

Life Cycle Cost Track: Lessons Learned from the Joint STARS Analysis of Alternatives for Cost and Risk Analyses

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Agenda

- Purpose
- AoA Overview – Admin & Alternatives
- Alternative Overview
- Methodologies
- Service Life
- Inflation
- Fully Burdened Cost of Delivered Energy
- Risk / Uncertainty
- Lessons Learned
- Questions

Purpose

- Present an overview of a recent AoA while sharing study issues, our methodologies, and lessons learned
- Identify dependencies with other AoA Working Group products and analyses, with a focus on cost estimation and uncertainty analysis

JSTARS AoA Admin Overview

- ACAT IA, Resource Management Decision (RMD) Directive 700 Tasking
- USAF Air Combat Command (ACC) lead agency, supported by OSD CAPE, OSD AT&L, AFCAA, OAS, SAF/AQI, USAF/A5R, USAF Electronic Systems Center (ESC), US Army, contracted support.
- Two Year Effort (~January 2010 – ~March 2012)
- Cost Analysis conducted with continued oversight and approval from AFCAA, OAS, OSD CA&PE

JSTARS Alternative Overview

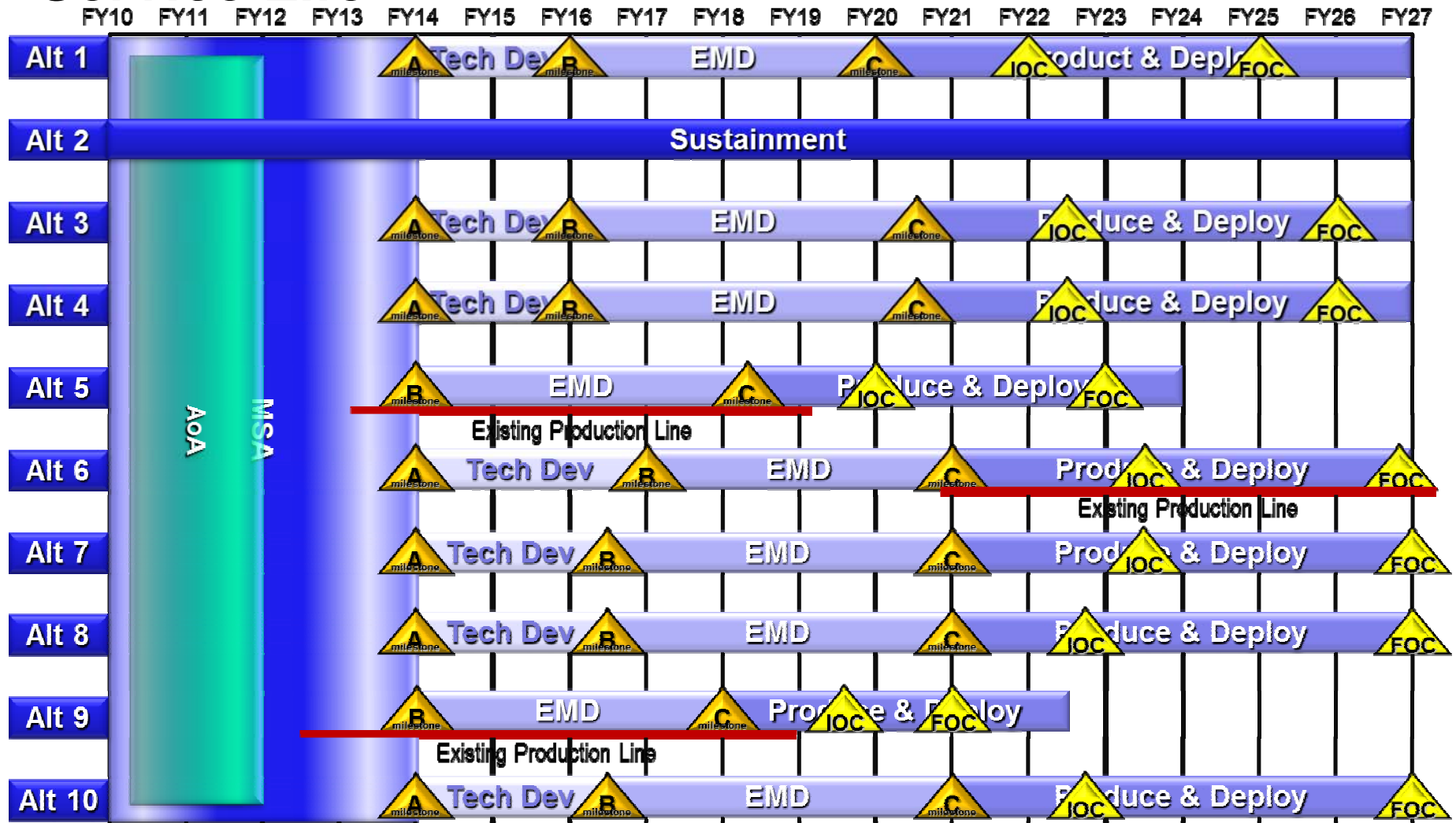
- *Air Combat Command (ACC) will conduct an AoA on the Airborne Synthetic Aperture **Radar**, Moving Target Indicator (SAR/MTI), Joint Surveillance Target Attack Radar System (JSTARS) **Mission Area** as part of a comprehensive effort to refine capability requirements and determine the way ahead for the **E-8** JSTARS weapons system recapitalization/modernization.*
- **Radar + Mission Area + E-8** Platform = AoA Complexity
 - Phase I – Sixteen individual “alternatives” with air platform and sensor
 - Phase II – Combinations of Phase I alternatives
 - Study-directed excursions
- 22 different solutions analyzed



