You've Invested, Now Sustain It:
Insights into the Sustainment Review Process

Technomics
Better Decisions Faster

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Introductions

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Senior Associate

Alex Bonich is a Senior Associate who joined Technomics in February 2021. He currently supports the Army in cost estimating and analysis for Transportations Systems and the Robotic Combat Vehicle program, and has experience supporting the Army in the development of Life Cycle Cost Estimates across various vehicle programs. Alex graduated from the University of Michigan in 2019 with a B.S.E. in Mechanical Engineering.

Adam Kidwell

Senior Associate

Adam is a Senior Associate at Technomics and has been with the company since February 2020. He currently provides cost support to the Navy within its Integrated Warfare Systems (IWS) PEO. He has prior experience designing aircraft parts for use in military flight simulators. Adam has a BS degree in Mechanical Engineering (2018) from the University of Maryland Baltimore County.

John Liss

Lead Analyst

John is a Lead Analyst who joined Technomics in October 2020. He has led and supported OSRs, Cost Estimate developments, and data collection improvements for the Program Management Transportation Systems (PMTS) office. Additionally, he has supported TACOM Security Assistance Management Directorate (SAMD) and IWS A in dashboard creation efforts to visualize large data sets in easy formats to make decisions.

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Session Summary

Defense acquisition has historically centered around the acquisition phase of programs, with multiple requirements for estimating and defending development and procurement costs in major Defense Programs. The 2017 NDAA introduced Title 10 U.S. Code 4323 – Sustainment Reviews, a new acquisition event that focuses on the planning, budgeting, and execution of System readiness and costs of ACAT I weapon systems during sustainment. Operations and sustainment activities comprise the majority of the life cycle and costs of a weapon system. Additionally, with readiness being a critical aspect of Defense Operations, and considering rising supply chain costs, it is not surprising that Congress has an interest in the sustainment-related performance metrics and costs.

As with any new policy, there are implementation challenges. Whether it is the collection of accurate and sufficient data to evaluate performance or resource limitations within program offices, these are challenges that the Defense department, services, and program offices must face and overcome. This paper will provide an overview of Sustainment Reviews and their requirements, discuss major challenges faced during their execution, and identify lessons learned from our experience conducting five Sustainment Reviews between the Army and Navy.

Overview

- What is a Sustainment Review?
- Sustainment Review Cost Estimating Process
- Differences across DoD Services
- Challenges
- Mitigation Techniques
- Final Takeaways

What is a Sustainment Review?

Sustainment Review (SR) and Accompanied Requirements

- Holistic assessment of the planning and execution of a system's product support strategy
  - ***Comprehensive***: Breadth and depth of analysis similar to other DoD milestone events
  - ***Recurring***: 5-year intervals
- All requirements outlined in 10 USC 4323: "Sustainment Reviews"
- Require support across functional areas
- Cost focus: Identify and assess cost drivers impacting program operational efficiency and sustainment cost growth


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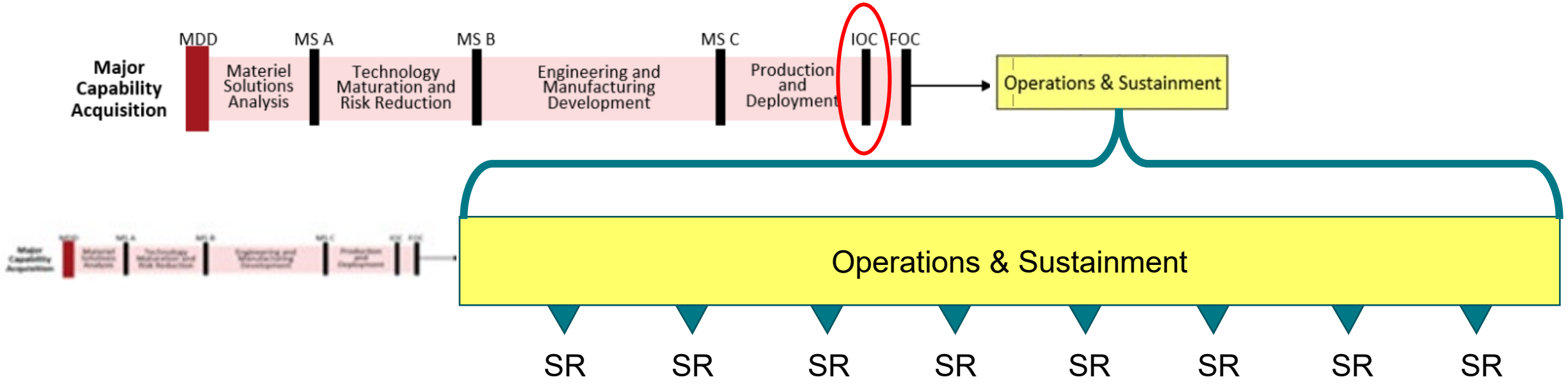
[1]Heavy expanded mobility tactical truck (2023) Wikipedia. Wikimedia Foundation. Available at: https://en.wikipedia.org/wiki/Heavy_Expanded_Mobility_Tactical_Truck (Accessed: April 27, 2023).
[2]Handling the San Antonio–class LPD (2022) U.S. Naval Institute. Available at: https://www.usni.org/magazines/proceedings/2019/january/handling-san-antonio-class-lpd (Accessed: April 27, 2023).
[3]X-51 Waverider makes historic hypersonic flight (no date) Air Force. Available at: https://www.af.mil/News/Article-Display/Article/116538/x-51-waverider-makes-historic-hypersonic-flight/ (Accessed: April 27, 2023).

