HONEYBEE ROBOTICS

A BLUE ORIGIN COMPANY

Autonomy for One-Shot Missions

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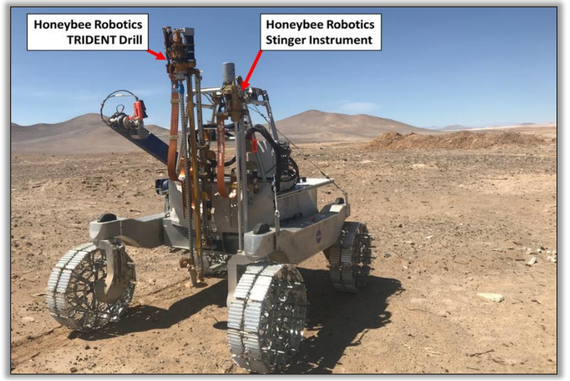
Background to HBR

- Founded in 1983 in New York City
- Acquired by Blue Origin in 2022
- Vertically integrated
- ~400 employees
- Over 3000 pieces of hardware in space
- Two divisions:
  - Motion Control in Longmont, CO
    - Solar Array Drives, Actuators
  - Exploration Systems in Altadena, CA
    - Mechanisms, structures, avionics, software, ops
    - Clean sheet development
    - Cost and schedule driven
    - Projects ranging from $10K to >$100M



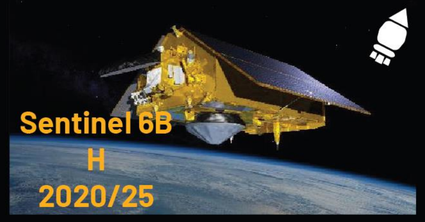
Sub Orbital

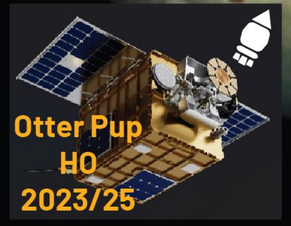
Phobos

In Space

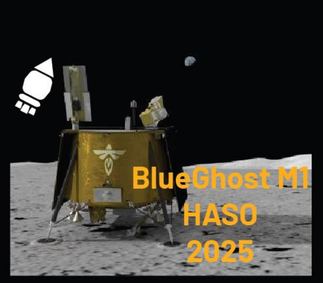
Titan

Earth Orbit





The Moon



Flight Programs

H - Hardware
A - Avionics
S - Software
O - Operations

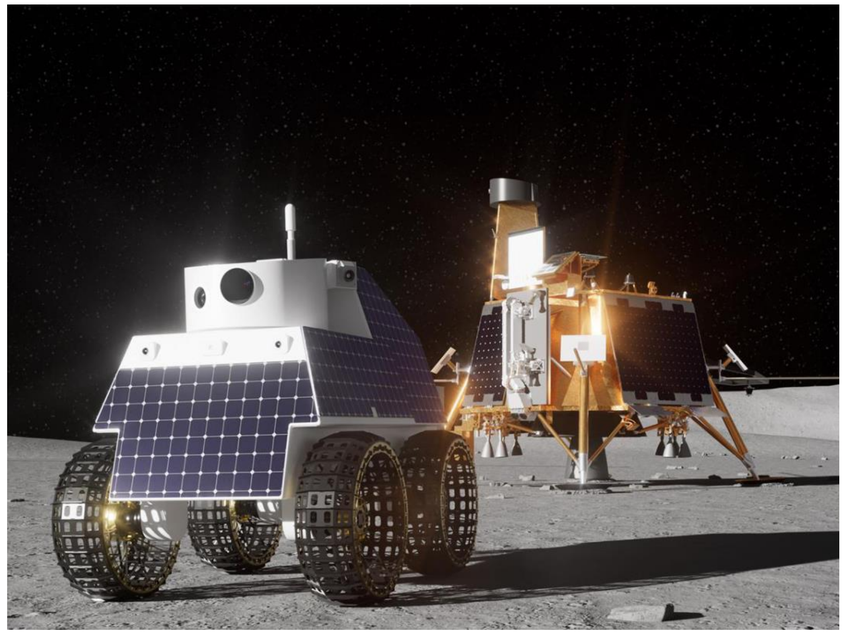
- Launched

- Shipped and ready for launch

Mobility Systems

CP-21: Honeybee Robotics is providing a rover (up to 100 kg) for NASA's 2028 CP-21 Mission to the Gruithuisen Gamma Dome. Launched by Firefly's 3rd Blue Ghost lander, it will carry NASA's Lunar-VISE instruments on a ~1 km traverse.