Methodologies

- Air Vehicles / Platforms
 - Blimps/LTA, manned aircraft (S, M, L), unmanned aircraft (L, S)
 - TRLs: conceptual, prototypes, COTS/commercial, variants
- Sensor Suites
 - Low cost / High density vs High cost / Low density
 - Scalable array sizes and densities
- Operations
 - Different orbits, times on station, CONOPs
 - Different O&S estimates with different effectiveness capabilities
- Does platform drive sensor or vice versa?
- Unable to apply consistent estimating methodologies across alternative analyses
- Unable to even use same CES across alternatives!

Service Life



Service Life

- AoA handbook prescribes “Common End of Service Life”
 - Blimp/LTA
 - 2-10 year service life limit; Reconstitution
 - Recompete every 5-7 years?; Buy data rights?; Tooling storage?
 - Production facility/line availability; Upgrade technology each procurement?
 - Manned
 - FH/Years/Cycles limit
 - No attrition reserve; exceed design service life (FVB)?
 - Unmanned
 - XX,000 FH limit (usually crash first!)
 - Attrition reserve; store spare assets
- O&S timeline involves different service lives with different flight hours (based on different CONOPs) with different attrition rates with different baseline alternative sunset profiles

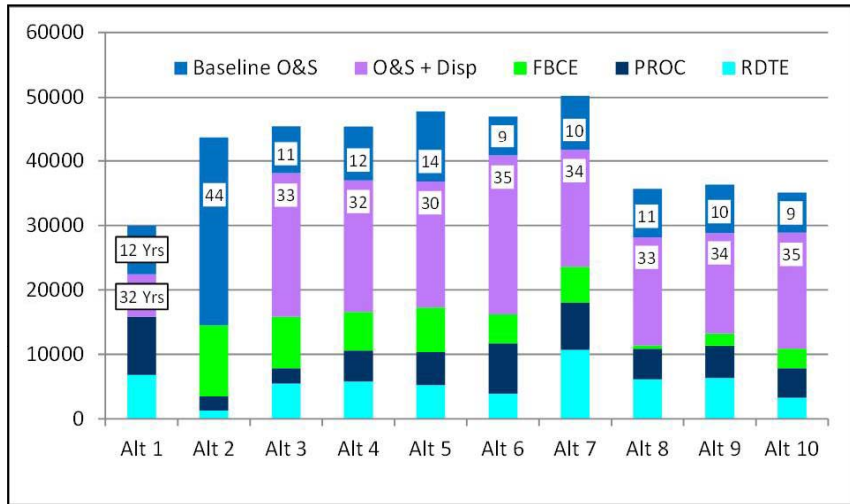
Inflation

- Standard inflation for TY\$
- Cost above inflation
 - 3% non-compounding growth factor on consumables
 - From start of program maturity