Applicability to DoD Programs

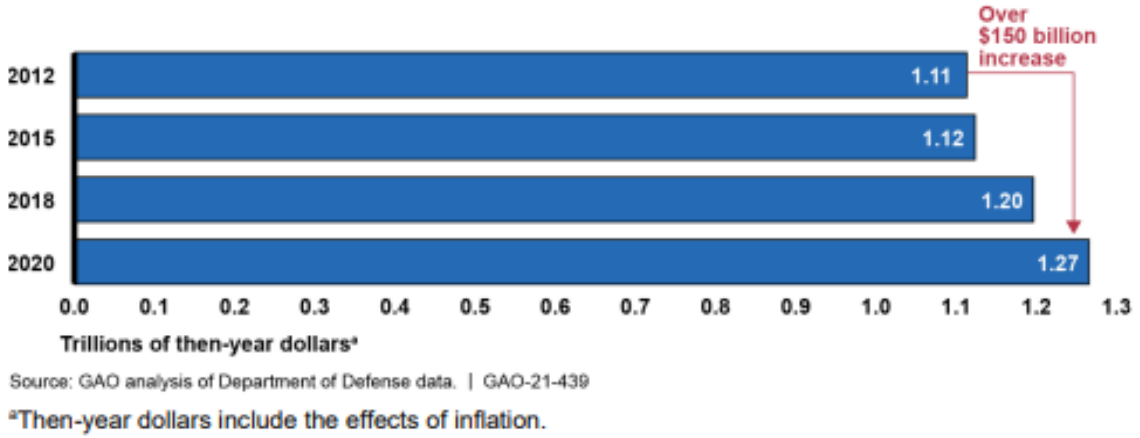
- Required for defense programs meeting the following criteria:
  - MDAP with ACAT I designation (at any point in program life)
  - At least five years removed from Initial Operational Capability (IOC)
  - Five years removed from last Sustainment Review
  - Includes all fielded and planned future systems within the program