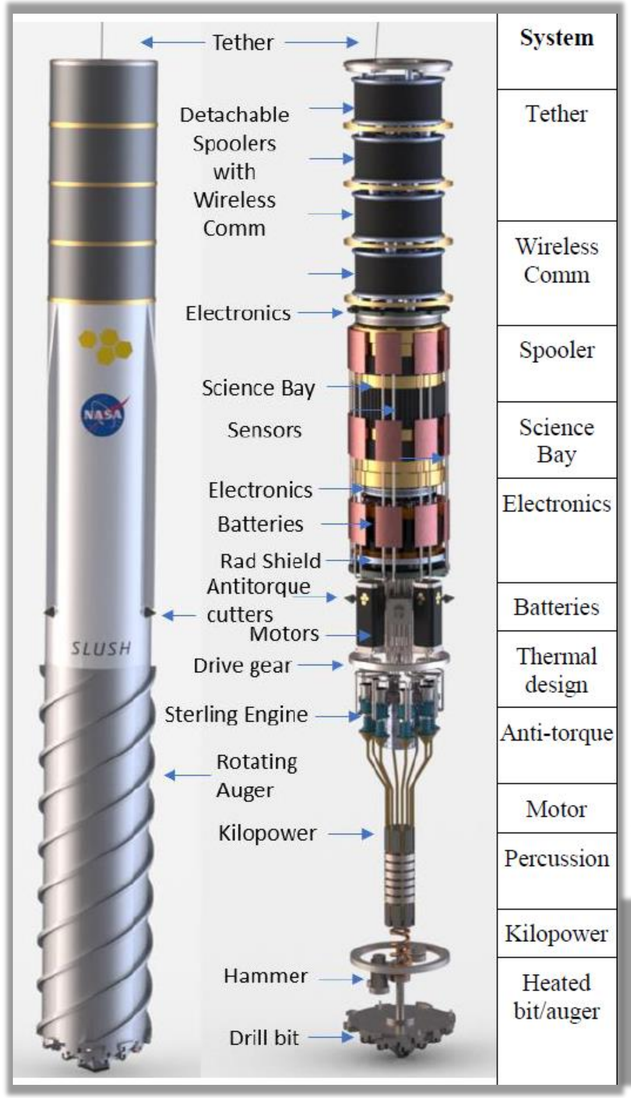
- **Launch Date:** Mid-2028
- **Landing Site Coordinates:** 36.4572° N, 319.2040° E
- **Traverse Distance:** Approximately 1.1 km
- **NASA Payload Weight:** 16 kg
- **Rover Mass:** Less than 100 kg

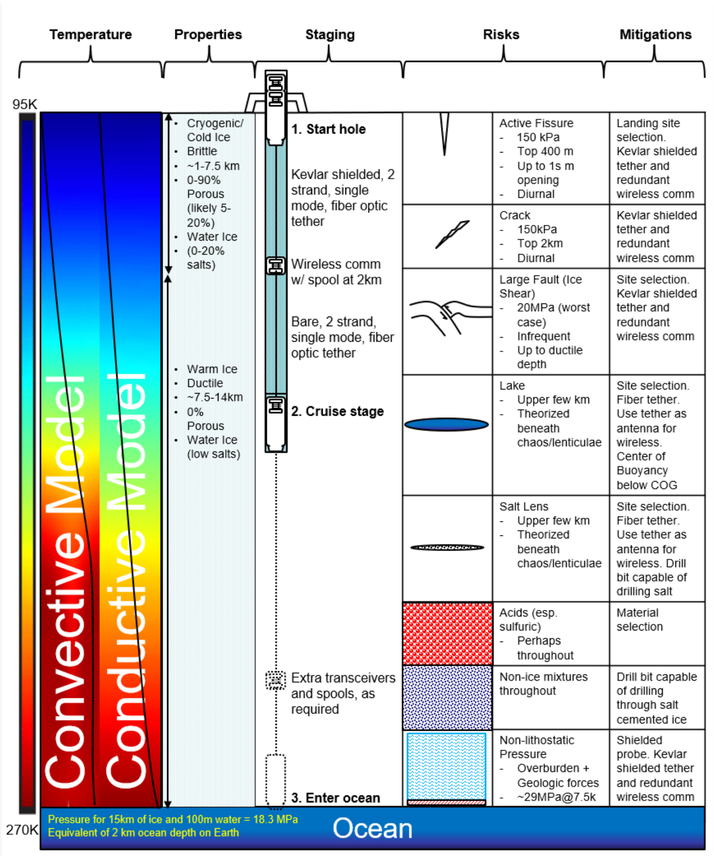


Haika: Honeybee Robotics has been developing a 1-ton class rover to travel long distances on the Moon quickly. This is a terrestrial testbed for demonstrating autonomy and logistics for lunar applications

