Aeronautical Systems Center

Dominant Air Power: Design For Tomorrow…Deliver Today

Integrated Risk Management (IRM) Revitalization Oct 07

U.S. AIR FORCE

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Agenda

- **IRM Process Background**
- **Integrated Risk Assessment Overview**
- **IRM Improvement Efforts**
- **Linkage with Air Force level efforts**
- **Status of Risk Management Actions**

IRM Process Background

- **IRM survey revealed confusion in Acquisition Weapon System (WS) Program Offices**
  - **Poor results**
  - **Lack of understanding**
- **Inconsistent process across WS life cycle**
  - **Varying levels of rigor**
  - **Process and knowledge base not documented across phases**

IRM Process Background

- **Pockets of excellent work**
  - **ACE pre-contract award risk workshops**
  - **Engineering (EN)-facilitated Integrated Risk Assessments (IRAs)**
  - **Finance (FM)-executed schedule and cost risk assessments for annual Program Office Estimate (POE)**

- **Efforts not well coordinated and IRA execution was not prioritized**

- **IRM joint process between Engineering and Finance. Program management not involved.**

Integrated Risk Management

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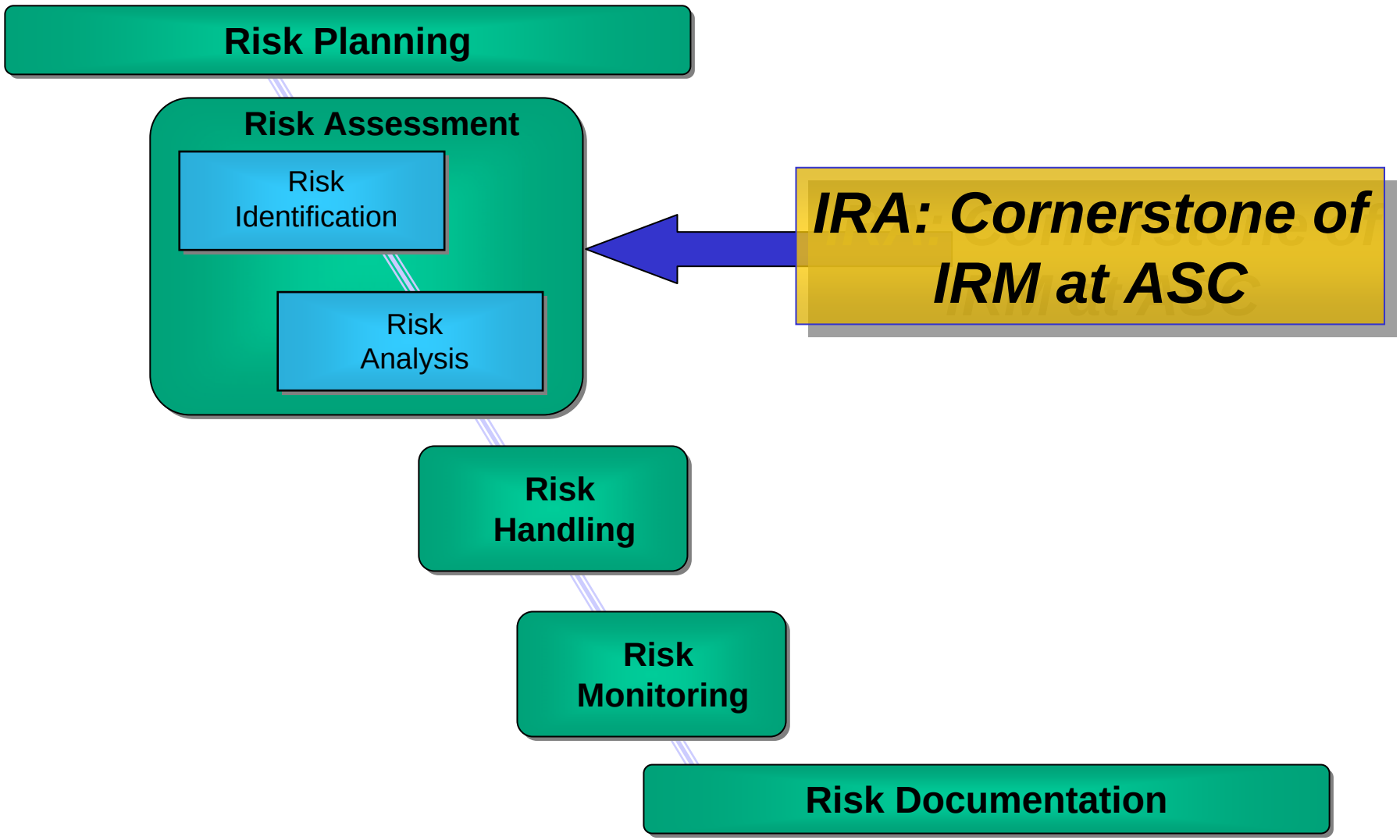

What is an Integrated Risk Assessment?

