superior supplier incentive program
- Increase effective use of Performance-Based Logistics
- Reduce backlog of DCAA Audits without compromising effectiveness
- Expand programs to leverage industry’s IR&D

Eliminate Unproductive Processes and Bureaucracy

- Reduce frequency of higher headquarters level reviews
- Re-emphasize Acquisition Executive, PEO and PM responsibility, authority, and accountability
- Reduce cycle times while ensuring sound investment decisions

Promote Effective Competition

- Emphasize competition strategies and create and maintain competitive environments
- Enforce open system architectures and effectively manage technical data rights
- Increase small business roles and opportunities
- Use the Technology Development phase for true risk reduction

Improve Tradecraft in Acquisition of Services

- Assign senior managers for acquisition of services
- Measure productivity using the uniform services market segmentation
- Improve requirements definition/prevent requirements creep
- Increase small business participation, including through more effective use of market research
- Strengthen contract management outside the normal acquisition chain – installations, etc.
- Expand use of requirements review boards and tripwires

Improve the Professionalism of the Total Acquisition Workforce

- Establish higher standards for key leadership positions
- Establish increased professional qualification requirements for all acquisition specialties
- Increase the recognition and support of excellence in acquisition management
- Continue to increase the cost consciousness of the acquisition workforce – change the culture

Green are new in BBPi 2.0

Achieve Affordable Programs

- Continue to set and enforce affordability caps

Achieve Dominant Capabilities While Controlling Lifecycle Costs

- **Strengthen and expand** “should cost” based cost management
- Build stronger partnerships between the acquisition, requirements, and intelligence communities
- **Anticipate and plan for responsive and emerging threats**
- **Institutionalize stronger DoD level Long Range R&D Planning**

Incentivize Productivity in Industry and Government

- Align profitability more tightly with Department goals
- Employ appropriate contract types, **but increase the use of incentive type contracts**
- **Expand** the superior supplier incentive program across DoD
- Increase effective use of Performance-Based Logistics
- **Remove barriers to commercial technology utilization**
- **Improve the return on investment in DoD laboratories**
- **Increase the productivity of IR&D and CR&D**

Incentivize Innovation in Industry and Government

- **Increase the use of prototyping and experimentation**
- **Emphasize technology insertion and refresh in program planning**
- Use **Modular Open Systems Architecture** to stimulate innovation
- **Increase the return on Small Business Innovation Research (SBIR)**
- **Provide draft technical requirements to industry early and involve industry in funded concept definition to support requirements definition**
- **Provide clear “best value” definitions so industry can propose and DoD can choose wisely**

Eliminate Unproductive Processes and Bureaucracy

- **Emphasize Acquisition Executive, Program Executive Officer, and Program Manager responsibility, authority, and accountability**
- **Reduce cycle times while ensuring sound investments**
- **Streamline documentation requirements and staff reviews**

Promote Effective Competition

- **Create and maintain competitive environments**
- **Improve technology search and outreach in global markets**

Improve Tradecraft in Acquisition of Services

- **Increase small business participation, including through more effective use of market research**
- **Strengthen contract management outside the normal acquisition chain**
- **Improve requirements definition**
- **Improve the effectiveness and productivity of contracted engineering and technical services**

Improve the Professionalism of the Total Acquisition Workforce

- **Establish higher standards for key leadership positions**
- **Establish stronger professional qualification requirements for all acquisition specialties**
- **Strengthen organic engineering capabilities**
- **Ensure the DoD leadership for development programs is technically qualified to manage R&D activities**
- **Improve our leaders’ ability to understand and mitigate technical risk**
- **Increase DoD support for Science, Technology, Engineering, and Mathematics (STEM) education**

Continue Strengthening Our Culture of:
Cost Consciousness, Professionalism, and Technical Excellence



Strengthen and Expand “Should Cost” Based Cost Management



AIM-9X Block II Should Cost Management

**CAPT John "Snooze" Martins, USN
Program Manager, PMA-259**

**CDR Paul "Bones" Mitchell, USN
AIM-9X IPT Lead, PMA-259**



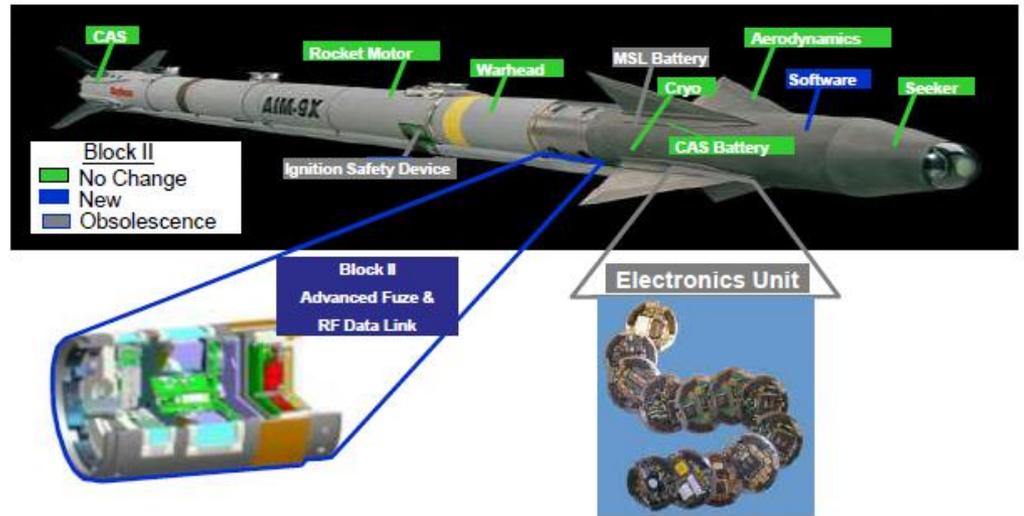
**2011 PEO/SYSCOM COMMANDER'S CONFERENCE
2011 PRODUCT SUPPORT MANAGER'S CONFERENCE
1-3 November 2011**



AIM-9X Block II Hardware



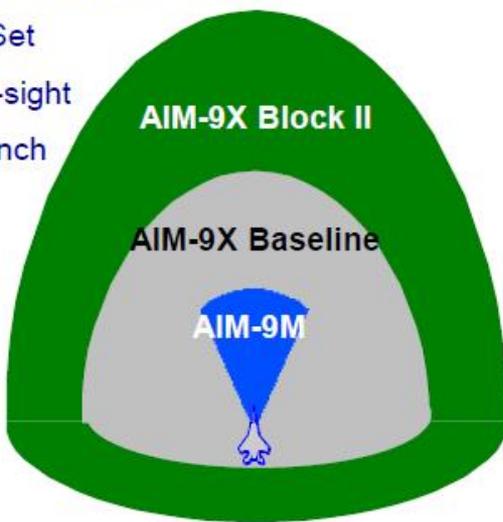
- Block II 85% common parts with baseline missile
- Initiated as Obsolescence & P3I efforts
 - Fuze/Data Link, Electronics Unit, Battery, & Ignition Safety Device
- 2007 Initial identification of potential Block II config.
- 2008 Joint N88/ACC Requirements Issued
- 2011 Block II CPD approved



Block II = AIM-9X-2 hw w/ v9.3 sw

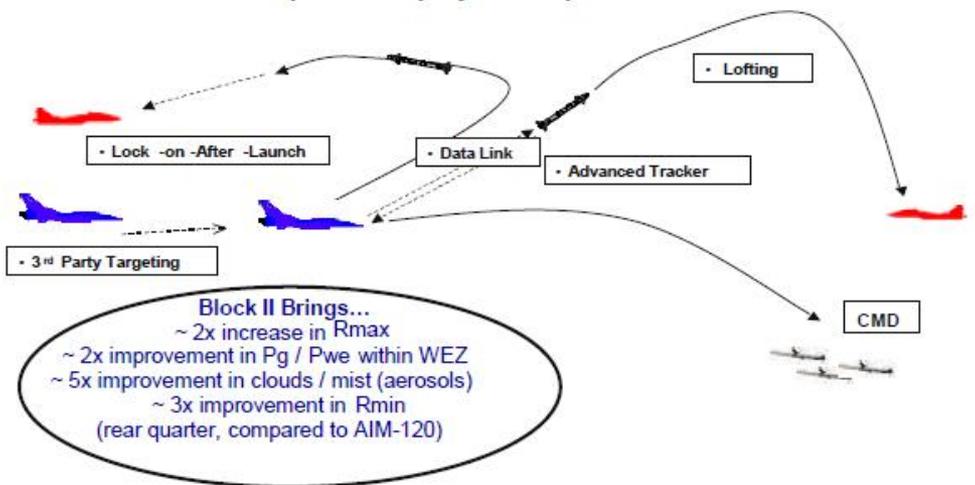
Core Capabilities:

- Increased Weapon Engagement Zone
- Expanded Target Set
- 360 High Off Bore-sight
- Lock-On After Launch



Not to scale

Improved Performance Dramatically Expands Employment Options





AIM-9X Block II Summary



- **AIM-9X Block II poised to continue the AIM-9X Legacy of Success:**
 - **Consistently delivered on cost and ahead of schedule for nine (9) straight years**
 - **Exceeds War Fighter Expectations in Every Way (Reliability, performance, maintainability)**
- **Software development on schedule, with few problems to date and seven (9) of (9) successful live fire events**
- **On Time June 2011 Milestone C, On track for March 2012 OTRR (ahead of schedule)**
- **Hardware development complete since 2010 and ready for production**
- **Active affordability improvements underway since 2009 to drive costs down**

BUT..... It's All About Should Cost



Block II DAB IPR ADM (01 Aug 2011)



“Prior to the Lot 11 LRIP (FY 2011) contract award, the Navy will submit a detailed Should Cost estimate for the program for my review.”

“This estimate will be based on implementing a cost reduction strategy with the goal of driving aggressive incremental decreases in the Block II missile costs, particularly unit price. The estimate will include discrete bases for reduced missile costs, including component upgrades, manufacturing process streamlining, plant improvements, second-sourcing of components, test efficiencies, and sustainment initiatives. Each lower cost basis will be fully defined with corresponding estimates for specific cost impact.”


 THE UNDER SECRETARY OF DEFENSE
 3010 DEFENSE PENTAGON
 WASHINGTON, DC 20301-3010

AUG - 1 2011

MEMORANDUM FOR SECRETARY OF THE NAVY
SECRETARY OF THE AIR FORCE

SUBJECT: AIM-9X Block II In-Process Review (IPR) Acquisition Decision Memorandum (ADM)

Decisions Sought: None. This was an IPR for the AIM-9X Block II program that was held prior to a Milestone-C Low-Rate Initial Production (LRIP) decision on an ACAT IC Navy-led program. The Program Executive Officer is Rear Admiral William Shannon and the Program Manager (PM) is Captain John Martin.

