## Prioritized Technology: Pinpoint Landing and Hazard Avoidance

### Europa Lander

### Mission Applications
- TRN can be used for any mission requiring pinpoint landing (ocean worlds, small bodies, etc)
  - For landing on bodies with atmospheres, need to evaluate atmospheric and dust effects (e.g. Venus)
  - Lidar can be used for any landing on body with changing small-scale topography (e.g. icy or tectonic bodies) or for which high-resolution surface imaging not available (e.g. Enceladus)

### Development Cost and Schedule
- TRN
  - Capability being implemented on Mars 2020 project
  - Evaluating suppliers for radiation hardened cameras
- Lidar
  - Design analyses and radiation tests (FY16 study contracts) provided existence proofs for lidar that can meet performance
  - Evaluating three Lidar suppliers for adapting commercial hardware to space
    - Also, developing 4th, alternate rad-hard detector option

### Simulated Europa Descent Image and Map

### Sigma Space Mini-ATM