- **Identifies and analyzes program risks against performance, schedule and cost objectives**
  - **Reveals impacted resources**
    - **Performance - Schedule - Cost**
  - **Develops more realistic schedule and cost estimates via Monte Carlo simulations with revealing 90% confidence interval**
  - **Should coincide with the annual life cycle Program Office Estimate (POE)**
- **Two Segments**
  - **Risk identification (qualification – ASC/AE and FM)**
  - **Evaluation and analysis (quantification – ASC/FM)**

Risk Assessments

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Pre-award, pre-MS B
Risk workshop (ASC/AE)

Input: **Scope, Purpose, Consequence Definitions**

Evaluation

Identification

Analyses

Technical Performance Assessment

IMS Schedule Assessment

POE Cost Estimate

Output:
Risk Matrix
Schedule
Cost Estimate
List of Risks
Risk Report
Presentations

P/CS*

Risk Impacts:
- Technical
- Schedule
- Cost

Risk+© schedule impacts Crystal Ball®

Risks:
- Technical
- Schedule
- Cost

- Best case
- Worst case
- Most likely

Integrated Risk Assessment (AE, EN and FM)

Outputs from both venues lead to more effective risk handling and monitoring

IRM Process Background, cont

- **ASC Commander Policy**
  - **"Complete an annual IRA, ideally in conjunction with the annual program life cycle cost estimate (POE) to ensure risks/risk handling are quantified and appropriately budgeted."**
- **Policy is not followed**
  - **Insufficient manpower to execute policy**
    - **Both in wings and staff to support**
  - **No tracking of IRA activities**
- **Inconsistent IRA and POE requirements**
  - **POE policy allows requirement waiver for programs meeting certain criteria**
  - **No similar policy for IRAs**

IRM Improvement

- **Risk Staff: program management, engineering, and financial management began risk management process advancement endeavors**
- **ASC Leadership process improvement offsite (AFSO21/Balanced Scorecard) identified two risk management initiatives**
- **Consolidated staff and Balanced Scorecard initiatives into single effort**
  - **“Improve risk vision, advocacy and processes”**

AF-Level Process Improvement

- **Develop and Sustain Warfighter Systems (D&SWS) Process Improvement Team**
  - **Continuous Capability Planning Sub-Process Team**
    - **Recommend process improvements, initiatives and metrics**
  - **RM is initiative due to high-level interest**
    - **Labeled as "enduring process" throughout life cycle**
    - **Objective to standardize processes, definitions, tools**
    - **SAF ACE identified as process owner and Implementation Team Lead**

Risk Management Improvement Completed Actions

- **Refine organizational responsibilities**
  - **AE/EN/FM joint owners of IRM process**
  - **AE designated as ASC risk management lead**
  - **EN IRM Tech Expert moved to AE to increase effectivity, efficiency, and consistency**
- **Ensured risk aspects of Probability of Program Success (PoPs) assessment tool was incorporated into risk assessments**
- **Ensure uniform risk training across ASC**

Risk Management Improvement
Current Action

- **Improving efficiency and effectiveness of IRA process**
  - **Align need for high-confidence programs with manpower limitations**
  - **Prioritize programs for IRAs beginning Winter 07**
- **Beta test using FM's Apr 06 PoE waiver process data to determine applicability to IRA waivers**
  - **Updated data with Wing Commanders and Directors of Engineering**
  - **Determined PoE waiver good starting point for IRA waiver or tailored IRA**

POE Waiver Criteria

- **ACAT III IRA Waiver Process**
  - **Low cost/risk**
  - **Cost Contract**
  - **Firm Fixed Price ≤ $50M**
  - **Time and Materials contract**
  - **Level of Effort programs**
  - **Programs in last year of effort**
  - **Short duration programs (1 year or less)**

Risk Management Improvement Current Actions, cont

- **Complete waiver process of ACAT III programs**
- **Prioritize remaining programs (ACAT I, II, and required ACAT III)**
  - **Event driven rather than annual**
  - **Emphasize high risk and new programs**
- **Develop schedule for IRA execution**
- **Update ASC/CC IRM policy**