Decisions:

- The Navy and Air Force will collectively fund AIM-9X Block II missile procurements to at least the program's Minimum Sustainment Rate (MSR) of 300 missiles per year commencing in FY 2013. If no other arrangement is agreed to by the Air Force and Navy, then each service will fund 150 missiles per year.

Tasking/Action Items:

- The Navy will evaluate supplier claims to intellectual property on the AIM-9X and establish business cases for acquiring intellectual property rights on components and features of the AIM-9X Block II missile that are determined to be supplier property. The Navy will focus primarily on high-cost components that offer cost reduction potential through either second-sourcing or other efficiency strategies.
- Prior to the Lot 11 LRIP (FY 2011) contract award, the Navy will submit a detailed Should Cost estimate for the program for my review. This estimate will be based on implementing a cost reduction strategy with the goal of driving aggressive incremental decreases in the Block II missile costs, particularly unit price. The estimate will include discrete bases for reduced missile costs, including engineering support labor hours, component upgrades, manufacturing process streamlining, plant improvements, second-sourcing of components, test efficiencies, and sustainment initiatives. Each lower cost basis will be fully defined with corresponding estimates for specific cost impact.
- The International Cooperation office will work with the Defense Security Cooperation Agency and the Navy in resolving outstanding Office of the Secretary of Defense staff issues with regard to approving or denying a Non-Recurring Cost waiver for a pending Letter of Offer and Acceptance for a United Arab Emirates Foreign Military Sales case.

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Should-Cost Management Motivation



Source: 01 July 2011 discussion with VADM Skinner

- Problem statement:
 - Data from last 30 years show that 80% of programs overrun their initial 50/50 independent cost estimates
- Approach:
 - Manage to and shoot for a cost point below the 50/50 estimate, ultimately to reduce probability of program cost overrun
- Intent: Change culture, behavior, and approach when dealing with costs and supporting contractors/suppliers
 - Avoid the pat answer: engage all parts of program office on thinking about “should cost”
- AIM-9X Block II MS C ADM signed 30 June 2011:
 - Detailed Should Cost Management plan required / briefed to USD (AT&L) via ASN(RDA) as a prerequisite for LRIP I contract award



Should-Cost Methodology: Step 1



- **Step 1: ID Cost Drivers:** Conduct “root cause” analysis
 - Disaggregate program by funding type
 - “Fishbone” analysis: Brainstorm “will-cost” estimate cost drivers and the underlying requirements: **“Follow the money...” – disaggregated by funding type**
 - Drivers not limited to just “technical” solutions: consider manpower, materials, method, machine, measures, and physical/policy/political/other environment factors
 - Aligned with NAVAIR 4.2 “Should Cost Management” and JMC best practices
 - Brainstorm...

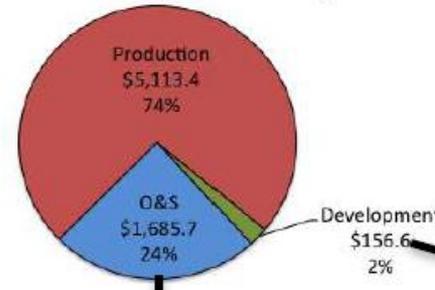




Step 1: Identify Cost Drivers

“Follow the money”...Total Ownership Cost

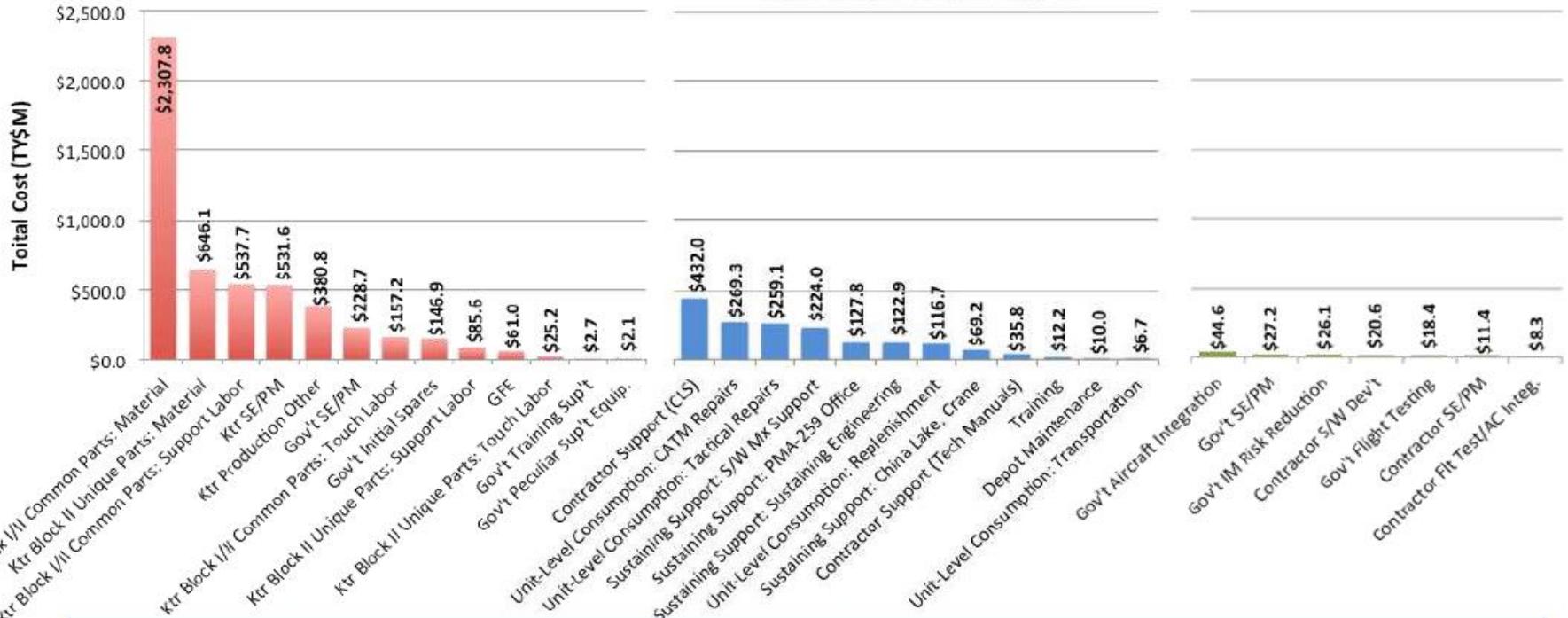
AIM-9X Block II Life Cycle Cost Summary



AIM-9X Production

AIM-9X Operations & Support

AIM-9X RDT&E



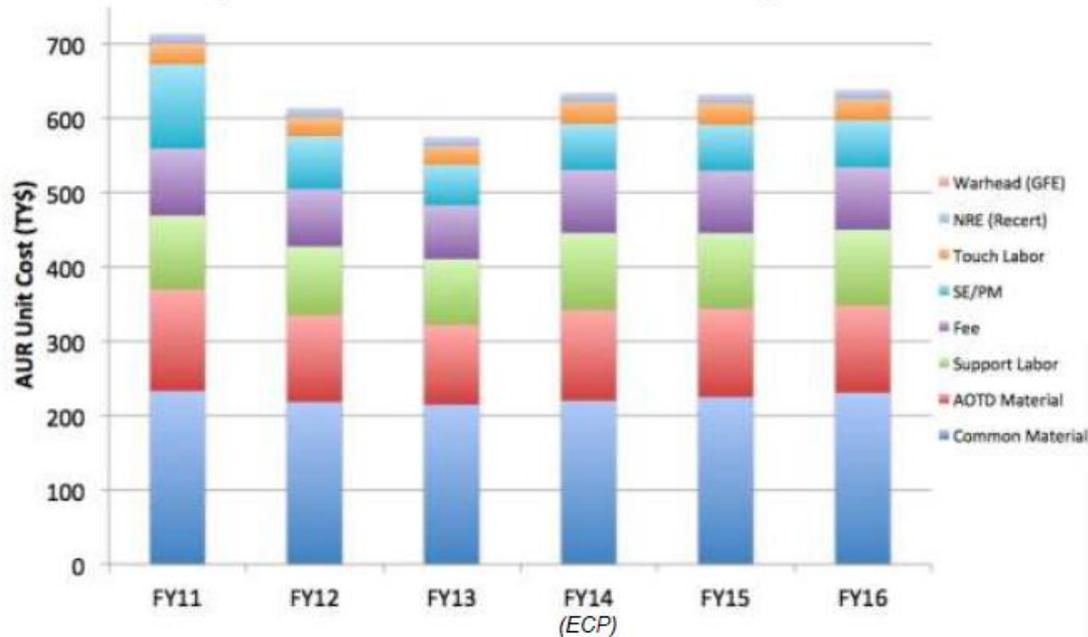
Focus Initially on Production Dollars & Reducing Unit Cost



Step 1: Identify Cost Drivers

“Follow the money” ...Production Dollars Unit Cost

AIM-9X Tactical Missile Unit Cost (USG Only) (NCCA “Will Cost” Position)



Unit Cost TY\$K	FY11	FY12	FY13	FY14	FY15	FY16	% total
Common Material	233.3	218.4	214.9	220.2	225.2	230.9	35.9%
AOTD Material	136.6	117.0	107.3	122.3	119.0	117.3	19.0%
Support Labor	99.4	92.0	88.5	103.4	101.6	101.6	15.8%
Fee	90.2	77.5	72.6	84.7	84.0	84.4	15.0%
SE/PM	113.7	71.1	54.3	62.2	61.7	63.3	11.4%
Touch Labor	28.1	26.1	25.2	29.5	29.1	29.2	2.7%
NRE (Recert)	10.5	10.0	10.1	9.8	9.7	10.0	1.6%
Warhead (GFE)	0.1	0.1	0.1	0.1	0.1	0.1	0.0%
Tactical Total	712.0	612.2	572.9	632.4	630.5	636.8	

70.7% of unit cost

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AIM-9X Block II Should Cost Brief 06 July 2011

Cost Analysis Drives Technical Focus to DSU-41

- Block I APUC
 - \$243,000 (BY '97)
 - \$306,000 (BY '11)
- Block I w/obsolescence ECPs (AIR 4.2 Estimate)
 - \$365,000 (BY '11) *
 - Increase driven by:
 - DSU-37 Replacement (3 year \$90M NRE, + \$30,000/unit)
 - Fuze was GFE under Baseline
 - Updated Electronics Unit (+ \$21,000/unit)
 - Re-spin 11 of 13 circuit card assemblies
 - New Battery & ESAD (+ \$8,000/unit)
- Block II APUC (AIR 4.2 Estimate)



