Objectives for Human Missions to NEOs

Precursor Group 1
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Deep Space Capabilities Theme: Key Observations

• Objectives
  – Demo human tolerance for extended missions
  – Determine potential resource utilization characteristics
  – Demo tele-operation

• Activities
  – Sampling
  – Construct infrastructure
  – Demo autonomy and light time delay
  – Demo tools for deep space use

• Target Characteristics
  – Extended mission duration in deep space
  – Water rich target
  – Larger than 50 meters
  – Short mission time
  – Slow rotation
Scientific Research Theme: Key Observations

• Objectives
  – Determine History and origin of NEO’s/ composition/ structure
  – Sample return
  – Understand frangibility and behavior in microgravity

• Activities
  – Conduct in-situ spectrometry
  – Emplace long-term observatory (space weather)
  – Intelligent human sample selection and placement of geophysical experiments

• Target Characteristics
  – Larger, water rich, containing rubble pile
  – Binary, if possible
Planetary Defense Theme: Key Observations

• Objectives
  – Don’t take a non-threatening asteroid and turn onto a hazardous course
  – Demo ability to modify delta V
  – Determine structure and composition
  – Understand fragility and breakup potential

• Activities
  – Emplace sensors
  – Emplace delta V device
  – Demo mitigation concept

• Target Characteristics
  – Select NEO representative of most likely statistical threat
Backup
## Magnitude of Findings

### Theme

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- Overarching observations
• Precursor missions: 1) telescopic recon, 2) in-situ spacecraft
• Dust/regolith properties as they relate to safe-operations
Possible Breakout Discussions for Tomorrow

• Optional Chart