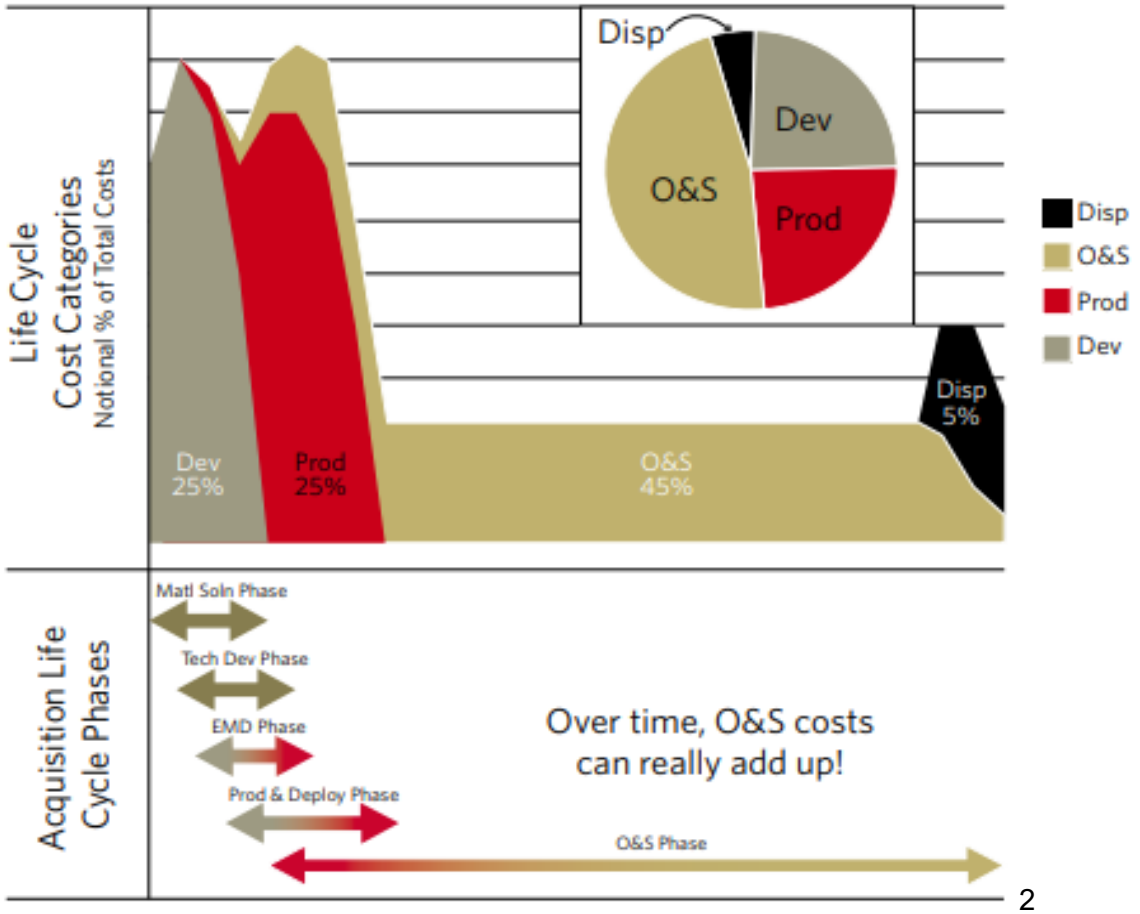


Major Capability Acquisition. (n.d.). Defense Acquisition University. Retrieved from https://aaf.dau.edu/storage/2020/01/mca-pathway-dec2019.png.

Why are Sustainment Reviews Important?

- DoD historical acquisition focus has centered on costs ***today*** and ***not tomorrow***
- Sustainment Reviews serve as pseudo-milestone for O&S





Example of sustainment cost estimate growth for the F-35 program[1]

[1]Government Accountability Office (2021) F-35 SUSTAINMENT DOD Needs to Cut Billions in Estimated Costs to Achieve Affordability5 SUSTAINMENT DOD Needs to Cut Billions in Estimated Costs to Achieve Affordability. GAO. Available at: https://www.gao.gov/assets/gao-21-439.pdf
[2]Taylor, M., & Murphy, J. (2012). Ok, We Bought This Thing, Can We Afford to Operate and Sustain It? Defense Acquisition Magazine, 41(225), 17–21.