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AIM-9X Block II Should Cost Brief 06 July 2011

Block II APUC Breakdown



- Roll/Node Combined Sensor: Raytheon, Tucson, AZ \$60,587
- Electronics Unit: Raytheon, Andover, MA \$92,053
- Advanced Fuze & RF Data In: Raytheon, Tucson, AZ \$177,000
- CAS/VC: Woodward HRT, Santa Clara, CA \$43,625
- Cryo-Engine: Goetts, CA \$11,485
- Electronic Safe & Arm Device: L3-KDI, Cincinnati, OH \$7,040
- WDU-170 Warhead Enrich: Enrich, Simsbury, CT GFE
- MK-36 Rocket Motor: ATK, Rocke Center, WV \$40,544

ALUR: Assembly, other hardware, and SE/PM Raytheon, Tucson, AZ \$108,262

Red: New Block II components; Black: Common between Block I and Block II

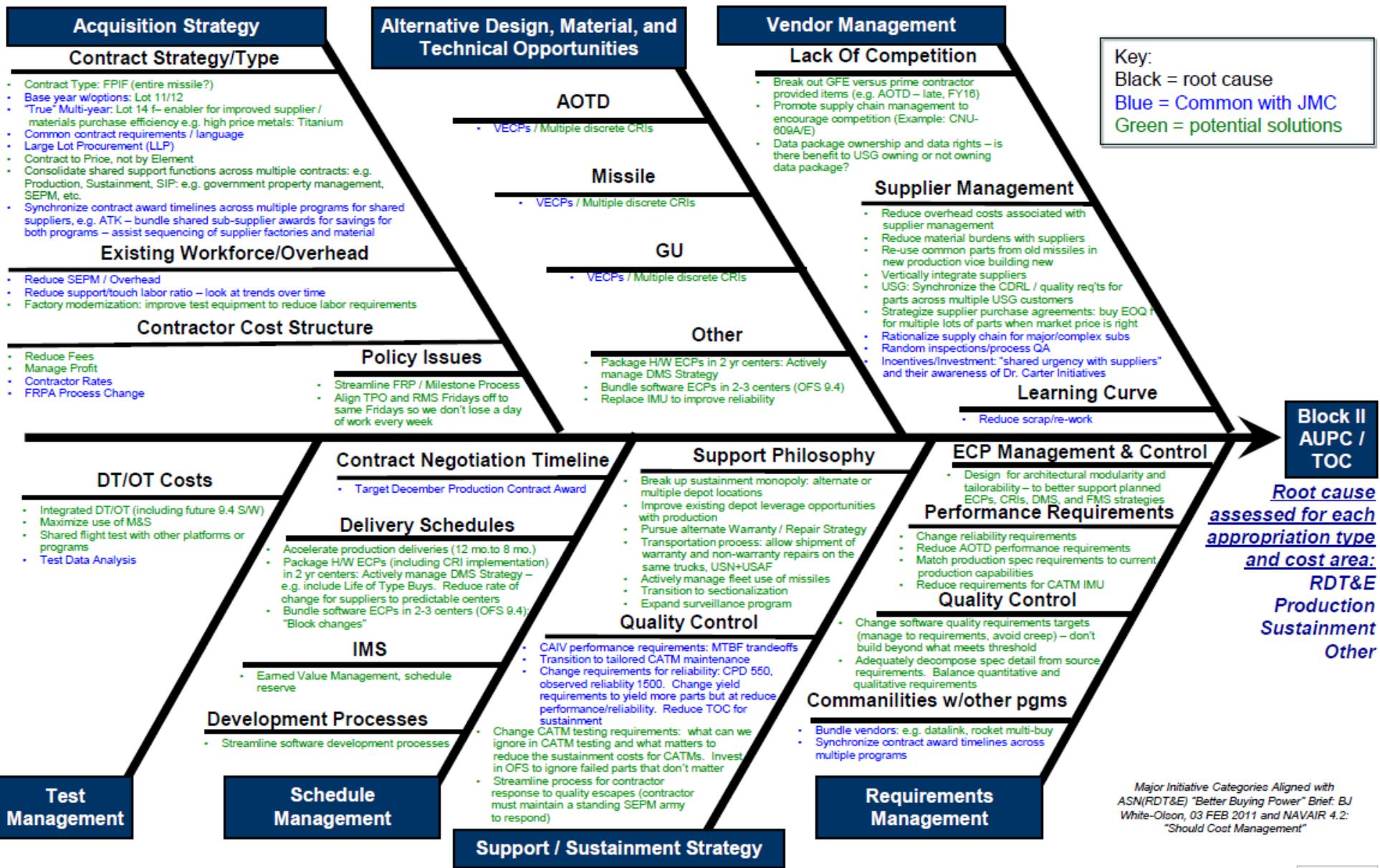
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Largest percentage of overall program-level dollars are in Production;
Production Unit Cost component analysis drives focus to AOTD, Common Material, and Labor



Step 1: Identify Cost Drivers: Root Cause Analysis





Should-Cost Methodology: Step 2A



- **Step 2A: ID Opportunities:** Collect candidate initiatives and opportunities
 - Purpose: Define/align ideas to largest cost drivers identified in fishbone root causes
 - Identify initiatives as Program-Driven, Service-Driven, or Externally Driven
 - Break down into teams aligned to common root causes / functional areas for initial analysis
 - Define clear tasking, investment cost (and funding type/source), measurement method, discrete measurable potential cost avoidance/savings targets (by funding type), implementation schedule / time to realize savings, potential cost growth and associated risk estimates, and idea "readiness" for implementation
 - Quantify investment/effort/time/skill/difficulty vs. return on investment/benefit/impact
 - Assess risks via risk management process (avoid, control, assume transfer)
 - Leverage & align with JMC initiatives – how do we compare to other analagous programs?
 - Populate Data Matrix spreadsheet

Example Spreadsheet

YELLOW - STEP 2A (IDENTIFY DATA NEEDED)				GREEN = STEP 2B (COLLECT ADDITIONAL DATA)							
Idea	Investment Dollars Type	Investment Cost	Quantify ROI	ROI Dollars Type	Measurement Method	Cross-Program Impacts			Time to Realize Savings	Initiative Risk Analysis	Initiative "Readiness" Level
						RDT&E	WPN - Production	OMN - Sustainment			
Define What it is	RDT&E, WPN, O&MN, RMS internal	BYS	BYS - either total savings or by unit (state assumptions). Minimum acceptable ROI to call the measure a success	WPN, RDT&E, O&MN, or RMS internal	What is the discrete method that will be used for measuring success?	Positive, Neutral, or Negative	Positive, Neutral, or Negative	Positive, Neutral, or Negative	Implementation Time Needed or	Risks, with probability / consequence	Scale 1-5
						Rating		Criteria			
						5		Planned; ROI Understood			
						4		Tasks understood			
						3		Tasks need defining; <= 2 month trade-study needed			
						2		Project needs to be broken-down			
						1		Needs a "long" trade study to quantify			
						N/A		Does not apply; No further funding needed			

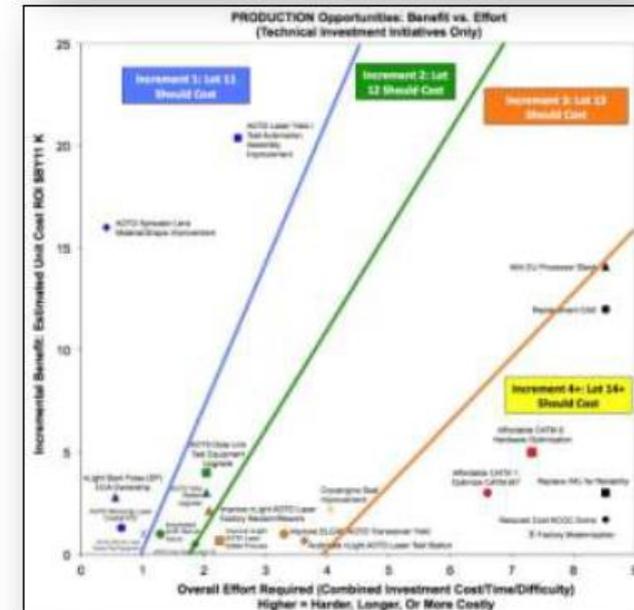
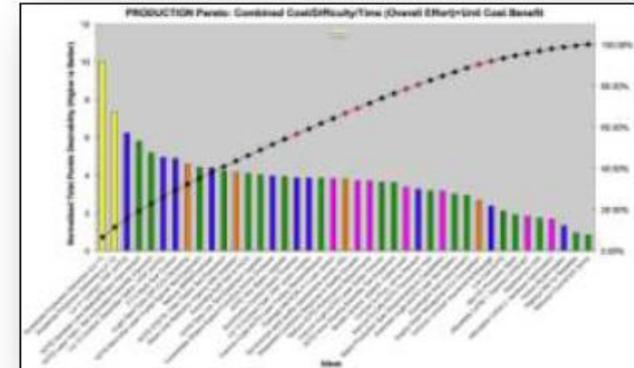


Should-Cost Methodology: Step 2B



Step 2B: Prioritize Opportunities: Business Case Analysis (BCA)

- Via Pareto, and Cost/benefit analysis
- Analyze and prioritize/sort list of ideas – based on analysis of top cost drivers and assessment of data from Step 2A
- Pareto methods include:
 - Compare Highest Benefit vs. Short Turnaround
 - Compare Highest Benefit by appropriation type
 - RDT&E, WPN, O&MN
 - Compare Highest Benefit vs. smallest investment
- Multiple Cost/Benefit Methods
 - Normalized Opportunities vs. Benefit Analysis
 - Define of “business rules” for normalizing difficulty
 - Investment Cost, Time, Skill Speciality, Risk, Initiative Readiness Level, Benefit factors

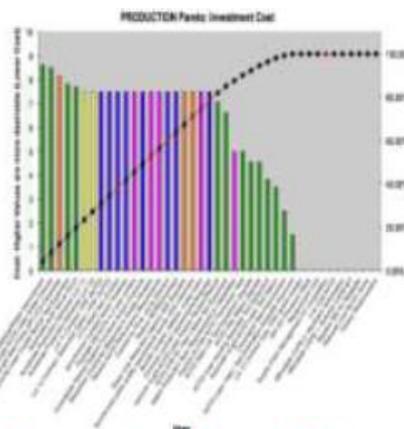




Step 2: Identify and Prioritize Opportunities (Production Dollars)



