

## Session 4 Space Robotics

Erick Dupuis (Canadian Space Agency) Dependability in Space Avionics: The Need for a Paradigm Shift

Issa Nesnas (JPL) CLARAty: Improving Software Reliability for Robotic Space Applications

Covered issues of reliability for two different types of robotics used in space:

Space Assembly (teleoperators)

Rovers

# Dependability in Space Avionics: The Need for a Paradigm

Questioned the way robotics are qualified as reliable for use in space

Testing done in “historic” ways

Subsystem models, failure analysis, test and simulation. To validate and get “qualified operating modes”

Then combine these motions into preplanned complex operations which are extensively simulated. Don’t allow for changing rigid plans. Astronauts given a menu to follow:

Dangerous assumptions and problems:

- Don’t worry about software errors
- Don’t use analytic techniques
- Inconsistent simulations
- Don’t take into account operator (Astronaut errors.)

# CLARAty: Improving Software Reliability for Robotic Space Applications

Collaboration of JPL and others to get commonality and reusability in rover designs.

They have a wealth of different designs but have to verify each of them independently, because they are all different.

They would like to be able to develop a reusable frameworks that would allow more efficient formal verification, testing and inherent reliability

Ways were presented to categorize and hopefully come up with reusable software and hardware components in space missions.

Deploying this methodology at several sites in heterogeneous robots will improve reliability and infrastructure.