Sustainment Review Cost Estimating Process

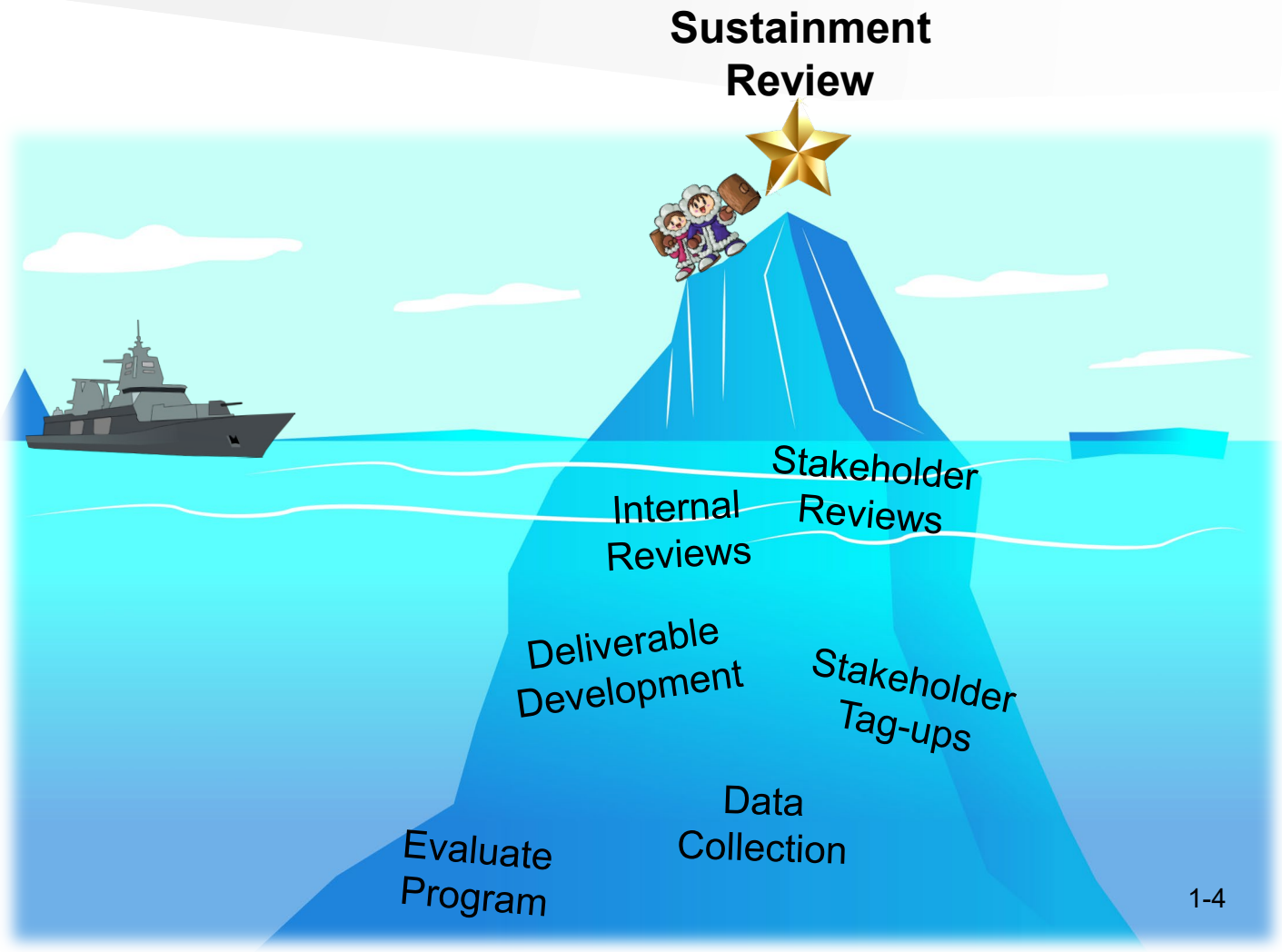
10 USC 4323 – Sustainment Review Requirements

- Sustainment Review Statue requires the following elements, at a minimum:
  - (1) An independent cost estimate for the remainder of the life cycle of the program.
  - (2) A comparison of actual costs to the amount of funds budgeted and appropriated in the previous five years, and if funding shortfalls exist, an explanation of the implications on equipment availability.
  - (3) A comparison between the assumed and achieved system reliabilities.
  - (4) An analysis of the most cost-effective source of repairs and maintenance.
  - (5) An evaluation of the cost of consumables and depot-level repairables.
  - (6) An evaluation of the costs of information technology, networks, computer hardware, and software maintenance and upgrades.
  - (7) As applicable, an assessment of the actual fuel efficiencies compared to the projected fuel efficiencies as demonstrated in tests or operations.
  - (8) As applicable, a comparison of actual manpower requirements to previous estimates.
  - (9) An analysis of whether accurate and complete data are being reported in the cost systems of the military department concerned, and if deficiencies exist, a plan to update the data and ensure accurate and complete data are submitted in the future.
  - (10) As applicable, information regarding any decision to restructure the life cycle sustainment plan for a covered system or any other action that will lead to critical operating and support cost growth

= Cost-centric requirement

Initial Planning

- Determine schedule expectations
  - Informed by past SR documentation, if available
- Collaboration across functional teams
  - **Logistics**: primary stakeholder support in SR process
  - **Cost:** data collection and analysis supporting cost growth assessment
  - **OSD CAPE/Service Cost Center:** support, verify and help framework assumptions for basis of reporting cost estimate
  - **Service Secretaries:** oversight organizations that guide SR schedule progression
  - **Engineering:** main source for technical characteristics, vehicle performance metrics
- Close coordination between cost and logistics team