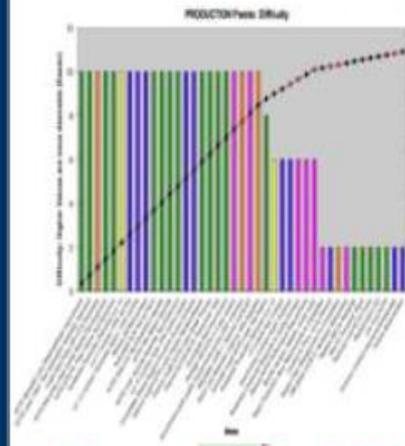
Investment Cost



- Lowest cost:**
1. AOTD Spreader Lens Improvement
 2. Improve nLight AOTD Laser Solder Fixtures
 3. nLight AOTD Start Pulse CCA Ownership
 4. AOTD Microchip Laser Crystal STE
 5. Automated AUR Test at FACO
 6. Accelerate Lot 11 Production Deliveries
 7. Accelerate Lot 12 Production Deliveries
 8. Lot 11 Contract: FPIF (AOTD)
 9. Lot 12 Contract: December Option / FPIF (AOTD)
 10. FY14 Multi-Year Contract

****Full-page version of Pareto in Backup**

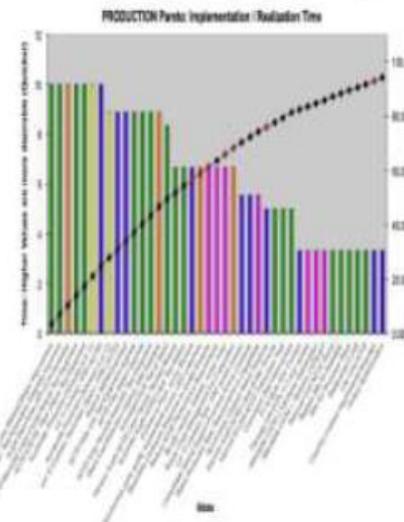
Ease Of Implementation



- Easiest:**
1. AOTD Spreader Lens Improvement
 2. AOTD Laser Yield / Test Automation Assembly Improvement
 3. nLight AOTD Start Pulse CCA Ownership
 4. AOTD Microchip Laser Crystal STE
 5. AOTD STE/TE: Fiber Cleave Test Equipment
 6. Accelerate Lot 11 Production Deliveries
 7. Lot 11 Contract: FPIF (AOTD)
 8. Lot 12 Contract: December Option / FPIF (AOTD)
 9. Reduce SEPM/Overhead
 10. Automated AUR Test at FACO

****Full-page version of Pareto in Backup**

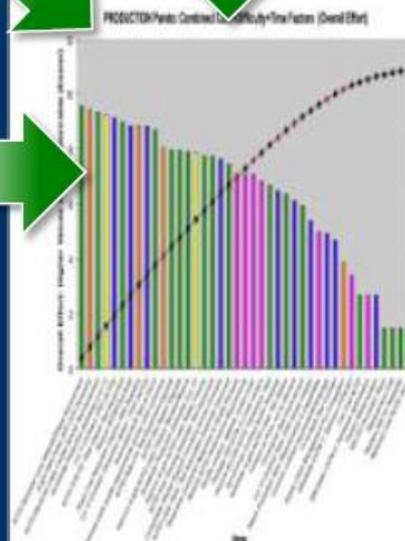
Time to Implement / Realize



- Quickest:**
1. AOTD Spreader Lens Improvement
 2. AOTD Laser Yield/Test Automation Assembly Improvement
 3. nLight AOTD Start Pulse CCA ownership
 4. AOTD Microchip Laser Crystal STE
 5. AOTD STE/TE: Fiber Cleave Test Equipment
 6. Accelerate Lot 11 Production Deliveries
 7. Lot 11 Contract: FPIF (AOTD)
 8. Accelerate Lot 12 Production Deliveries
 9. Lot 12 Contract: December Option / FPIF (AOTD)
 10. Reduce SEPM/Overhead

****Full-page version of Pareto in Backup**

Combined Pareto: Overall Effort Required



- Overall least effort:**
1. AOTD Spreader Lens Improvement
 2. nLight Start Pulse CCA ownership
 3. AOTD Microchip Laser Crystal STE
 4. Accelerate Lot 11 Production Delivery
 5. Lot 11 Contract: FPIF (AOTD)
 6. AOTD STE/TE: Fiber Cleave TE
 7. Reduce SEPM/Overhead
 8. Supplier Cost Reduction Urgency
 9. Lot 12 Contract: December Option / FPIF (AOTD)
 10. Automated AUR Test at FACO

****Full-page version of Pareto in Backup**

Bar Color Key: Major Fishbone Cost Areas
 Acquisition Strategy
 Alternative Design, Material, Tech Opportunities
 Vendor Management
 Test Management
 Schedule Management
 Support/Sustainment Strategy
 Requirements Management

Line / Markers Color Key:
 Black = Program-Driven Initiative
 Red = Externally-Driven Initiative



Step 2: Identify and Prioritize Opportunities (Production Dollars)

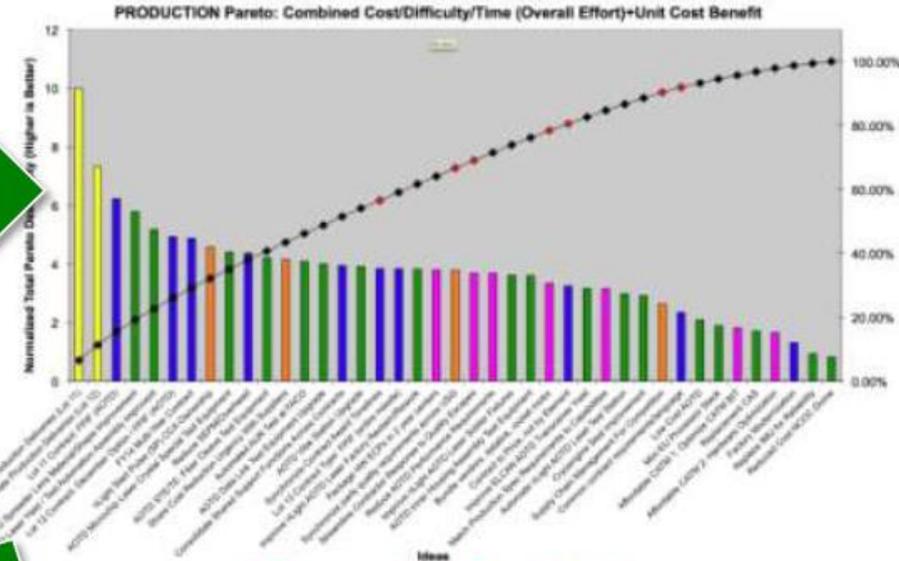
Unit Cost Benefit

Highest Unit Cost Benefit:

1. Accelerate Lot 11 Production Deliveries
2. Accelerate Lot 12 Production Deliveries
3. FY14 Multi-Year Contract
4. Lot 11 Contract: FPIF (AOTD)
5. AOTD Laser Yield/Test Assembly Automation
6. AOTD Spreader Lens Improvement
7. Lot 13 Contract: FPIF (entire missile)
8. Mini EU Processor Stack Replacement CAS
9. Replacement CAS
10. Lot 12 Contract: December Option / FPIF (AOTD)

****Full-page version of Pareto in Backup**

Combined Pareto Effort & Benefit



****Full-page version of Pareto in Backup**

Step 2: Identify and Prioritize Opportunities (Production Dollars)

Investment Cost

LEAST COST

1. AOTD Spreader Lens Improvement
2. Improve S&PT/AOTD Laser Sub-Assembly
3. nLight AOTD Start Pulse CCA Ownership
4. AOTD Microchip Laser Crystal STE
5. Automated AIR Test at PACD
6. Accelerate Lot 11 Production Deliveries
7. Accelerate Lot 12 Production Deliveries
8. Lot 11 Contract: FPIF (AOTD)
9. Lot 12 Contract: December Option / FPIF (AOTD)
10. FY14 Multi-Year Contract

Ease of Implementation

EASIEST

1. AOTD Spreader Lens Improvement
2. AOTD Laser Yield / Test Automation
3. Replace AOTD Start Pulse CCA Ownership
4. AOTD Microchip Laser Crystal STE
5. AOTD STE/STE: Fiber Glass Test Equipment
6. Accelerate Lot 11 Production Deliveries
7. Lot 11 Contract: FPIF (AOTD)
8. Lot 12 Contract: December Option / FPIF (AOTD)
9. Reduce SEPM/Overhead
10. Automated AIR Test at PACD

Time to Implement / Realize

QUICKEST

1. AOTD Spreader Lens Improvement
2. AOTD Laser Yield/Test Automation
3. nLight AOTD Start Pulse CCA Ownership
4. AOTD Microchip Laser Crystal STE
5. AOTD STE/STE: Fiber Glass Test Equipment
6. Accelerate Lot 11 Production Deliveries
7. Lot 11 Contract: FPIF (AOTD)
8. Accelerate Lot 12 Production Deliveries
9. Lot 12 Contract: December Option / FPIF (AOTD)
10. Reduce SEPM/Overhead

Combined Pareto: Overall Effort Required

OVERALL EFFORT

1. AOTD Spreader Lens Improvement
2. nLight Start Pulse CCA Ownership
3. AOTD Microchip Laser Crystal STE
4. Accelerate Lot 11 Production Deliveries
5. Lot 11 Contract: FPIF (AOTD)
6. AOTD STE/STE: Fiber Glass Test Equipment
7. Reduce SEPM/Overhead
8. Regular Cost Reductions Ongoing
9. Lot 12 Contract: December Option / FPIF (AOTD)
10. Automated AIR Test at PACD

■ Bar Color Key: Major Fishbone Cost Areas
■ Acquisition Strategy
■ Alternative Design, Material, Tech Opportunities
■ Vendor Management
■ Test Management
■ Schedule Management
■ Support/Sustainment Strategy
■ Requirements Management

— Line / Markers Color Key:
● Black = Program-Driven Initiative
● Red = Externally-Driven Initiative

Highest Combined Pareto Effort & Benefit

1. Accelerate Lot 11 Production Deliveries
2. Accelerate Lot 12 Production Deliveries
3. Lot 11 Contract: FPIF (AOTD)
4. AOTD Spreader Lens Improvement
5. AOTD Laser Yield/Test Assembly Automation
6. Lot 12 Contract: December Option / FPIF (AOTD)
7. FY14 Multi-Year Contract
8. nLight Start Pulse CCA Ownership
9. AOTD Microchip Laser Crystal STE
9. Reduce SEPM/Overhead

