GSAW2007
Ground System Architectures Workshop

# *Working Group Session 4G:*

# Goal-Based Operations


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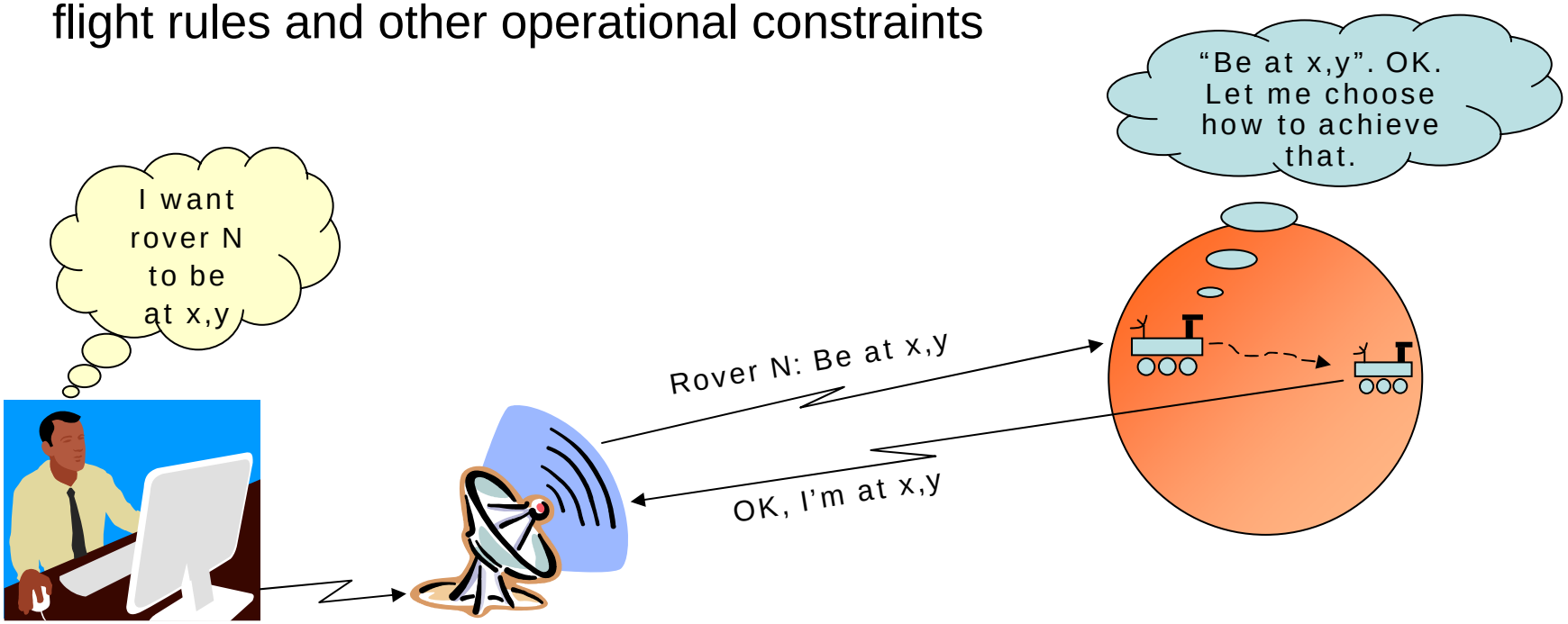
# What is Goal-Based Operation?

**A "goal" is an explicit expression of operator or customer <u>intent</u>**

- Specify *what* you want to happen, not *how* to accomplish it
- Express intent in a declarative and explicitly verifiable form
- Carry expression of intent into uplink products
- Allow system to select among alternatives to achieve goals
- Intent includes not only activity objectives but also flight rules and other operational constraints



# Why Should You Care?

## Flexibility, reliability, and robustness

- Systems have a much better chance of …
  - preserving planned functionality, because they know what was *intended* by the original plan
  - responding to opportunities, because they can quickly implement intent *according to local conditions*
- Checking plans becomes more rigorous and complete
- Execution directly monitors results, enabling local fault responses

## Operability

- Enables more concurrent, iterative operations planning

## Inspectability

- More readable *and* verifiable than sequences, sequence generators, and rule bases