IRA waiver does not eliminate need for day-to-day risk management

IRA Prioritization Schedule

- **Emphasis new programs**
- **Ensure IRA completed early in program**
  - **Prior to PDR**
  - **Complete early assessment of performance, schedule and cost risks and impacts. And Maintain!**
  - **Establish robust risk management practices at the onset of the program**

Risk Management Improvement Ongoing Actions

- **Improve and document total program Life Cycle risk process**
- **Ensure consistency with DoD, DAU, AFIT, CSE, and INCOSE**
- **Create ASC-wide risk IPT with reps from AE/EN/FM and each WS program office**
- **Increase knowledge and awareness of risk management**
- **Develop cadre of trained facilitators**
- **Evaluate adequacy of available manpower resources**

Comments/Questions?`

Backup

IRM Survey Results

- **IRM survey revealed confusion on requirements in Wings**
  - **Poor results**
  - **Lack of understanding**
- **Inadequate manpower in Wings and staff organizations to support IRA policy**
- **Disconnects between annual Program Office Estimate (POE) and IRA policy letters**
  - **IRA and POE requirements are linked**
    - **Results of IRA input to POE**
    - **Can complete IRA without POE; however, POE is not considered complete without IRA**
    - **Identification of risks alone does not constitute an IRA**
  - **Current policy letters are out of sync**
    - **POE policy allows waiver under certain conditions**
    - **IRM policy allows for no IRA waiver**

Risk Workshop vs. IRA

- **Significant difference in AE Risk pre-award workshops and Facilitated IRA**
  - **1 day vs 2 weeks**
  - **Focus primarily on high level programmatic risk assessment vs total risk assessment (cost, schedule, performance)**
    - **Shallow dive vs deep dive**
    - **Risk of getting on contract vs total program risks (cost, schedule, performance)**

Technical Performance Assessment

- **Insert description**

Schedule Risk Analysis (SRA)

- **Risks identified during IRA are quantified in and added to the Integrated Master Schedule (time)**
- **Accomplished for critical path elements (time constraints may preclude expanding SRA to other elements)**
- **Best case, most likely and worst case results input to Risk+ schedule assessment tool, Monte Carlo analysis run**
- **Results in additional time (hrs, months, etc.) and dollars needed for higher confidence schedule**

Cost Risk Analysis (CRA)

- **Risks identified during IRA are quantified in and added to the cost estimate (dollars)**
- **Accomplished at lowest WBS element appropriate**
- **Best case, most likely and worst case results input to Crystal Ball cost assessment tool, Monte Carlo analysis run**
- **Results in additional costs required for higher confidence estimate**

Risk in the Acquisition Life Cycle

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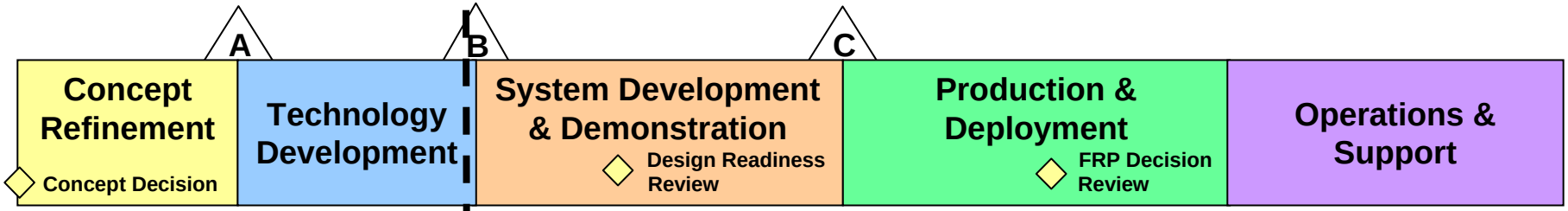

ASC/AE-facilitated Risk Workshop*

Pre-award, Pre-MS B
Output: Risks identified and plotted on 5x5 matrix
Duration: 1-3 days
Location: ASC/AE facility
Involves Program Office, user, contractor (if sole source)
Technical Analysis accomplished on ability to execute, schedule analysis accomplished on getting on contract, not program's IMS
ASC/CC Policy: N/A

***Can occur at any time throughout the life cycle in conjunction with contractual actions (pre MS B, LRIP, pre MS C, etc)