Bar Color Key: Major Fishbone Cost Areas
■ Acquisition Strategy
■ Alternative Design, Material, Tech Opportunities
■ Vendor Management
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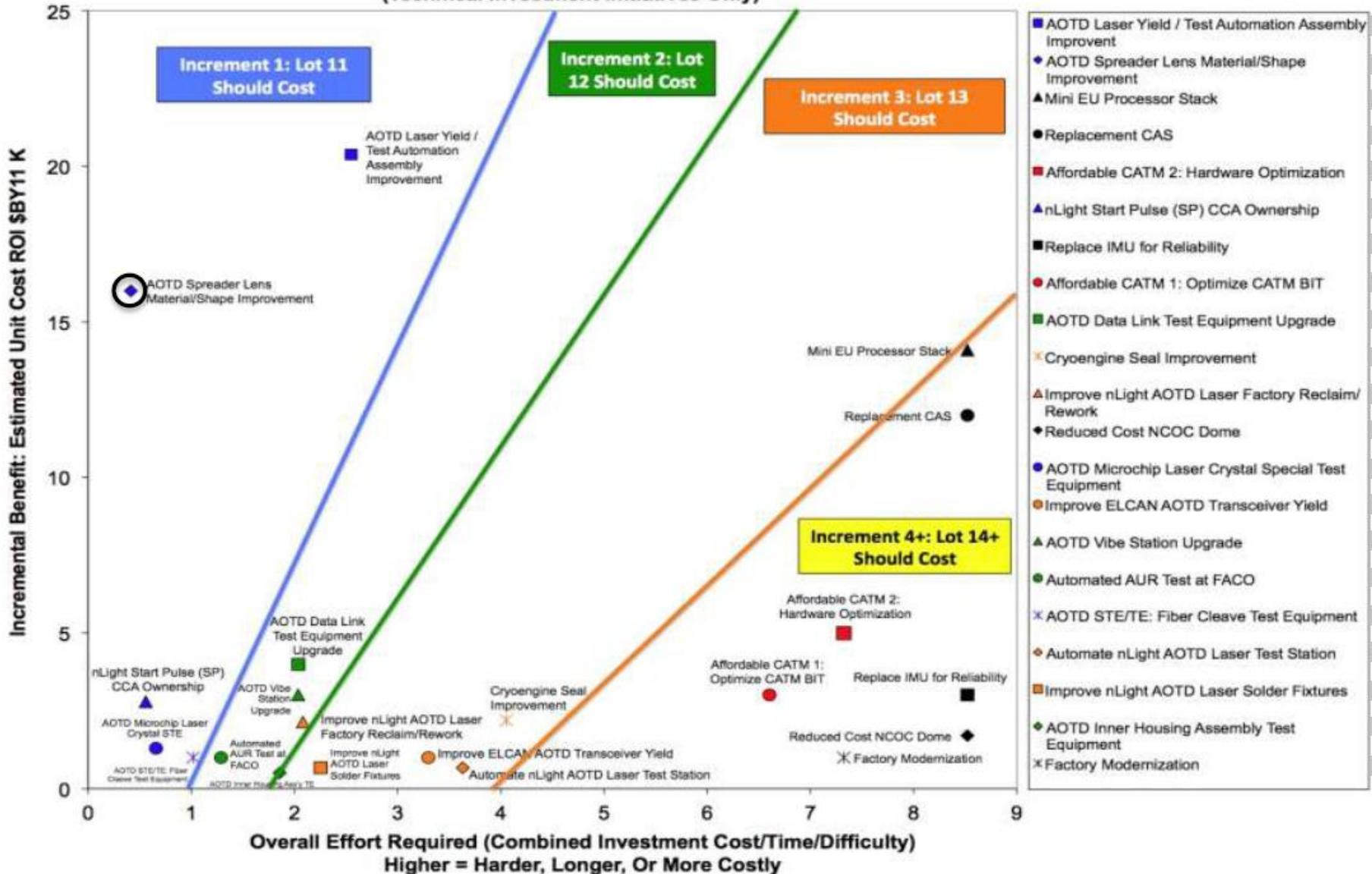


Step 2: Identify and Prioritize Opportunities

Production Dollars, Technical Initiatives



PRODUCTION Opportunities: Benefit vs. Effort
(Technical Investment Initiatives Only)



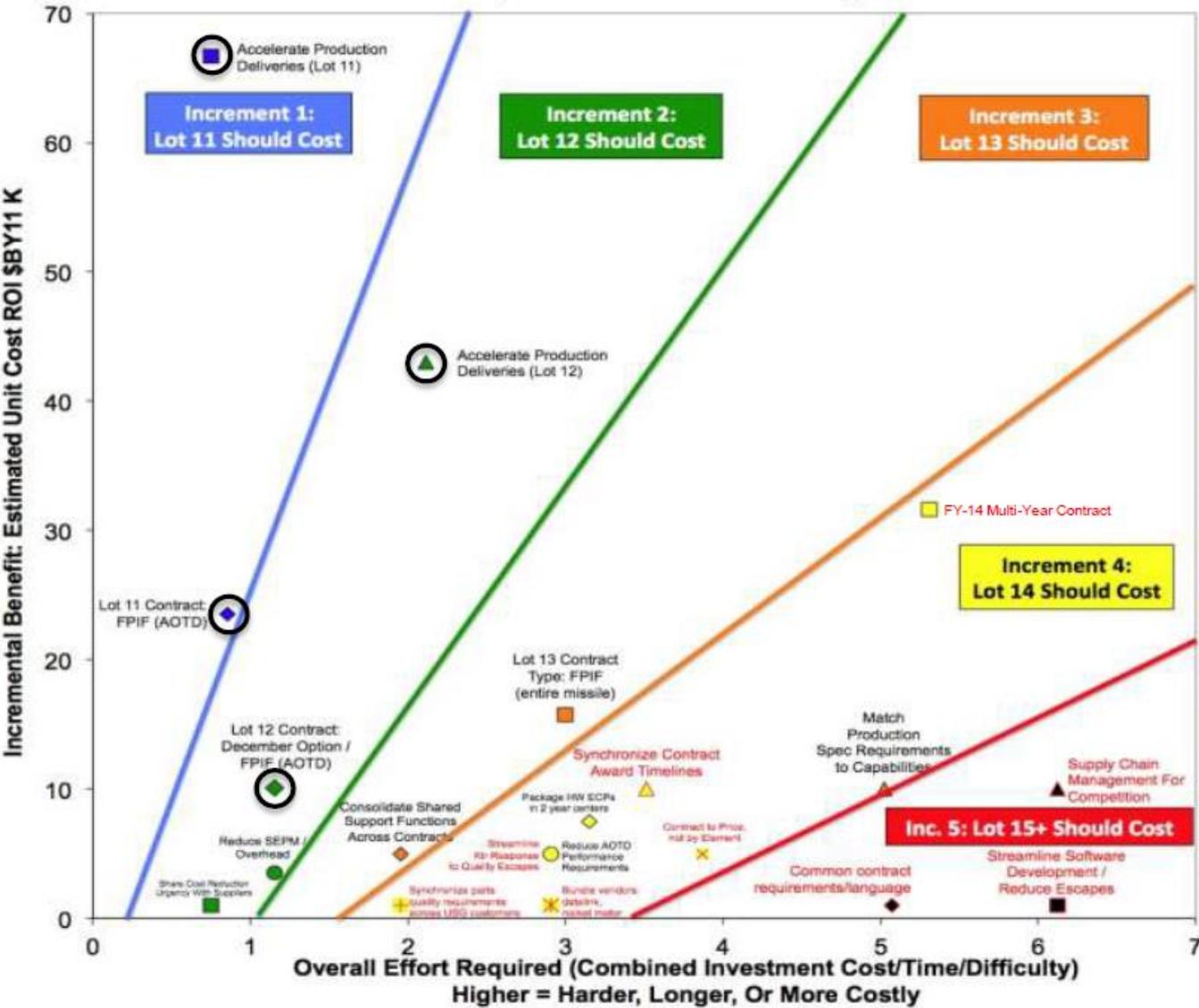


Step 2: Identify and Prioritize Opportunities

Production Dollars, **Non-Technical Initiatives**



PRODUCTION Opportunities: Benefit vs. Effort
(Non-Technical Initiatives Only)



- ◆ Lot 11 Contract: FPIF (AOTD) Quad
- Accelerate Production Deliveries (Lot 11) Quad
- FY14 Multi-Year Contract Quad
- ▲ Supply Chain Management For Competition Quad
- ▲ Match Production Spec Requirements to Capabilities Quad
- ✕ Contract to Price, not by Element Quad
- Streamline Contractor Response to Quality Escapes Quad
- Reduce AOTD Performance Requirements Quad
- ◇ Consolidate Shared Support Functions Across Contracts Quad
- ◇ Package HW ECPs in 2 year centers Quad
- Reduce SEPM/Overhead Quad
- Streamline Software Development / Reduce Escapes Quad
- ◆ Common contract requirements/language Quad
- Lot 13 Contract Type: FPIF (entire missile) Quad
- ✕ Bundle vendors: datalink, rocket motor Quad
- ✕ Synchronize parts quality requirements across USG customers Quad
- ◆ Lot 12 Contract: December Option / FPIF (AOTD) Quad
- Share Cost Reduction Urgency With Suppliers Quad
- ▲ Accelerate Production Deliveries (Lot 12) Quad
- ▲ Synchronize Contract Award Timelines Quad

Text Color Key:
 Black = Program-Driven
 Red = Externally Driven (RMS, JMC, Other)



Step 2: Identify and Prioritize Opportunities

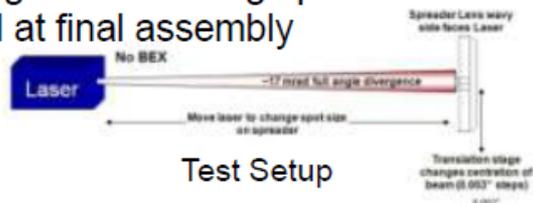
Sample Technical Initiative Project Quad:

AOTD Spreader Lens Improvement



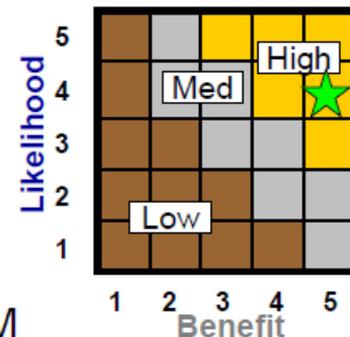
Topic / Benefit

- Issue: AOTD spreader lens yields are below 61% yield at final assembly and fail to meet print due to material failures and output shape non-uniformity (melting polycarbonate / F52R spreader lenses)
- Initiative: Design a spreader lens using an improved plastic material and shape that will not melt, yet provide a signal with enough performance margin and higher yield at final assembly