Europa probe: SLUSH

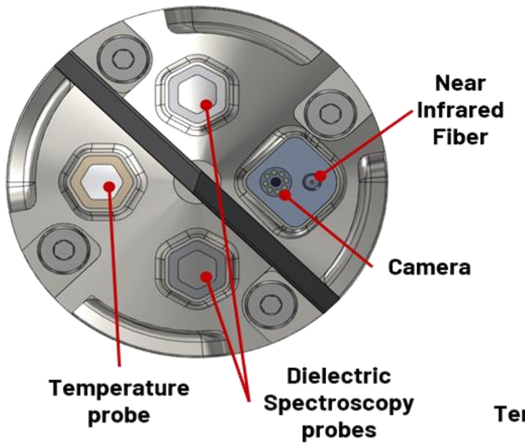
- Autonomous probe designed to drill through 15km of Europa ice in 3 years to reach the ocean below
- Unknown subsurface requires autonomy and learning as the probe progresses

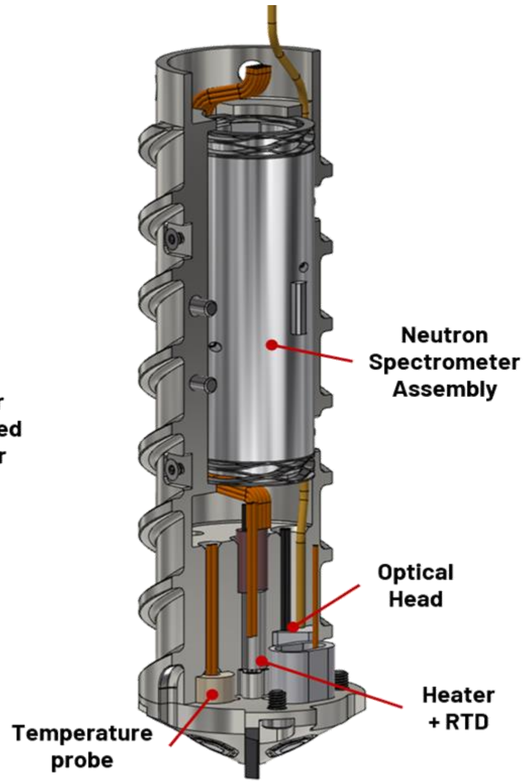




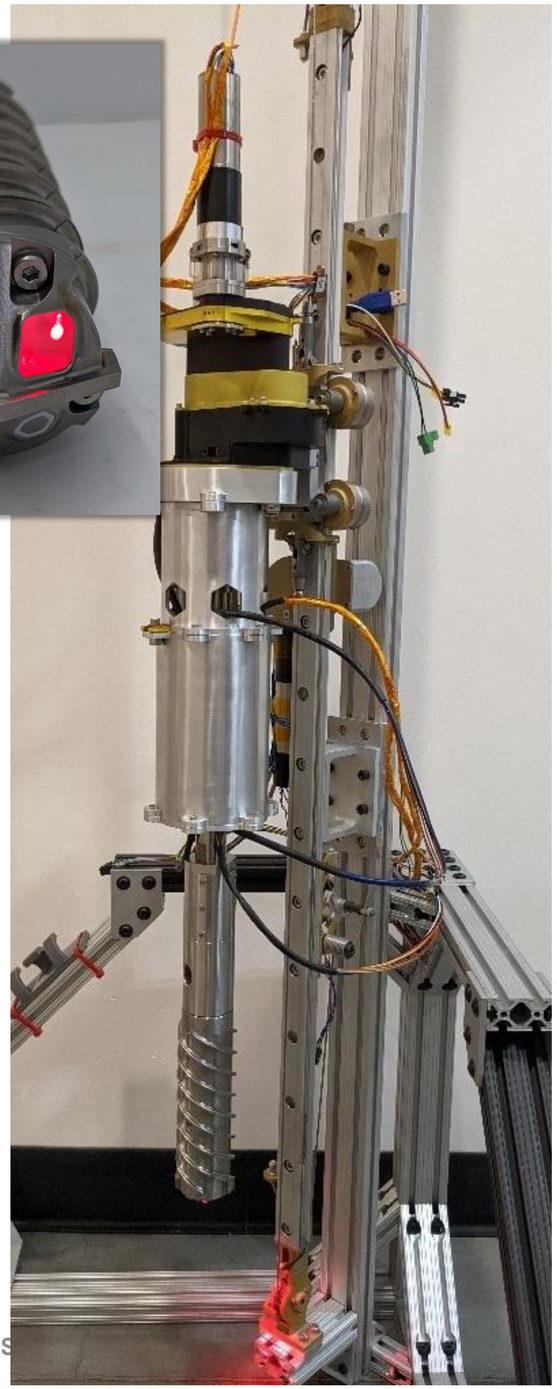
SMART drill

- SMART has integrated downhole instruments
- It brings instruments to a sample (as opposed to sample to an instrument)
- Allows true in-situ analysis