[1]Iceberg drawing. Iceberg Drawing | Free download on ClipArtMag. (n.d.). Retrieved April 27, 2023, from https://clipartmag.com/iceberg-drawing#iceberg-drawing-25.jpg
[2]Ice climbers - wiki clipart - full size clipart (#1604531) - pinclipart. PinClipart.com. (n.d.). Retrieved April 27, 2023, from https://www.pinclipart.com/maxpin/oiJhRb/
[3]Free Gold Star Transparent Background,, Free ClipArts on Clipart Library. (n.d.). Retrieved April 27, 2023, from http://clipart-library.com/free/gold-star-transparent-background.html
[4]PlusPNG. (n.d.). Battleship PNG HD. PlusPNG. Retrieved April 27, 2023, from https://pluspng.com/battleship-png-hd-7361.html

Cost Estimating Requirements

Cost Analysis Requirements Description (CARD)

- Statutory requirement for all ACAT I programs
- Must be updated annually
- Programmatic and technical baseline for a DoD system
- Data collection (stakeholder and database resources)

Life-Cycle Cost Estimating (LCCE)

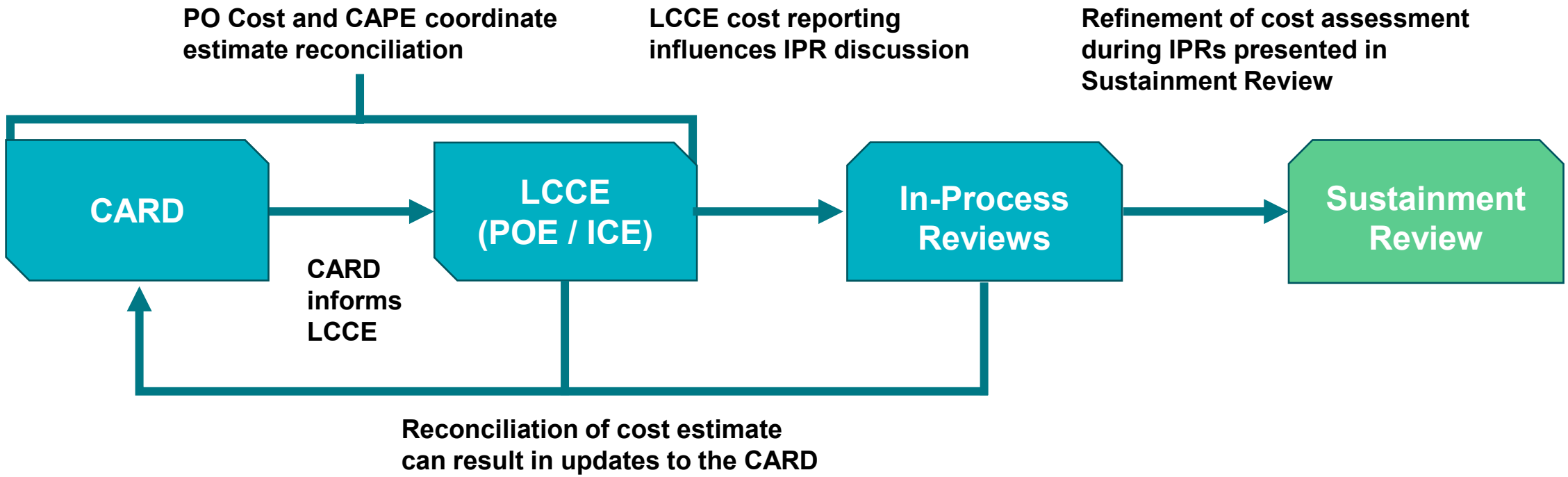
- Informed by the CARD
- Total acquisition and O&S cost assessment
- LCCE development:
  - Program office estimate (POE)
  - OSD CAPE / Service Cost Center – Independent Cost Estimate (ICE)

❑ Data quality of CARD integral to development and maturation of estimate

Data Criteria	Definition
Availability	Data exists in a formal system or database, and is accessible for analysis
Accuracy	Reliability and completeness of the data
Granularity	Level of detail at which the data is reported (across cost estimating categories, temporal dimensions, or by asset or variant)
Recency	Recent and updated regularly
Well-documented	Complete explanation of data source, date, available data fields and values, data basis, and assumptions
Applicable	Representative of current system and requirements

Cost Workflow

- OSD CAPE / Service Cost Center coordination with program office (PO) on cost reporting
- In-Process Reviews (IPR)
  - Ensure consistency throughout the process
  - Facilitate discussions on CARD inputs, cost data, and methodology
  - Provide opportunities for all stakeholders to present questions and findings



Critical Cost Growth Assessment

- Critical cost growth is assessed in two ways:

Cost Growth	Baseline Estimate	New Estimate	Critical Growth Threshold %
Category A	Most Recent ICE O&S	SR ICE O&S	≥ 25% increase
Category B	Original Baseline O&S	SR ICE O&S	≥ 50% increase

