Flight Software Ground System Impacts: Motivation

- Spacecraft flight software is increasing in size and complexity
- Flight software has major and increasing cost and schedule impacts on ground systems
- Greater complexity and capability drive rethinking system design assumptions, both ground and space

Increasing cost and schedule impacts!
Flight Software Ground System Impacts: Increasing Impacts

<table>
<thead>
<tr>
<th>Flight Software</th>
<th>Ground System Impacts</th>
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<tr>
<td>Changing processor types and architectures</td>
<td>Changes to core memory management functions</td>
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<tr>
<td>Increased autonomy</td>
<td>New requirements / late requirement changes impact cost and schedule</td>
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<td>Increased fault handling complexity and autonomy</td>
<td>New and custom tools</td>
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<td>Increasing size of telemetry points to monitor</td>
<td>Multiple spacecraft interfaces must be supported</td>
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<td>Stored program languages</td>
<td>More operator requirements to provide flight software situational awareness</td>
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<td>Variations in spacecraft product</td>
<td>Changing operations concepts</td>
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<td>Proprietary interfaces</td>
<td>Increasing payload processing</td>
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Flight Software Ground System Impacts: Panel Topics

- Part 1: Flight software trends and current issues involving flight software impacts on ground systems
  - Flight software evolution and coming impacts
  - Interface challenges and the impact on the operator
  - Role of operations concepts in partitioning functionality

- Part 2: Solutions, actions, and new directions
  - Ways to improve communication and collaboration between flight and ground software development teams
  - Architecting to avoid local optimizations to flight or ground software
  - Decoupling flight and ground software
  - Developing and applying appropriate standards
  - Application of modeling and architectural methods

Panel discussions
Flight Software Ground System Impacts: Panel Discussion

- Panelists:
  - Vera Horochask: Boeing Satellite Systems
  - Anneli Kyner: Boeing Satellite Systems
  - Jane Marquart: NASA Goddard Space Flight Center
  - Robert Rasmussen: Jet Propulsion Laboratory
  - Mary Rich: The Aerospace Corporation
  - Gerry Simon: Integral Systems, Inc.
  - Takahiro Yamada: Japan Space Exploration Agency

- Moderator:
  - Mark Walker: Integral Systems, Inc.

Finding Solutions!