Aerospace Mission Design and Analysis Across the Engineering “V”

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Common aerospace challenges

• More sophisticated missions
• More complex, faster acquisition cycles
• More demanding engineering processes
Concept development example: A2AD
Test example: air system DT&E
Training example: logistics war game
Operations example: task planning

- Satellite Tracking: Determine Uncertainty Based on Number of Tracking Ops
  - Satellites
    - MEO Sats
  - Tracking Ops Per Sat: 10
- Tracking Networks
  - Space Fence
  - Missile Defence Radars
  - CONUS Stations
  - OCONUS Stations
- Responses to Evaluate:
  - Percent of Tracks Scheduled
  - Intrack Uncertainty
  - Daily Ops Cost Estimate

Percent of Tracks Assigned (%): 32.09
Uncertainty (m): 888.599117755381
Estimated Operational Cost ($): 76950.7
AGI background

• Commercial software product company

• Founded 1989

• Aerospace mission modeling, simulation, and analysis

• Phoenix Integration collaboration since 2003
Lifecycle Enterprise Engineering Mandates

- **Lifecycle** – Integrate mission with engineering and connect models across entire lifecycle
- **Process Evolution** – Solve problems today; adapt to tomorrow’s processes
- **Stakeholders** – Support all engineering disciplines, mission areas, and user personas
- **Fidelity Spectrum** – Account for graphical models through high-fidelity, physics-based models
- **Integration** – Avoid need for tool-to-tool, project-by-project integrations
- **Orchestration** – Execute simulations composed from models of models
Process Evolution

![Bar Chart]

- Culture
- Education & training
- Organizational structure / boundaries
- Talent availability
- Tool fragmentation
- Management support
  - Complexity of tools
  - Price / cost
  - IT / infrastructure
  - Data management
  - Licensing restrictions
  - Data translation

People: 80%
Technology: 0%
Process: 20%

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Summary

• Integrate mission and engineering across lifecycle

• Important tool attributes include:
  • Open APIs, open data, and interoperability
  • Multiple levels of fidelity
  • Orchestration of models of models

• Learn by doing
  • Solve today’s problems
  • Evolve tomorrow’s solutions

• ModelCenter is a key component