Example of Notional Critical Growth Assessment

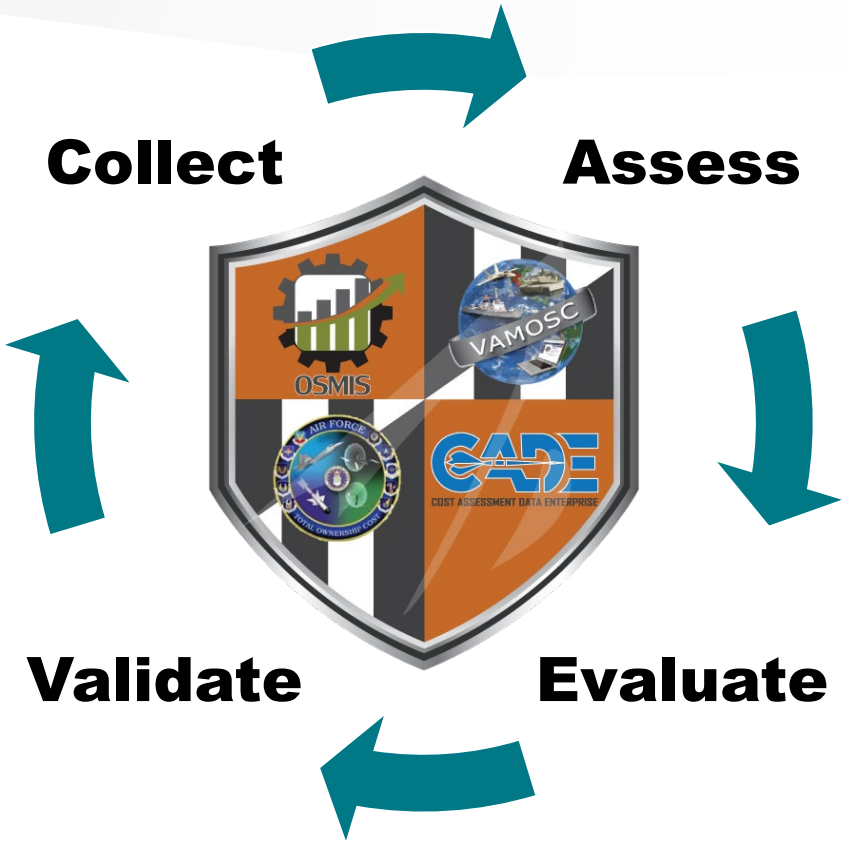
Cost Growth Category	Baseline Estimate (BY23$M)	New Estimate (BY23$M)	% Change	Critical Growth Assessment	Baseline Cost/Unit (BY23$M)	New Cost/Unit (BY23$M)	Per Unit % Change
Category A: 2018 to 2023	$21,568 (prev. ICE O&S)	$28,364	32%	Yes	$0.041	$0.049	20%
Category B: 2014 to 2023	$19,357 (orig. Baseline O&S)	$28,364	47%	No	$0.039	$0.049	26%

- Mitigation plan may be necessary based on critical cost growth results

*Per the **Sustainment Review Statute in 10 USC 4323**, "For a covered system with critical O&S cost growth, such submission shall include a remediation plan to reduce O&S costs or a certification by the Secretary concerned that such critical O&S cost growth is necessary to meet national security requirements."*

Additional Requirements

- Assess data source accuracy and completeness
- Compare program office expenditures against VAMOSC
- CSDR compliance:
  - Do contracts have approved plans in place?
  - What are the contract statuses?



Differences Across DoD Services

Differences Among DoD Services

- Terminology for Sustainment Reviews
- Implementation date of formal process
- Unique Sustainment Review processes
- Different commodities assessed
- Maintenance level type
  - Field Level
  - Intermediate Level
  - Depot Level
- Service level O&S cost resource
  - Army: OSMIS
  - Navy: Navy VAMOSC
  - Air Force: AFTOC

[1]Heavy expanded mobility tactical truck (2023) Wikipedia. Wikimedia Foundation. Available at: https://en.wikipedia.org/wiki/Heavy_Expanded_Mobility_Tactical_Truck (Accessed: April 27, 2023).
[2]Handling the San Antonio–class LPD (2022) U.S. Naval Institute. Available at: https://www.usni.org/magazines/proceedings/2019/january/handling-san-antonio-class-lpd (Accessed: April 27, 2023).
[3]X-51 Waverider makes historic hypersonic flight (no date) Air Force. Available at: https://www.af.mil/News/Article-Display/Article/116538/x-51-waverider-makes-historic-hypersonic-flight/ (Accessed: April 27, 2023).

