

# Integrating Robotic and Human Exploration

Dr. Suzy Young

# Robotic and Human Exploration

- Space
- Military
- Homeland Defense
- Manufacturing
- Medical
- Commercial



What is the role of science and technology?

Near, Mid and Far Term?

# Robotic and Human Exploration

- Generation Robots:
  - First Generation
    - Intellectual Capacity, Lizard.....2010
  - Second Generation
    - Intellectual Capacity, Mouse.....2020
  - Third Generation
    - Intellectual Capacity, Monkey.....2030
  - Fourth Generation
    - Intellectual Capacity, Human.....2040 - 2050

Hans Moravec, CMU RI, 1997

# Systems Approach

Power – organic garbage

Actuation – elastic, shape memory alloys, electroactive polymers

Sensing – haptic, vision, effectors

Locomotion – hopping, skating, slithering

HR Interaction – visual, speech, socialization

Intelligence & Autonomy

Software Intensive!

# Robotic and Human Exploration

- Systems Approach
- Intelligence
- Complex Environments

It will take:

- National priority
- Resourcing
- Time

Innovative System Solutions

It will be revolutionary and yield huge ROI