ASC/EN- and FM-facilitated Integrated Risk Assessment

Post-award, annual requirement throughout acquisition life cycle
Output: Risks identified and plotted on 5x5 matrix, risk impacts quantified, risk impacts analyzed via statistical analysis, additional time and budget required to complete program calculated and added to IMS and POE
Duration: 2 weeks not including prep time and post-workshop analysis time
Location: Offsite
Involves Program Office (all functionals), contractors, subs, users, subject matter experts, advisors
Technical, Schedule and cost analyses accomplished against ability to meet contract requirements
ASC/CC Policy: 05-004

Day-to-day risk management should occur jointly with the contractor

Recent Policy Directives

- **ASC/CC Policy Memo 05-014: PEO Policy for Systems Engineering**
  - **Requires more rigorous systems engineering with risk management as a key aspect**
  - **https://www.asc.wpafb.af.mil/policy_letters/policymemo05-014.pdf**
- **ASC/CC Policy Memo 05-003: Policy on Life Cycle Estimates**
  - **Programs to provide Life Cycle Cost Estimates including integrated risk assessments reflecting 90% confidence of meeting our commitments**
  - **https://www.asc.wpafb.af.mil/policy_letters/policymemo05-003.pdf**

Recent Policy Directives

- **ASC/CC Policy Memo 05-004, Policy on Integrated Risk Management**
  - **Requires annual Integrated Risk Assessment**
  - **https://www.asc.wpafb.af.mil/policy_letters/policymemo05-004.pdf**
- **ASC/CC Policy Memo 06-007, Policy on Environment, Safety and Occupational Health (ESOH) Programmatic Risk Management Integration into Acquisition and Systems Engineering Processes**
  - **Requires annual programmatic ESOH risk assessments in conjunction with the IRA**
  - **https://www.asc.wpafb.af.mil/policy_letters/policymemo06-007.pdf**

Sample Risk Definitions

Tailorable Risk Grid

Consequence → Higher

Probability ↑ Higher

	Negligible (N)	Minor (Mi)	Moderate (Mo)	Serious (S)	Critical (C)
5 91-100%	Cost = < 1% Variance Schedule = < 1 Wk Var Technical = Meets Performance	Cost = 1-5% Variance Schedule = 1-4 Wk Var Technical = Minimal Impact to Performance	Cost = 6-10% Variance Schedule = 5-8 Wk Var Tech/Performance = Acceptable Work-around	Cost = 11-20% Variance Schedule = 9-12 Wk Var Tech/Performance = Degraded	Cost = > 20% Variance Schedule = > 12 Wk Variance Tech/Performance = Impacted
4 61-90%	Cost = < 1% Variance Schedule = < 1 Wk Var Technical = Meets Performance	Cost = 1-5% Variance Schedule = 1-4 Wk Var Technical = Minimal Impact to Performance	Cost = 6-10% Variance Schedule = 5-8 Wk Var Techl/Performance = Acceptable Work-around	Cost = 11-20% Variance Schedule = 9-12 Wk Var Tech/Performance = Degraded	Cost = > 20% Variance Schedule = > 12 Wk Variance Tech/Performance = Impacted
3 41-60%	Cost = < 1% Variance Schedule = < 1 Wk Var Technical = Meets Performance	Cost = 1-5% Variance Schedule = 1-4 Wk Var Technical = Minimal Impact to Performance	Cost = 6-10% Variance Schedule = 5-8 Wk Var Tech/Performance = Acceptable Work-around	Cost = 11-20% Variance Schedule = 9-12 Wk Var Tech/Performance = Degraded	Cost = > 20% Variance Schedule = > 12 Wk Variance Tech/Performance = Impacted
2 11-40%	Cost = < 1% Variance Schedule = < 1 Wk Var Technical = Meets Performance	Cost = 1-5% Variance Schedule = 1-4 Wk Var Technical = Minimal Impact to Performance	Cost = 6-10% Variance Schedule = 5-8 Wk Var Tech/Performance = Acceptable Work-around	Cost = 11-20% Variance Schedule = 9-12 Wk Var Tech/Performance = Degraded	Cost = > 20% Variance Schedule = > 12 Wk Variance Tech/Performance = Impacted
1 0-10%	Cost = < 1% Variance Schedule = < 1 Wk Var Technical = Meets Performance	Cost = 1-5% Variance Schedule = 1-4 Wk Var Technical = Minimal Impact to Performance	Cost = 6-10% Variance Schedule = 5-8 Wk Var Tech/Performance = Acceptable Work-around	Cost = 11-20% Variance Schedule = 9-12 Wk Var Tech/Performance = Degraded	Cost = > 20% Variance Schedule = > 12 Wk Variance Tech/Performance = Impacted