Opportunity Management

- Investment: \$138K
 - Labor and Material
 - Leveraged Mantech
- Estimated Savings:
 - Single Unit: \$16K/AOTD
 - Across 300 AUR Units: ~\$4.8M
 - Across 6000 units: ~\$96M
 - Assumptions: Lot 11 Pricing Model, 225/75
- Positive reliability impact: predicted additional O&S Dollars Savings due to reduced repairs



POA&M

- Phase 1: Change drawing to include improved material
- Phase 2: Design lens and create drawing
- Phase 3A: Order molds and parts
- Phase 3B: Get parts and measure
- Phase 3C: Compare test results to model
- Phase 4: Conduct upper level testing
- **Incorporate into production: LOT 11**

Measurements / Triggers

- Phase 2: Verify through engineering analysis that spreader lens shape redesign (using a plastic material) will not melt, yet provide a signal with enough performance margin
 - Compare 2 separate mold-making techniques to get better optical accuracy: Wire Electrical Discharge Machining and Diamond Point Tuning
 - Compare 3 sizes: (1) nominal; (2) 2% over, and (3) 2% under lenslet height scaling
- Phase 3: Optically measure molded parts and output compared to requirements; using simulation to verify performance; estimate yields
- Phase 4: Verify total amount of light out of the spreader is unchanged, but is better distributed. Targeted minimum signal for worst-performing roll-angle: 8% or better with new spreader than with old spreader

Detailed Quads Generated For Each Technical and Non-Technical Cost Reduction Initiative Of Interest



Step 2: Identify and Prioritize Opportunities

Sample Non-Technical Initiative Project Quad:

Lot 11 Contract (FPIF: AOTD) / Lot 12 December Option (FPIF: AOTD), Accelerated Lot 11 & Lot 12 Deliveries



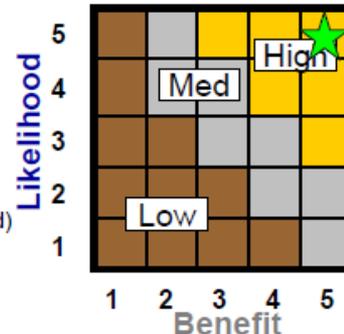
Topic / Benefit

- Optimize RMS production line and reduce SEPM/overhead by reducing build cycle for LRIP 1 (FY11) to 8 months and LRIP 2 (FY12) to 8 months
- Execute LRIP 2 (FY12) option NLT Dec 2011 to:
 - Optimize manufacturing support
 - Eliminate production gap at RMS and suppliers
 - Avoid Loss of Learning, Restart, and Setup Costs
 - Avoid pricing recertification
 - Provide USG additional leverage in negotiations
- Include FPIF for AOTD in Lot 11 / Lot 12
- Negotiate a Variation in Quantity (VIQ) Clause for Potential FMS Buys and to mitigate potential FY12 CRA

Opportunity Management

Estimated Savings (BY11\$):

- Accelerated Lot 11 deliveries: \$66.7K/unit
- Accelerated Lot 12 deliveries: \$43K/unit
- FPIF for \$235.061K AOTD: 10% cost risk share with RMS (objective) / 5% threshold
 - \$23.5K / unit (Lot 11)
 - \$10.1K / unit (Lot 12) (learning curve, threshold)
- Further savings possible through management of fee and reconciliation of rates (RMS vs. DCAA audit) during negotiations



Considerations:

- Risk of FY12 Continuing Resolution
- Limits authority to buy increased quantities
- Impacts savings achieved by FY11 with FY12 option
- Address via Variation In Quantity (VIQ) clause

POA&M

Key Milestones/Action Plan

- Update Acq Plan Rev and J&A with ASN(RDA) approval
- Obtain Lot 12 cost and pricing data; Complete Negotiations by Sep 11
- Establish Contingency Plan for FY12 CRA (negotiate VIQ clause)
- Obtain USD(AT&L) concurrence to award LRIP 1; award FY11 w/FY12 Option NLT 30 Sep 11
- Execute Lot 12 Option NLT 31 Dec 2011

Production / Lot Phasing Strategy



Measurements / Triggers

- Trigger: USD(AT&L) concurrence to award Lot 11
- Measure: Verify negotiated prices reflect estimated savings
- Trigger: Successful completion of Variation In Quantity (VIQ) clause for Lot 12
 - Allow government to procure remainder of USG FY12 missiles after budget passes if a CR limits FY12 authority to FY11 levels

Detailed Quads Generated For Each Technical and Non-Technical Cost Reduction Initiative Of Interest

Opportunity Mgmt

PMA CRI ID: #2, 4, 114
RMS Opp#:
Version: 03 AUG 2011



Should-Cost Methodology: Step 3



- **Step 3: Develop Discrete “Should Cost” POA&M**
 - Allocate/time-phase cost reduction initiatives to Lots, based on BCA and difficulty
 - Generate Initial POA&M in technical and non-technical subcategories
 - Reconcile POA&Ms into a combined, program-level POA&M and should-cost strategy

Step 3: Develop Discrete “Should Cost” POA&M
Production Dollars (TY\$, PB12 Quantities)

Title	FY11 (2011 units)		FY12 (2012 units)		FY13 (2013 units)		FY14 (2014 units)		FY15 (2015 units)		FY11-FY15 Savings PB12 quantities \$B	Notes
	Invest \$K	Return Per \$K (\$K)										
Investment A												
Automotive Production Conversion Lot 11		1.5									0.3	
Lot 11 Contract FPP (AOTIS)		1.5									1.5	
Investment B												
Automotive Production Defining Lot 13			10.0								0.3	
Lot 13 Contract Executive Order FPP (AOTIS)			10.0								1.0	
Refurb SPS/Overhaul			1.0		1.0		1.0		1.0		1.5	
Automotive AGR Tool w/ PMS			1.0		1.0		1.0		1.0		0.7	Total RC: 120K FY12/100K FY13/210K FY14/120K FY15
AGTD Data Link Test Equipment Upgrade			1.0		1.0		1.0		1.0		0.9	Total RC: 45K FY12/140K FY13/140K FY14/140K FY15
AGTD Vibe Station Upgrade			1.0		1.0		1.0		1.0		0.2	Total RC: 30K FY12/100K FY13/100K FY14/100K FY15
AGTD Inert Housing Assembly Test Equipment			4.0		4.0		4.0		4.0		0.9	Total RC: 40K FY12/100K FY13/100K FY14/120K FY15
Investment C												
Lot 13 Contract Paper FPP (series rebates)					10.0		10.0		10.0		3.8	Market "lock" in regular production contract negotiation
Contractible Shared Support Functions/Agency Contracts					4.0		4.0		4.0		2.1	
Major Production Span Requirements to Capabilities					4.0		4.0		4.0		1.2	
Improve High AGTD Laser Factory Production/Work	10.0				1.0		1.0		1.0		1.3	Total RC: 30K FY13/140K FY14/170K FY15
Improve High AGTD Laser Solder Fixture	10.0				1.0		1.0		1.0		0.4	Total RC: 120K FY13/130K FY14/140K FY15
Automotive High AGTD Laser Test Station	10.0				1.0		1.0		1.0		0.4	Total RC: 120K FY13/140K FY14/140K FY15
Improve ELGAR AGTD Test Station	10.0				1.0		1.0		1.0		0.4	Total RC: 100K FY13/110K FY14/100K FY15
Challenge Total Improvement	10.0				1.0		1.0		1.0		0.4	Also saves ~\$500K/year in O&M Sustainment Dollars
Investment D												
FY14 Multi-Year Contract							10.0		10.0		10.0	
Package MW EOPs in 2 year contract							10.0		10.0		1.8	
Contractible Contract Award Transition							10.0		10.0		2.8	Leverage Multi-Year for Savings - Leverage AOT
Contract to Buy, not to Develop							10.0		10.0		1.4	
Contract to Buy, not to Develop - Incrementally across 200 quantities							10.0		10.0		1.4	
Contractible Contract - Reserve in Quality Strategy							10.0		10.0		2.2	Leverage AOT
Reduce AGTD Performance Requirements							10.0		10.0		2.2	
Reduce AGTD Performance Requirements - Incrementally across 200 quantities							10.0		10.0		2.2	Leverage AOT
Investment E												
Quality Chain Management For Component											0.7	Contractor managed - Leverage Multi-Year
Affordable CatB 1 - Capable CATM MT											0.7	Also saves \$1.5M/year in O&M Sustainment Dollars
Affordable CatB 2 - Hardware Optimization											1.1	Also saves \$1.5M/year in O&M Sustainment Dollars
Investment F												
Use E2 Processor Stack												
Reduce SAU for Reliability												
Reduced Cost NGCC Drive												
Low Cost AGTD												
Total Investment and Total Per-Unit Savings											11.1	

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Step 3: Develop Discrete "Should Cost" POA&M Production Dollars (TY\$, PB12 Quantities)