Fully Burdened Cost of Delivered Energy

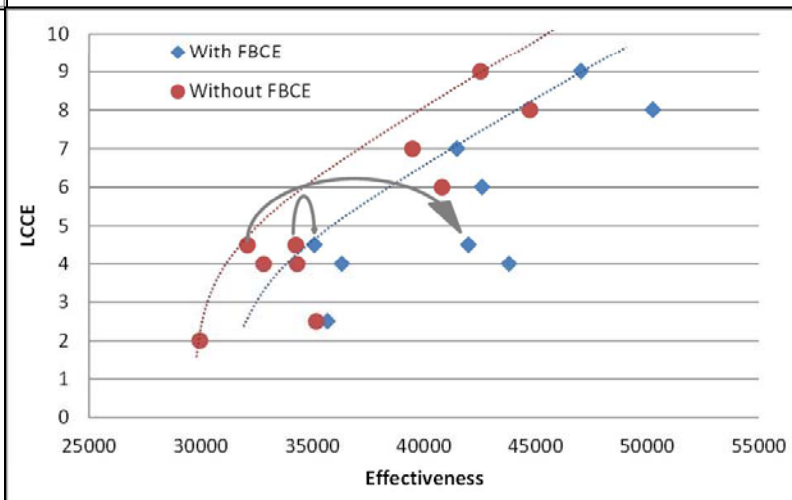
- *FBCE estimates the energy-related costs to **sustain** specific pieces of equipment, including **procurement** of energy, the **logistics** needed to deliver it where and when needed, related **infrastructure**, and **force protection** for those logistics forces directly involved in energy delivery.*
- *Consistent with Section 138c of title 10, United States Code, and DoDI 5000.02, FBCE estimates shall be made and reported for all acquisition category (ACAT) I and II systems that will demand fuel or electric power in operations and will be applied to all phases of acquisition beginning with the preparation of the Analysis of Alternatives (AoA).*
- *Plotting cost/effectiveness/risk charts with and without FBCE analysis produced drastically different messages to stakeholders and acquisition community*
 - *Up to a 30% change in O&S estimates for large platforms with aerial refueling*
 - *AR provides ability for longer on-station times, thus potential for greater effectiveness*
 - *Do you have time to update the AFCAA FBCE Seven Step Model: Commodity Fuel Cost, Delivery Cost, Asset Depreciation, Direct/Indirect Infrastructure, Environmental, Service and Platform Delivery, Security Protection, etc*
 - *How to best present the material in 8-10 slides to AFROC & JROC & Acq Community?*
- *<https://dap.dau.mil/policy/Documents/2012/ASD%20EPP%20FBCE%20Memo%20to%20Services.pdf>*
- *<https://acc.dau.mil/CommunityBrowser.aspx?id=488333#3.1.6>*

Fully Burdened Cost of Delivered Energy



- Can change LCCE order
- Can shift efficient frontier and those alternatives on the efficient frontier on the Cost v Effectiveness chart

- Stakeholders must validate Energy KPP(s) and/or KSA(s)
- FBCE must be calculated
- Must determine how and when FBCE results are presented
- This only shows Phase I results for single alternative solutions



Risk / Uncertainty

- Cost risk at top line
 - TRL / Milestone based factors
 - MS-A to completion: 40% R&D + 20% Prod
 - MS-B to completion: 20% R&D + 10% Prod
 - Treat platform & sensors separately?
- Input variable probability dist & MC Runs
 - Countless input variables = countless distributions
 - With correlation, no discernible difference in PE, 50th, 80th

Lessons Learned

- Booz Allen Study Team
 - Ensure gov't lead, OSD CAPE & AFCAA establish expectations and milestones for LCCEs and NACA
 - Propose Cost Analysis Working Group plan within overall AoA study plan and to OAS and OSD AT&L
 - Identify data needs and input variables from other WG early
 - Seek common methodologies and CESs (mod w/ approval)
 - Ask for crosscheck materials, methodologies, recent LCCEs & NACAs, best practices from community, Service estimates
- AFCAA / OSD CAPE / OAS
 - Early and often reviews - Bi-monthly/monthly IPT calls
 - Formal mid-term and final reviews with Appn Type leads
 - Set expectations from top down based on stakeholder key questions
 - Good scrub on all methodologies with lots of crosschecks
 - Ensure compliance with CE guidance

Questions