- Allows for stratigraphic analysis





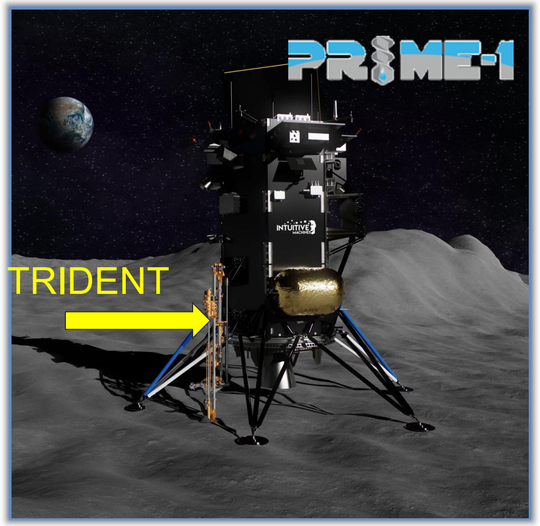
Devon island



TRIDENT drill

- Goal: Drill to 1 m depth, provide material for analysis, measure subsurface temp
- Missions: PRIME-1 and VIPER
- TRIDENT is ready for other planetary bodies
- Autonomous fault monitoring for unknown terrains

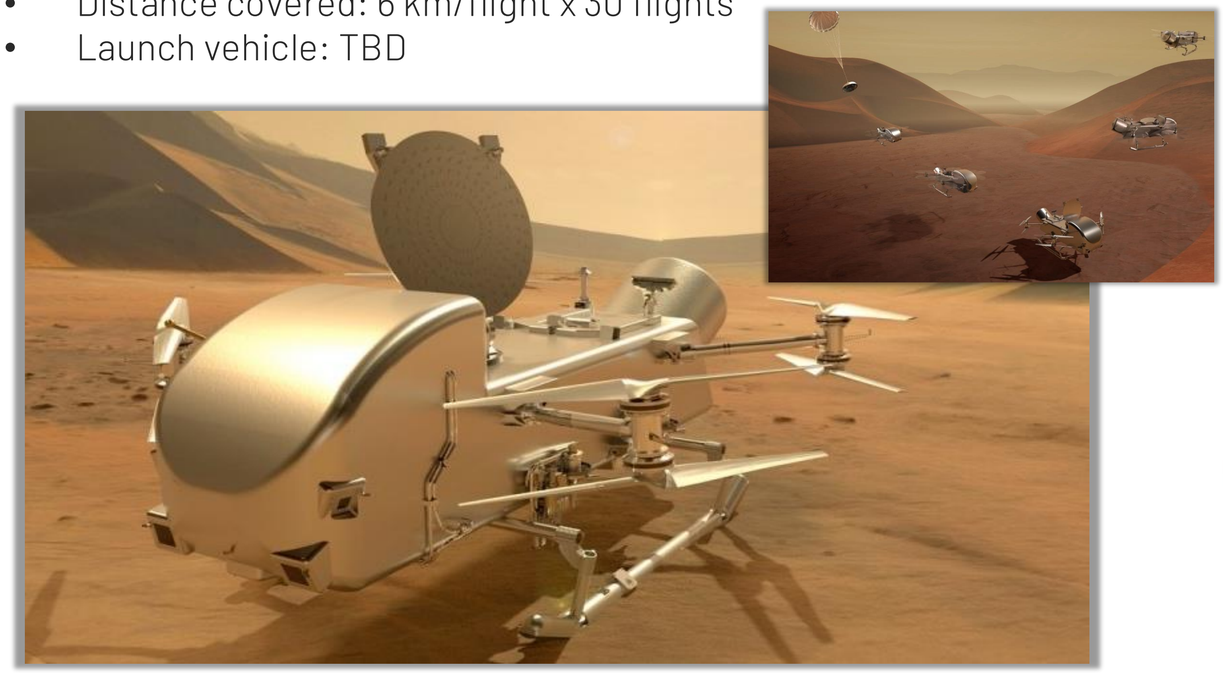
- 1 m depth
- Rotary-percussive
- Mass: 19 kg (drill) + 7 kg (avionics)
- Downhole Temp. and heater