Costs / Returns in TY\$, Quantities basis: PB12

Title	FY11 (120 units)		FY12 (186 units)		FY13 (229 units)		FY14 (242 units)		FY15 (247 units)		FY11-FY15 savings (PB12 quantities), \$M	Notes
	Invest \$K	Return Per Unit (\$K)										
Increment 1												
Accelerate Production Deliveries (Lot 11)		66.7									6.0	
Lot 11 Contract: FPIF (AOTD)		23.5									2.8	
Increment 2												
Accelerate Production Deliveries (Lot 12)			44.8								8.3	
Lot 12 Contract: December Option / FPIF (AOTD)			10.5								2.0	
Reduce SEP/Overhead			2.3		2.9		3.1		3.2		2.6	
Automated AUR Test at FACO			0.6		0.8		0.9		0.9		0.7	Total ROI: 120K (FY12) / 185K (FY13) / 211K (FY14) / 223K (FY15)
AOTD Data Link Test Equipment Upgrade			2.6		3.2		3.5		3.6		3.0	Total ROI: 481K (FY12) / 741K (FY13) / 842K (FY14) / 892K (FY15)
AOTD Vibe Station Upgrade			1.9		2.4		2.6		2.7		2.2	Total ROI: 361K (FY12) / 556K (FY13) / 632K (FY14) / 669K (FY15)
AOTD Inner Housing Assembly Test Equipment			0.3		0.4		0.4		0.5		0.4	Total ROI: 60K (FY12) / 93K (FY13) / 105K (FY14) / 112K (FY15)
Increment 3												
Lot 13 Contract Type: FPIF (entire missile)					16.7						3.8	Absorb "cost" in regular production contract negotiation.
Consolidate Shared Support Functions Across Contracts					4.0		4.3		4.5		3.1	
Match Production Spec Requirements to Capabilities					6.1		6.7		9.0		6.2	
Improve nLight AOTD Laser Factory Reclaim/Rework	293				1.7		1.9		1.9		1.3	Total ROI: 394K (FY13) / 448K (FY14) / 475K (FY15)
Improve nLight AOTD Laser Solder Fixtures	150				0.5		0.6		0.6		0.4	Total ROI: 122K (FY13) / 139K (FY14) / 147K (FY15)
Automate nLight AOTD Laser Test Station	650				0.5		0.6		0.6		0.4	Total ROI: 124K (FY13) / 141K (FY14) / 149K (FY15)
Improve ELCAN AOTD Transceiver Yield	500				0.8		0.9		0.9		0.6	Total ROI: 185K (FY13) / 211K (FY14) / 223K (FY15)
Cryoengine Seal Improvement	375				1.8		1.9		2.0		1.4	Total ROI: 408K (FY13) / 463K (FY14) / 491K (FY15) Also saves ~\$600K/year in O&MN Sustainment Dollars
Increment 4												
FY14 Multi-Year Contract							34.1		43.3		18.9	
Package HW ECPs in 2 year centers							8.1				2.0	
Synchronize Contract Award Timelines							10.8				2.6	Leverage Multi-Year for Savings. Leverage JMC?
Contract to Price, not by Element							5.4				1.3	
Synchronize parts quality requirements across USG customers							0.9		0.9		0.4	Leverage JMC?
Streamline Contractor Response to Quality Escapes							4.3		4.5		2.2	
Reduce AOTD Performance Requirements							4.3		4.5		2.2	
Bundle vendors: datalink, rocket motor							0.9		0.9		0.4	Leverage JMC?
Increment 5												
Supply Chain Management For Competition									11.0		2.7	Contractor-managed. Leverages Multi-Year.
Affordable CATM 1: Optimize CATM BIT			500		750		750				2.7	Also saves \$0.9M/year in O&MN Sustainment Dollars
Affordable CATM 2: Hardware Optimization					500		500				4.5	Also saves \$1.1M/year in O&MN Sustainment Dollars
Increment 6												
Mini EU Processor Stack												Realize \$14K/Unit return in FY18. Investment cost leveraged with Block III program starting in FY13. Concurrently addresses obsolescence.
Replace IMU for Reliability			1500		750		750		2000			Cut-in lot 16. IMU is high failure rate item. Replacing it also yields 3K/repair O&MN Sustainment savings
Reduced Cost NCOC Dome												Start in FY13, leveraging investment with Block III program. Cut-in FY16, savings 1.7K/GU
Low Cost AOTD												Start in FY13, leveraging Block III program investment.
Total Investment and Total Per-Unit Savings	1968	90.2	2000	63.1	2000	44.0	2000	98.1	2000	102.7	81.8	
Lot 11 RMS Contractual Position Offset		-58.0										
"Will Cost" TY\$	712.0		612.2		572.9		632.4		630.5			
"Should Cost" TY\$	679.8		549.0		528.9		534.3		527.8			

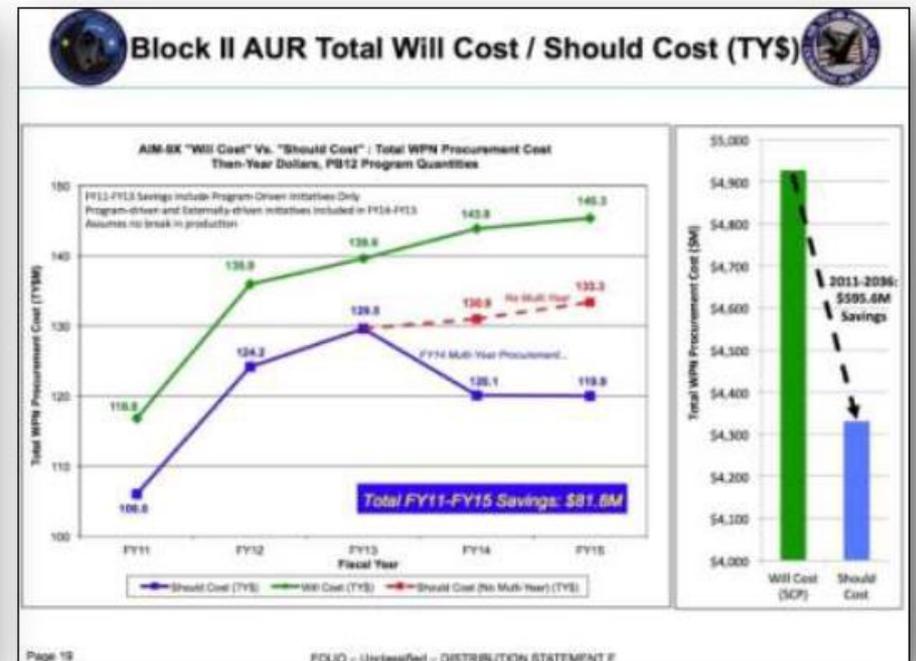


Should-Cost Methodology: Step 4



Step 4: Establish Measurable Targets, Consolidate Strategy:

- Assign measurable targets using negotiated Lot 11 cost model and SCP as a baseline
- Develop discrete, incremental "should cost" curve(s) from Lot 11 baseline curve, aligned to Service Reference Cost Position (NCCA)
- Create final briefing for leadership





Step 4: Establish Measurable Targets

Production Dollars (TY\$, PB12 Quantities)

Increment 1 CRIs already in FY11 Will-Cost:

- 1.AOTD Spreader Lens Improvement
- 2.AOTD Laser Yield/Test Automation
- 3.nLight Start Pulse CCA Ownership
- 4.AOTD Microchip Laser Crystal STE
- 5.AOTD STE/TE: Fiber Cleave TE

Increment 1: in FY11 Should Cost

1. Accelerate Production Deliveries (Lot 11)
2. Lot 11 Contract: FPIF (AOTD)

Increment 2: In FY12 Should Cost

- 1.Accelerate Production Deliveries (Lot 12)
- 2.Lot 12 Contract: Dec. Option / FPIF (AOTD)
- 3.Reduce SEPM/Overhead (5%)
- 4.Automated AUR Test at FACO
- 5.AOTD Data Link Test Equipment Upgrade
- 6.AOTD Vibe Station Upgrade
- 7.AOTD Inner Housing Assembly TE

Increment 3: in FY13 Should Cost

- 1.Lot 13 Contract Type: FPIF
- 2.Consolidate Shared Contract Support Fns
- 3.Match Production Spec to Capabilities
- 4.Improve nLight AOTD Laser Reclaim
- 5.Improve nLight AOTD Laser Solder Fixtures
- 6.Automate nLight AOTD Laser Test Station
- 7.Improve ELCAN AOTD Transceiver Yield
- 8.Cryoengine Seal Improvement

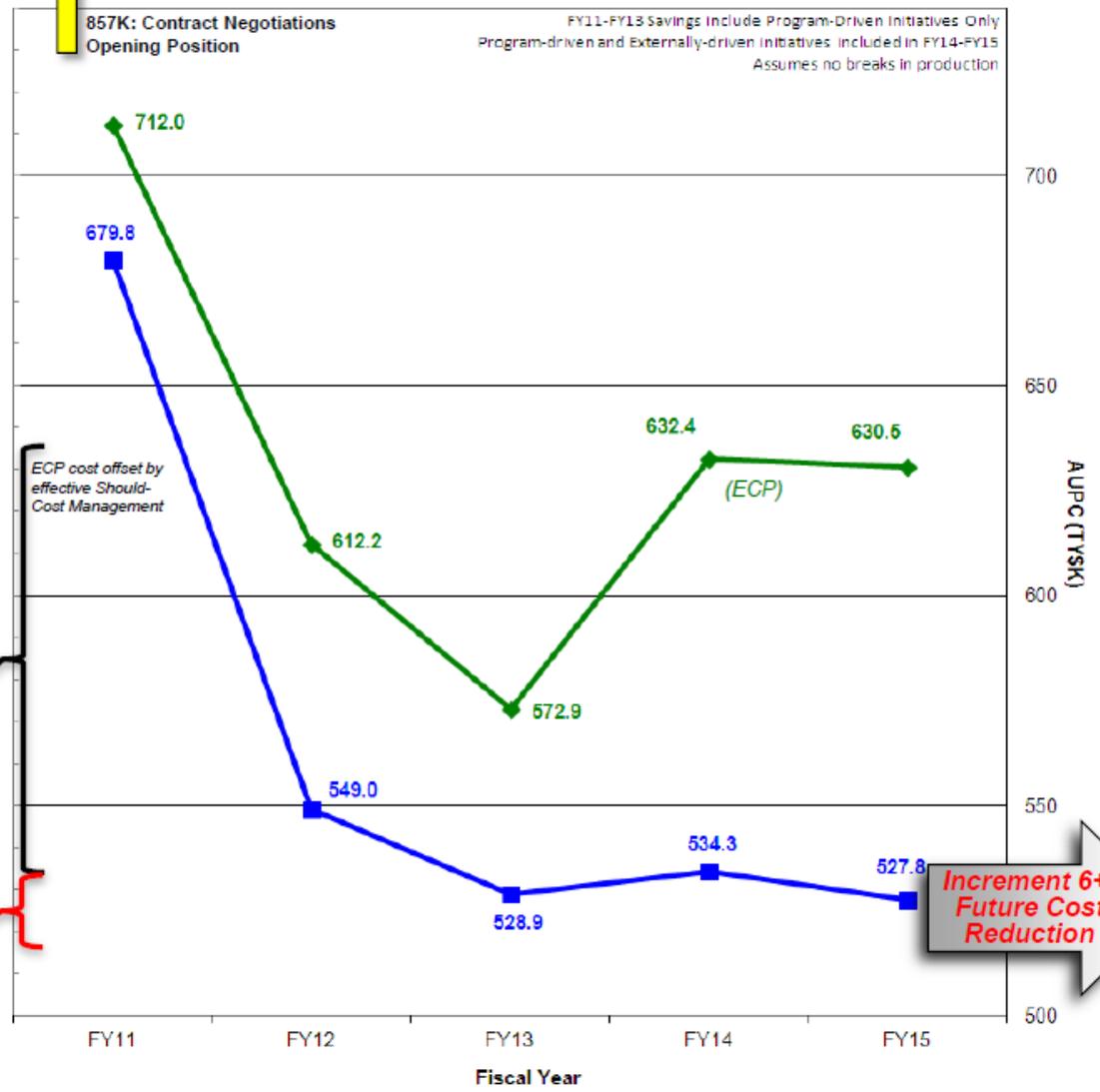
Increment 4: in FY14 Should Cost:

- 1.FY-14 Multi-Year Contract
- 2.Package HW ECPs in 2 yr centers
- 3.Sync Contract Award Timelines
- 4.Contract to Price, not by Element
- 5.Sync Parts quality req'ts across USG cust.
- 6.Streamline KTR response to quality escapes
- 7.Reduce AOTD performance requirements
- 8.Bundle vendors: datalink, rocket motor

Increment 5 in FY15 Should Cost:

- 1.Supply Chain Management for Competition (RMS. in conjunction with FY14 Multi-Year, realize savings in FY15)
- 1.. Affordable CATM 1: Optimize CATM BIT
2. Affordable CATM 2:CATM H/W Optimization

AIM-9X "Will Cost" Vs. "Should Cost" Then-Year Dollars, Program Quantities



FY11-FY13 Savings Include Program-Driven Initiatives Only
 Program-driven and Externally-driven Initiatives Included in FY14-FY15
 Assumes no breaks in production

ECP cost offset by effective Should-Cost Management

Increment 6+: Future Cost Reduction

Will Cost (TY\$) Should Cost (TY\$)

Red Text = Externally-Driven Initiative

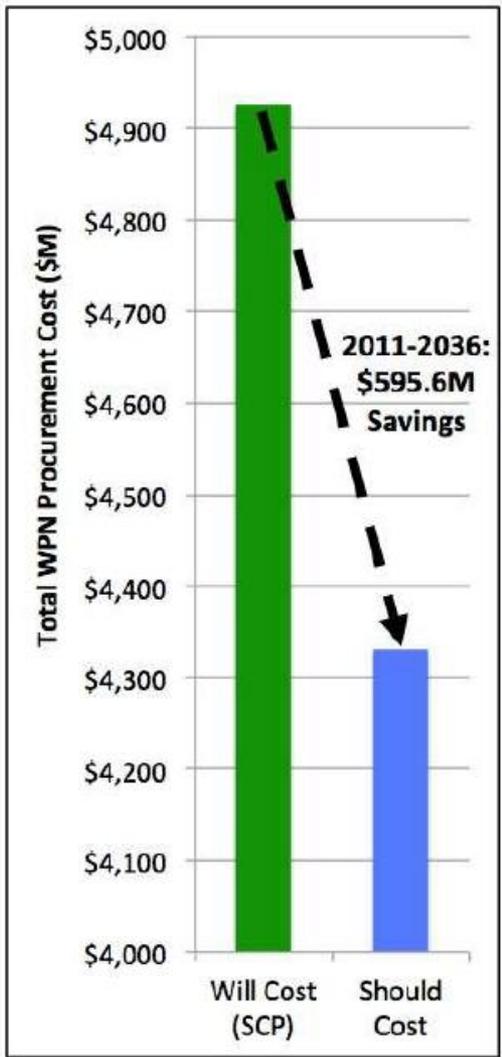
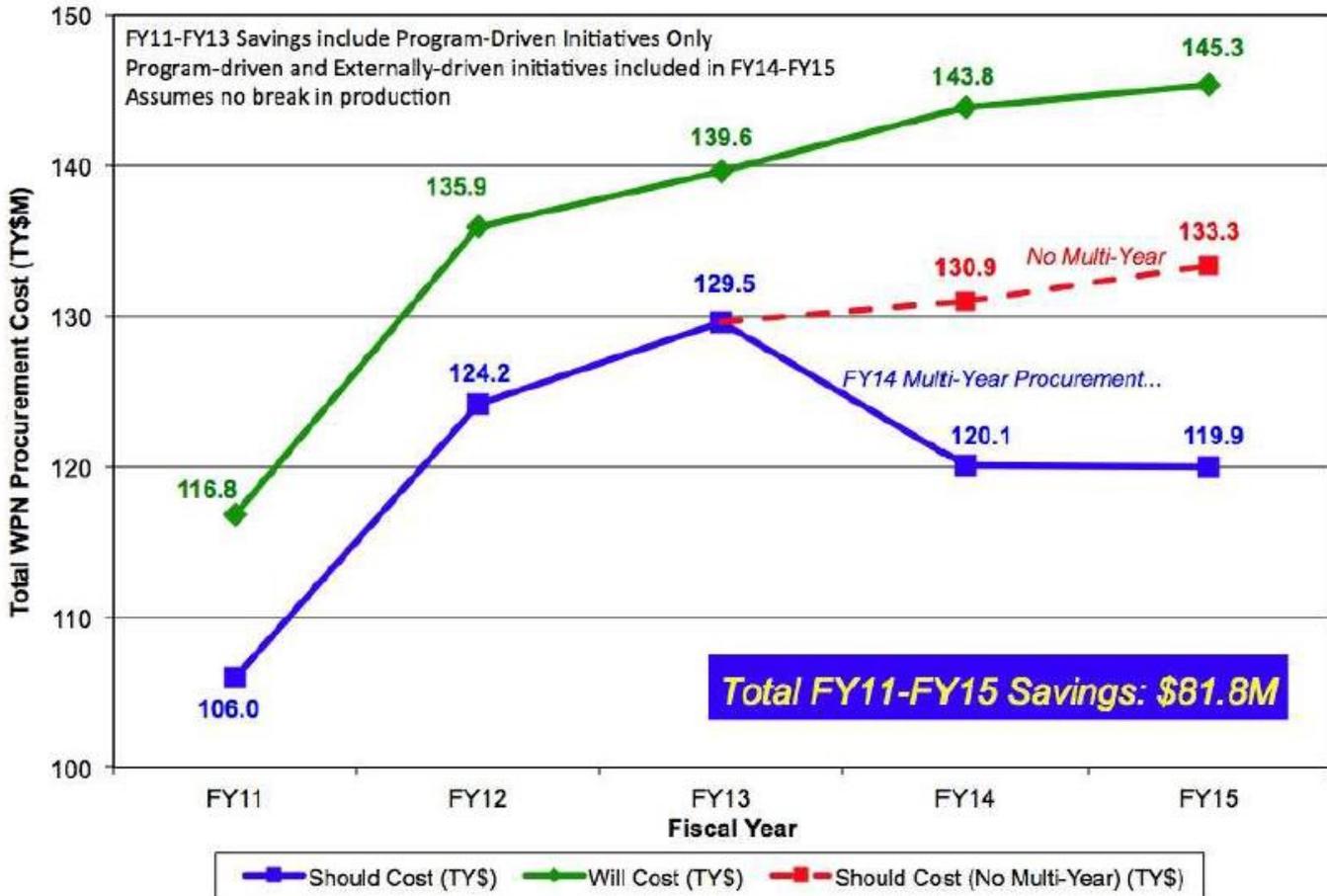
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Block II AUR Total Will Cost / Should Cost (TY\$)



AIM-9X "Will Cost" Vs. "Should Cost" : Total WPN Procurement Cost Then-Year Dollars, PB12 Program Quantities



Savings proposed to be applied for re-investment for continued cost reduction, obsolescence, and increased of program of record production quantities



Independent Cost Estimate (NCCA) Deltas to Pre-MS C Spruill



(\$ in Millions / Then Year)	Prior	FY11	FY12	FY13	FY14	FY15	FY16	FY12-16	To Comp	Prog Total
RDT&E										
Current \$ (PB 12)	57.4	7.0	16.8	13.2	10.5	11.5	13.6	65.6	0.0	130.0
Required SCP \$	57.4	24.5	31.0	29.4	17.7	24.6	7.3	110.0	22.1	214.0
Delta \$ (Current - Required)	0.0	(17.5)	(14.2)	(16.2)	(7.2)	(13.1)	6.3	(44.4)	(22.1)	(84.0)
PROCUREMENT										
Current \$ (PB 12)	30.5	119.7	135.9	139.6	143.8	145.3	146.6	711.2	3,188.3	4,049.7
Required SCP \$	30.5	85.5	115.1	134.9	148.7	150.9	153.2	702.9	4,067.9	4,886.8
Delta \$ (Current - Required)	0.0	34.2	20.8	4.7	(4.9)	(5.6)	(6.6)	8.3	(879.6)	(837.1)
PROCUREMENT SPARES (Initial and Replen)										
Current \$ (PB 12)	0.0	2.5	2.5	5.8	6.3	6.1	6.4	27.1	53.9	83.5
Required SCP \$	0.0	3.7	6.5	5.2	11.0	10.5	10.6	43.7	269.5	317.0
Delta \$ (Current - Required)	0.0	(1.2)	(4.0)	0.6	(4.7)	(4.4)	(4.2)	(16.6)	(215.6)	(233.5)
O&M										
Current \$ (PB 12)	0.0	0.0	0.0	7.2	7.7	8.1	7.8	30.8	1,530.8	1,561.6
Required SCP \$	0.0	0.0	0.0	7.1	8.5	10.0	12.4	38.1	1,530.8	1,568.9
Delta \$ (Current - Required)	0.0	0.0	0.0	0.1	(0.8)	(1.9)	(4.6)	(7.3)	0.0	(7.3)
TOTAL										
Current \$ (PB 12)	87.9	129.2	155.2	165.8	168.3	171.0	174.4	834.7	4,773.0	5,824.8
Required SCP \$	87.9	113.7	152.6	176.6	185.9	196.0	183.5	894.6	5,890.4	6,986.6
Delta \$ (Current - Required)	0.0	15.5	2.6	(10.8)	(17.6)	(25.0)	(9.1)	(59.9)	(1,117.4)	(1,161.8)
QUANTITIES										
Current \$ (PB 12)	31	120	186	229	242	247	245	1,149	4,731	6,031
Required Qty	31	120	186	229	242	247	245	1,149	4,731	6,031
Delta Qty (Current - Required)	0	0	0	0	0	0	0	0	0	0



Summary

- Established a rigorous Should-Cost methodology
- Applied methodology to define Should-Cost Plan for AIM-9X Block II
- Aggressively applying Should-Cost Management and effective contract negotiations yielded \$21M savings in Sep 11 for Lot 11 (Purchased 120 units for \$21M less than planned)
 - \$664K Unit price was 43% less than 1 year ago
 - 22% less than \$857K opening negotiation position
 - Savings purchased an additional 28 units, reinvested in future cost reduction, and paid pop up obsolescence bills
- Should-Cost Plan yields over \$595M savings across program of record

Questions?

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