

Open Global Community NEO Workshop
**Session 4: NEO Characteristics for
Safe and Meaningful Human Exploration**

Session Conclusions/Highlights

- 1. NEOs show a range of diversity in physical characteristics of interest for human exploration**
 - **Some useful constraints exist based on data in hand**
 - **Dynamical studies suggest range of proximity operations options exist**
- 2. Characterization of candidate NEO targets for human exploration must (should?) include:**
 - **Internal structure/regolith properties as function of various parameters (context of anchoring)**
 - **Dust/regolith properties/dynamics (context of nuisance/hazard, response to interaction)**
 - **Activity/debris/satellites (context of nuisance/hazard, response to interaction)**
 - **Composition (context of toxicity/collection/handling)**
 - **Rotational characteristics (context of overall suitability)**
 - **Physical properties: size/shape/geology (context of operations)**
 - **Gravity field (context of operations)**
 - **Well-constrained orbit**
- 3. Some of these properties are known in a statistical sense for the NEO population (rotation rates/thermal inertia, for instance)**
- 4. Some of these properties are measureable from Earth/near Earth, others will require in situ measurements**
 - **We lack intuition about “ μ -gravity geology”**
- 5. Choice NEO targets will *likely* be driven by accessibility vs. other factors → trade-off between size and rotation rate**

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Session Open Questions

- 1. Are there *any* NEOs for which we have sufficient knowledge *right now* to send astronauts (assuming they were on suitable orbits)?**
- 2. Can the set of necessary measurements to ensure safe and meaningful human exploration of NEOs be obtained without targeted in-situ mission(s)? (i.e. SMD vs. ESMD missions)**
- 3. Can the required in-situ measurements be made on asteroids other than the ones to be visited by the astronauts?**
- 4. When must the NEOs be characterized to most effectively influence mission/instrument development?**