**Platform:** Fixed Lander or Rover

**Science:**
- **SCEM Concept 2:** Understand the structure and composition of the lunar interior (mineralogy).
- **SCEM Concept 3:** Study key planetary processes through the diversity of lunar crustal rocks (mineralogy and elemental composition).
- **SCEM Concept 4:** Understand volatile sources at the lunar poles (water-bearing minerals).
- **SCEM Concept 5:** Understand thermal and compositional evolution of the Moon (mineralogy).
- Prospect for and evaluate lunar regolith materials for ISRU (Fe-bearing minerals).

**Objectives:**
- Identify and quantify major and minor minerals in as-received lunar regolith.
- Determine the crystal chemistry (composition) of individual major minerals in lunar regolith.
- Determine the concentrations of major elements & detect minor elements (10<Z<26) in lunar regolith.
- Determine the quantity and composition of amorphous component(s) in lunar regolith.

**CoIs:** T. Bristow, R. Quinn, R. Walrhoth / NASA-ARC; P. Sarrazin / SETI Inst.; P. Dera, GJ Taylor, P. Lucey, L. Martel / HIGP; J. Chen / Baja Tech.; K. Zacny / Honeybee Robotics; R. Downs / U. Ariz.; M. Gailhanou / CNRS.

**Key Milestones:** (project start date 01/01/19)
- XRD/XRF Geometry Refinement Complete 06/19
- XTRA Subsampling System (XSS) Prototype Complete @ TRL-5
- XTRA Baseline Performance Requirements Validated 06/20
- Sample Acquisition and Delivery (SA/D) and XSS Verification and Validation complete 10/20
- XSS Environmental testing complete @ TRL-6 01/21
- XRD & XRF calibration complete 09/21
- XTRA I&T Complete @ TRL-6 12/21

**TRL 4 to 6**