Challenges in Sustainment Reviews

SR Scope Definition

Challenges

- Elements requiring "evaluation" or "analysis" of the life cycle sustainment plan may leave room for interpretation
  - "An analysis of the most cost-effective source of repairs and maintenance."
  - "An evaluation of the cost of consumables and depot-level reparables."
- LCCE for Sustainment Reviews contains more than operations and sustainment costs
- What is the scope of the program being evaluated?

Mitigation Techniques

- Assess which requirements are applicable to the program conducting the Sustainment Review
- Identify nuances of the programs support strategy to fit statute requirements
  - This can differ program to program based on whether organic or external support is used for sustainment efforts
- LCCE requires a full acquisition-to-demilitarization estimate
- Coordinate with OSD CAPE/Service Cost Center and program office to achieve concurrence on systems covered under Program of Record
  - New Variants
  - Configuration Changes

Data

Challenges

- CARDs tend to be an afterthought past acquisition phase milestone decisions
- Sustainment Reviews require a prior baseline to compare against
  - Acquisition phase baseline estimates can give a useful path to follow for the programs LCCE
  - 8 out of 9 FY21 Air Force Sustainment Reviews had no baseline cost estimate
- Assessment and adjudication of data from many disparate sources
  - Outdated
  - Poorly documented data origin

Mitigation Techniques

- Assess CARDs health well in advance of the kickoff date for the Sustainment Review
- Allocate extra time prior to the kickoff date to define the scope of the program's LCCE
- Communication with data providers is essential early in the Sustainment Review development process
  - Consult for guidance on data related issues with OSD CAPE/Service Cost Center supporting the SR
  - Assess data quality

Collaboration/Coordination

Challenges

- Maintain alignment in messaging between functional areas during SR
  - Internal: program cost team, product support team, field activities, ISEA, logistics team, etc.
  - External: OSD CAPE, Service Cost Center, Congress
- Reconciliation is required between the Program Office and CAPE/Service Cost Center

Mitigation Techniques

- Consult with Assistant Program Managers of the system
- Create recurring communication in the form of IPT meetings to help with:
  - Establishing common working folders
  - Adjudicating data
  - LCCE status update discussions
  - Data maturation
- Frequent communication on deliverable status with OSD CAPE/Service Cost Center to assess viability

Workload Planning

Challenges

- Sustainment Reviews require effort similar to a typical milestone event
  - Additional analyses and evaluations of the program's sustainment go beyond the typical LCCE
- When should the Sustainment Review process begin?
  - OSD CAPE recommends a kickoff meeting 6 months prior to the event
- Sustainment Review effort must be balanced with other program support
  - What is the level of cost support necessary for SR?
  - Number of internal/external reviews of material before submission

Mitigation Techniques

- Familiarize yourself with the requirements of 10 USC 4323 in advance of Sustainment Review kickoff
  - Prepare for how to satisfy requirements beyond the LCCE
- Based on experience - 9 months ahead of the SR due date allows for preliminary preparation and program assessment for cost analysts
  - Know upcoming schedule of programs requiring a Sustainment Review event
- Assess your ability to staff the Sustainment Review
  - Experience working in teams of 2 full-time cost estimators during the Sustainment Review process
  - Do you have access to analysts with prior experience?

Estimating

Challenges

- Tie operational performance into the LCCE
  - Actual reported data should be available to assess at this point of the program's life cycle
- Ensure the cost estimate reflects the findings of the SR
- What steps can be taken to ensure smooth updates to the estimate for future SRs?
- Evaluating/estimating cost based off historical/future operational performance

