Objectives for Human Missions to NEOs

Policy and Public Engagement

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Multiple approaches for human NEO missions

Thoughtful approach to human NEO missions needed to ensure the maximum return on investment
Deep Space Capabilities Theme: Key Observations

• Objectives
  – The mission should contribute to planetary defense and economic expansion
  – Demonstrate the ability for extended operations in deep space
    • Hardware, software reliability and repair
  – Build in the ability to respond in real-time to new information
  – Develop dust mitigation techniques

• Activities
  – Ensure open communication between the crew and the people
  – Develop robotic installation techniques
  – Develop adequate radiation shielding, mitigate reactive chemistry
Scientific Research Theme: Key Observations

• **Objectives**
  – Characterize resource rich targets, structural stability and chemistry
  – Identify human factors, risks of extended missions
  – Learn more about the beginning of the solar system

• **Activities**
  – Safely remove a core drill sample at multiple depths
  – Leave a scientific network for tracking and seismic monitoring
  – Take multiple samples across a NEO population

• **Target Characteristics**
  – Would robotic precursor missions synchronize with human missions?
Planetary Defense Theme: Key Observations

• Objectives
  – Planetary defense (protection) plus economic drivers (economic growth) should be the level 1 objective
  – Be able to answer all questions that would enable you to more accurately characterize the NEO and its orbital location in order to support mitigation decisions about similar bodies

• Activities
  – Test deflection techniques
  – Develop an international working group on threat mitigation
  – Safely remove a core drill sample
  – Leave a scientific network
  – Take multiple samples across a NEO population

• Target Characteristics
  – Accessibility
  – Representative of population of interest and scientifically interesting? Commercially useful? Potentially hazardous?
Economic Expansion/ISRU

- **Objective**
  - Identify valuable materials

- **Activities**
  - Develop means for gathering resources from NEOs
  - Develop a NEO resource map
  - Grapple and bring a portion of an asteroid near the Earth/moon