

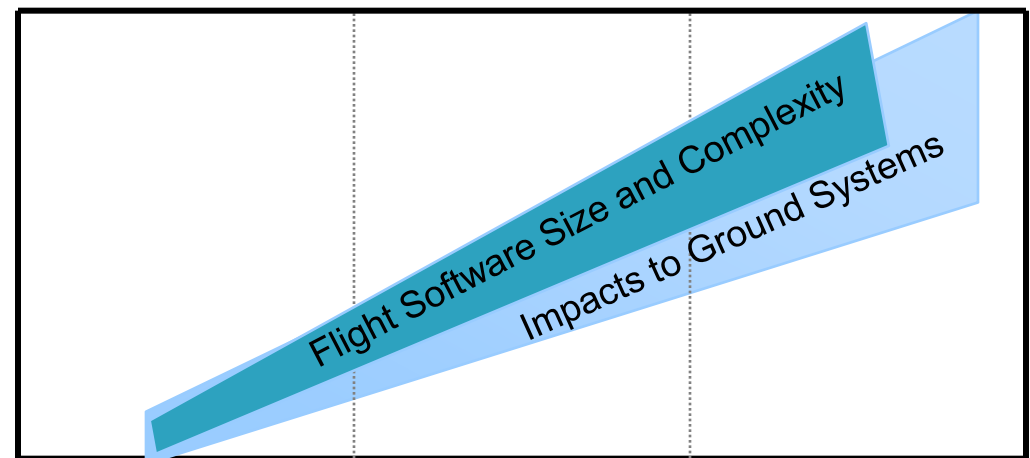


Flight Software Ground System Impacts: Motivation

- ▶ 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

Flight Software

- Changing processor types and architectures
- Increased autonomy
- Increased fault handling complexity and autonomy
- Increasing size of telemetry points to monitor
- Stored program languages
- Variations in spacecraft product
- Proprietary interfaces
- Increasing payload processing

Ground System Impacts

- Changes to core memory management functions
- New requirements / late requirement changes impact cost and schedule
- New and custom tools
- Multiple spacecraft interfaces must be supported
- More operator requirements to provide flight software situational awareness
- Changing operations concepts



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 Horoschak 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!