Legend: Low Medium High

Integrated Risk Management Survey

- **Does your program have a Risk Management Plan (RMP)?**
- **Does your program have an Integrated Master Schedule (IMS)?**
- **Does your program have a current Integrated Risk Assessment (IRA)?**

Survey Top level Findings

- **Lack of common understanding of requirements, policy and utility of these items**
  - **Many have "never heard of the IRA process"**
  - **Many believe "I've got Risk covered"**
    - **I did an AE Risk Workshop**
    - **I've got my risks plotted on a matrix!**
    - **Yes I had an IRA. It's scheduled next year!**
- **Organizations lack training in RMPs, IMSs, and IRAs**
- **Programs are not following current ASC IRM policy relating to RMP (64%), IMS (67%), IRA (56%)**
  - **Confusion on how to answer questions**
  - **RMP and IMS stats seem to be inaccurate, IRA stat is inaccurate**

Program Risk Not Adequately Understood or Managed at ASC

D&SWS Integrated "To Be"

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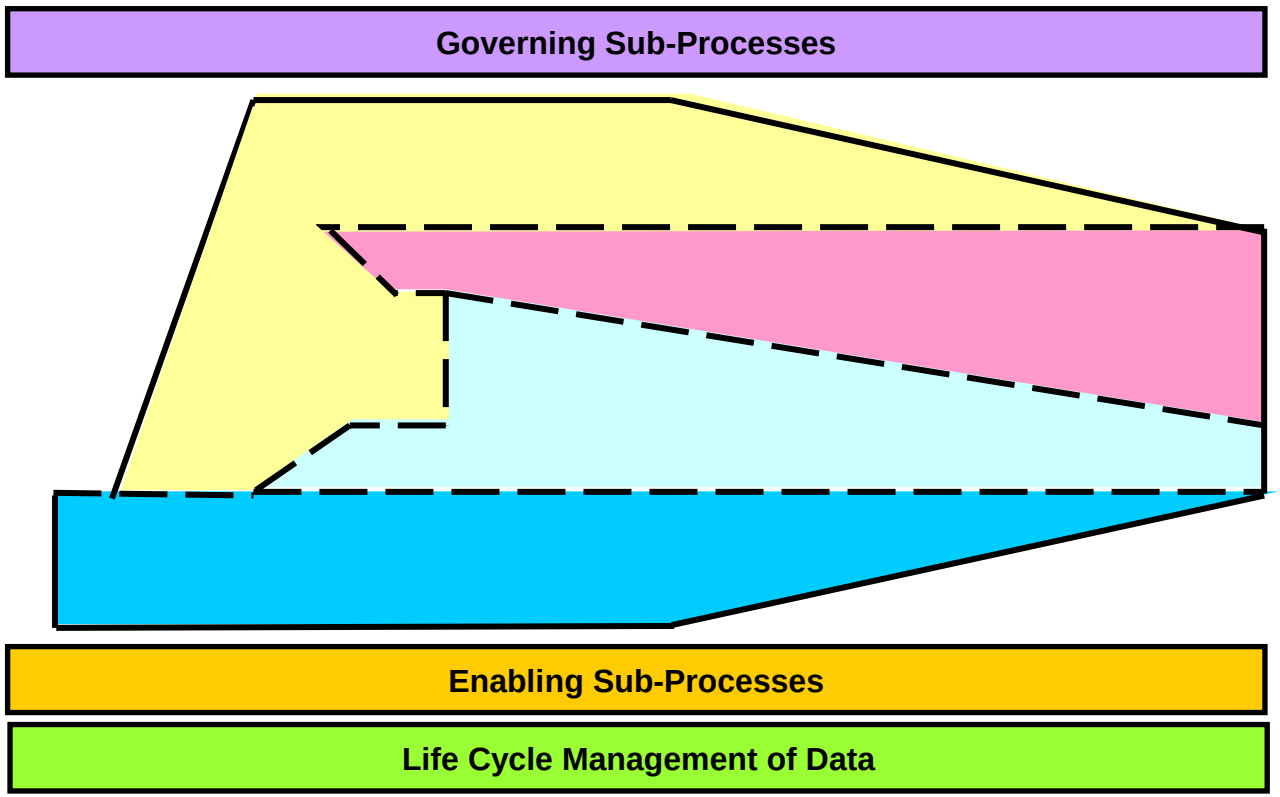

Attributes

- Minimize Total Ownership Costs
- Capability Focus Throughout Life Cycle
- High Confidence Programs
- Transition Mature Technology
- Tight Stakeholder Partnerships
- Right Data for Right Decision at Right Time

Enduring Processes

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