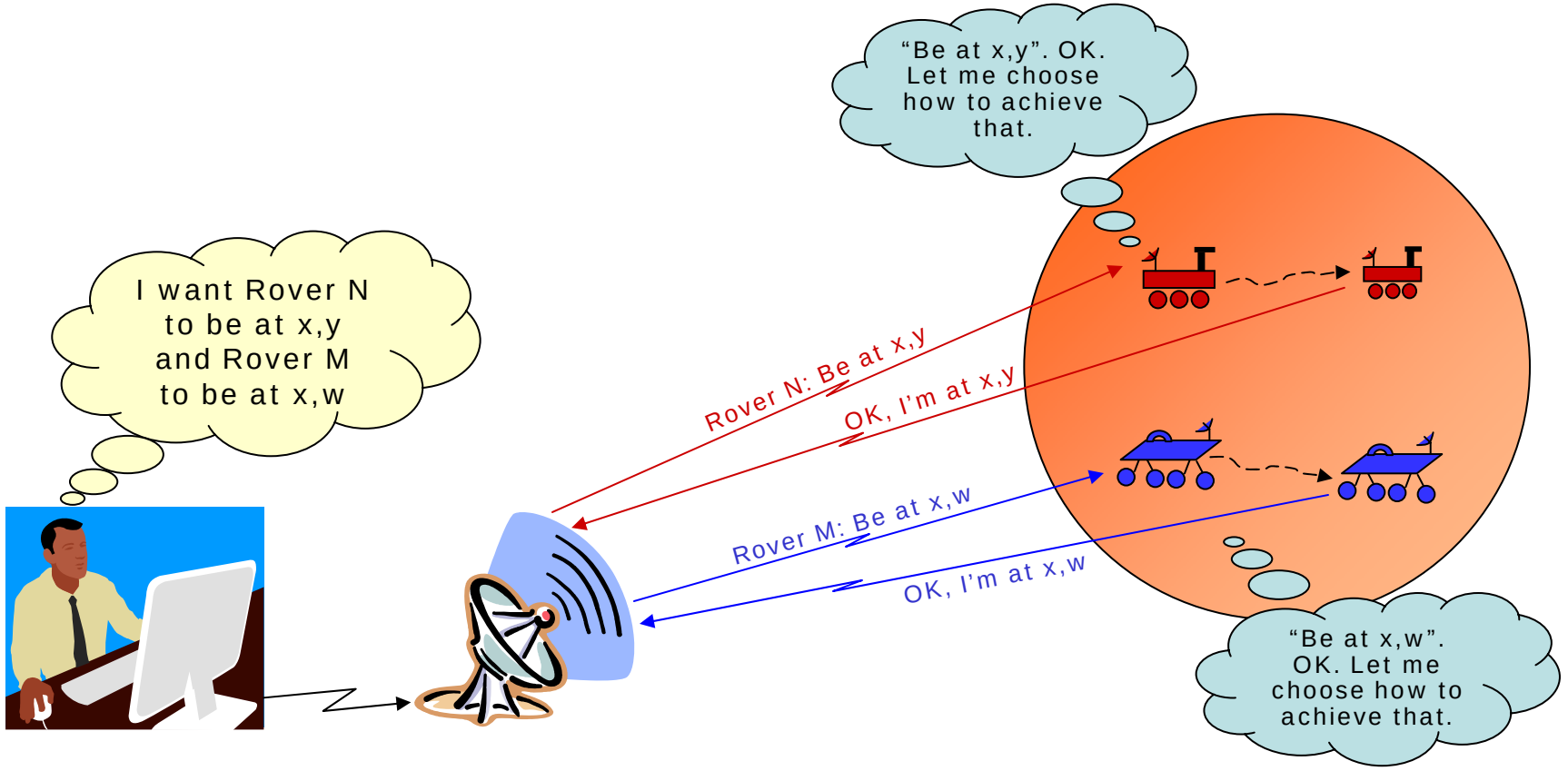
## Automation

- Goals are amenable to automated reasoning using domain models
- Easier to encode domain models than rules

# Interoperability and Standards

**Interoperability and reusability**

- Goals enable an interoperability standard for control
- Same *high-level* goals can be used by diverse elements of a system
- Hierarchical nature of goals makes them more reusable



# What's the Objective of this Working Group?

**Objectives:**

- Build a community of interest in goal-based ops
- Explain motivations and benefits
- Explore consequences of goal-based ops
- Brainstorm roadmap issues, concerns, ideas, etc

## Topics of Interest

- Definition of goal-based operation
- Human supervisory dialogue with goal-operated systems
- Visualization of goals and states
- Operations process
- Operations cost model
- Planning and execution
- Verification and validation
- Resource management
- Fault protection
- Barriers to infusion and adoption
- Areas for standards