Dragonfly mission to Titan

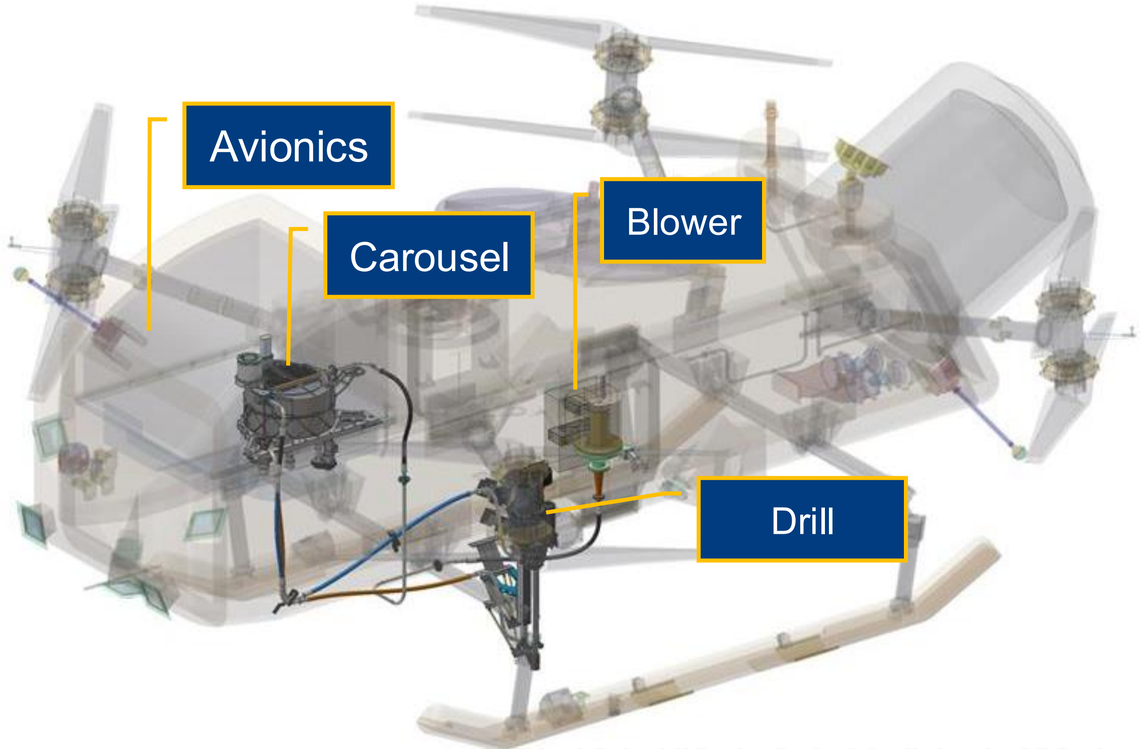
Dragonfly Highlights

- Program: NASA's New Frontiers class mission
- Lead Org.: John Hopkins Applied Physics Laboratory
- Cost: Phase A-D at $2.1B, Total: $3.35B
- Titan: 96 K, 1.5 atm N2, 1/7th Earths gravity
- Launch/Landing: 2028 / 2034
- Surface Operations: 3 years [nominal]
- Spacecraft: Robotic rotocraft [2x4 x 1.3 m dia. rotors]
- Mass / Power: ~1 ton / ~100 We MMRTG
- Distance covered: 6 km/flight x 30 flights
- Launch vehicle: TBD



Honeybee Contribution

- DrACO: Drill for Acquisition of Complex Organics
  - Drill + Carousel + Blower + Avionics + Software + Mission Ops
- Pneumatic drilling and sample delivery to Mass Spectrometer
- Mass / Power: 50 kg / 1 kW
- Assembly in ISO 6 cleanroom with laminar flow benches
- Flight hardware delivery staring in Q4 2025

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