Europa Kinetic Ice Penetrator (EKIP)

- R. M. Winglee, ESS, Univ. of Washington
- C. Knowlen, AA, Univ. of Washington
- D. Winebrenner, APL, Univ. of Washington

**Research Objectives.**

- Characterized properties of impact including depth and width of crater.
- Demonstrate that a 2<sup>nd</sup> impact in the same area experiences significantly less deceleration.
- Demonstrate two-stage penetrator system with onboard electronics can survive a hypervelocity impact more easily than a single penetrator impact.

**Example Penetrator Systems**

**Approach**

- RAM acceleration tests give overall characteristics of hypervelocity impact.
- ANSYS simulations allow design of full scale system.
- Field testing allows validation of modeling.
- Laboratory and field testing evaluate survivability and heating of onboard electronics.

**Potential Impact**

- Increase penetrator survivability regime to hypervelocity speeds.
- Facilitate Europa Ice Penetrator mission.
- Enable new spacecraft missions with penetrator technology.