

NASA Technology Investments for Future Science Missions: Exciting Enabling Technologies

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NASA TECHNOLOGY INVESTMENTS FOR FUTURE SCIENCE MISSIONS:
EXCITING ENABLING TECHNOLOGIES

PICASSO

Volatile-sensing Array for Planetary Onsite Research (VAPOR)

- Develop instrument-on-chip for in situ chemical analysis fo trace gases
- Enable unambiguous detection of species with mass interference (H_2O, CH_4, NH_3)

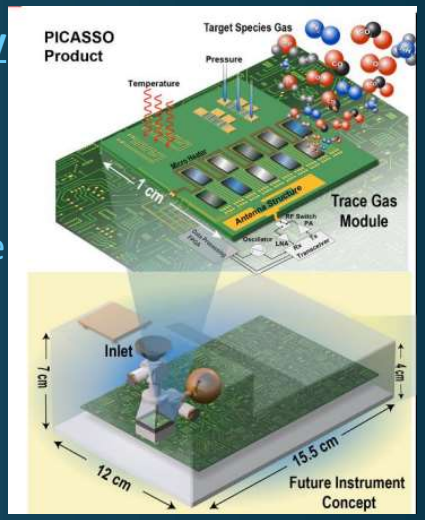


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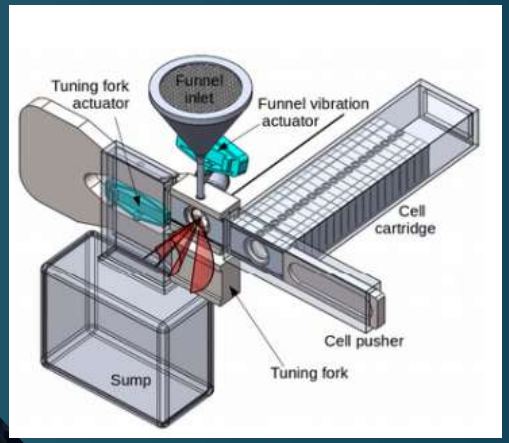


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MatISSE

Seismometer to Investigate Interior Asteroid Structure (SIIAS)

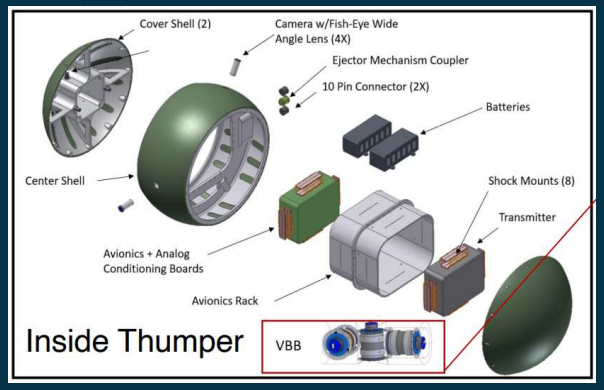


Image credits: University of Arizona

- Develop a very broad band (VBB) seismometer and penetrometer burial system to deploy seismometer
- Enable characterizing the structure and seismicity of an asteroid structure

Micro-Sampling System for Mineralogical Instruments

- Develop micro-sampling system for deployment of XRD/XRF for smaller rovers
- Enable quantitative soil mineralogy, document oxidation, establish limits for CO_2 levels

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COLDTech

PARTI Pucks

- Develop communications pucks for deployment behind cryobot during descent
- Provides backup communications using series of relay pucks
- Enable cryobots to assess habitability, water parameters/ salinity, search evidence of life

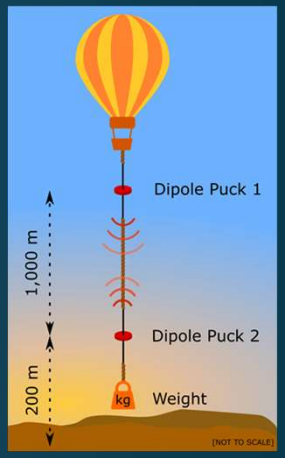


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Technology Developments for Sending Signals Through the Ice (STI)

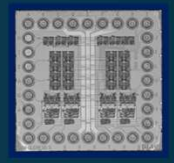
- Develop tethered optical fiber and acoustic communication
- Enable search for evidence of life, assessment of habitability, surface and subsurface properties

HOTTech

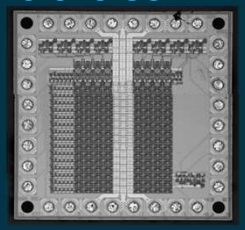
SiC JFET-R Integrated Circuits (ICs)

- Enable long duration missions to high temperature destinations
- Have demonstrated:
  - 1000's hours operation at 500 °C
  - Continuous operation during 60 day GEER test
- HOTTech-21 projects utilizing SiC JFET-R:
  - Non-volatile SiC Memory (NASA GRC)
  - Actuator/motor (Honeybee Robotics)
  - Seismometer development (NASA GRC)
  - UV Imager (General Electric Research)

SiC IC Gen 10



SiC IC Gen 11



SiC IC Gen 12

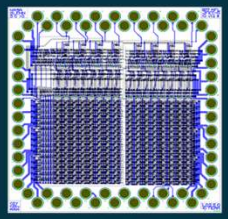


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