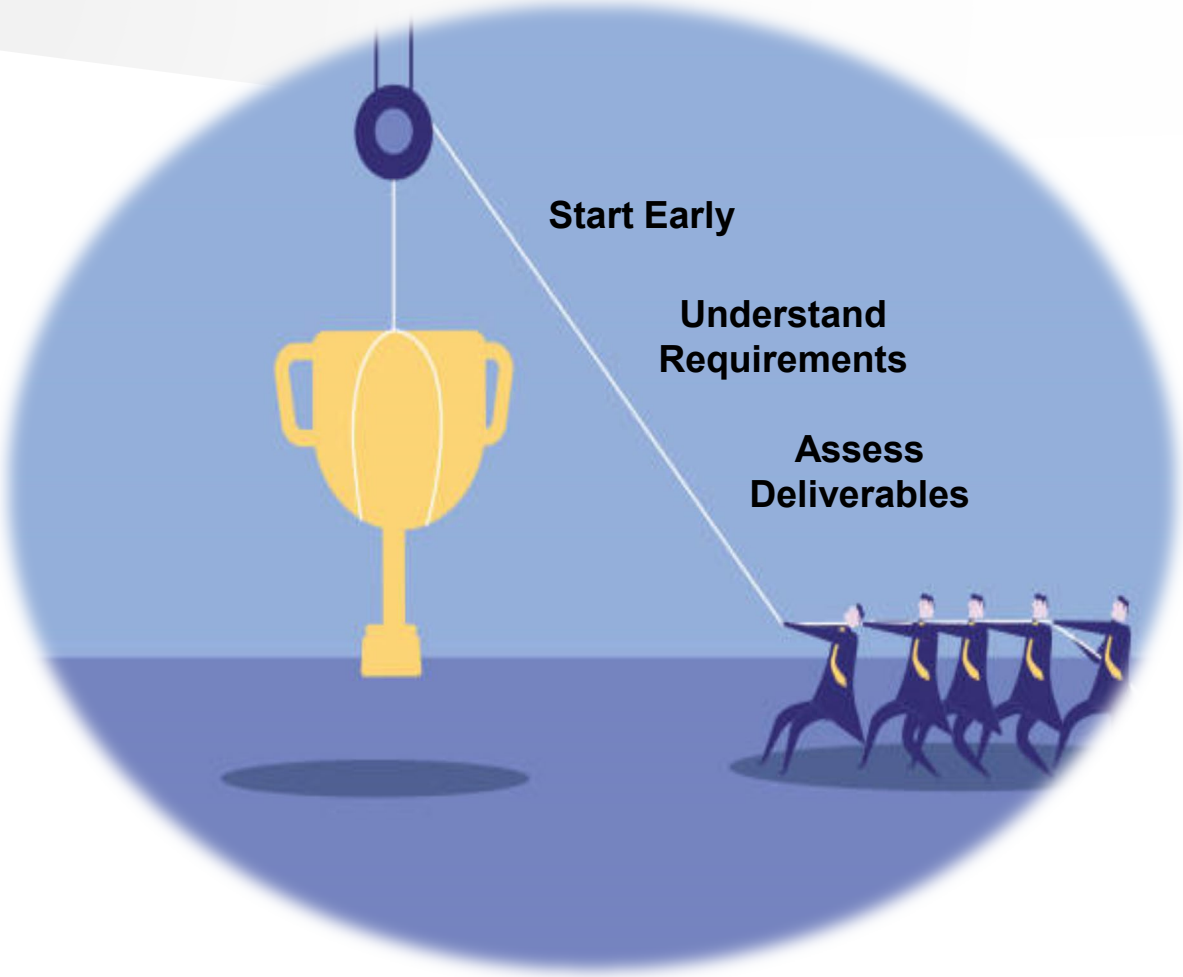
Mitigation Techniques

- Utilize RAM metrics and operational hours/miles into calculations
  - Maintenance Ratios
  - Mean Miles/Time Between Failure
- Align major points of the product support strategy assessment and the cost estimate
  - Do funding requests address issues regarding system availability?
- Take steps to reduce rework during future SRs
  - Detail documentation of data analyses and transformation tools
  - What kind of calculations were performed on data before/during cost model development?
- Assess historical costs and changes to the Product Support Strategy to accurately depict future O&S cost

Final Takeaways

Final Takeaways

- Sustainment Reviews are required every 5 years for ACAT I programs under Title 10 US Code 4323
  - New requirement (FY17)
  - Scope of the SR has expanded since initial rollout to better understand key cost drivers impacting program operational efficiency and sustainment cost growth
- Sustainment Reviews require collaboration across multiple functional areas
  - Internal: program cost team, product support team, field activities, ISEA, logistics team, etc.
  - External: OSD CAPE, Service Cost Center, Congress, etc.
- Sustainment Review cost deliverables:
  - CARD: Provides the programmatic and technical baseline of the program
  - LCCE: Total acquisition and O&S cost assessment to measure O&S cost growth
- Two types of O&S cost growth evaluations – Category A and B
  - Remediation plan to reduce O&S costs must be submitted if critical growth exists with certification by the Secretary
- Main Challenge Areas
  - SR Scope Definition
  - Data
  - Coordination/Collaboration
  - Workload Planning
  - Estimating



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Thank you!

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