DESTINY+

★ Technology demonstration & science observation.
★ Engineering mission is led by ISAS_JAXA.
★ Science mission is led by Chiba Inst. of Technology.
★ International collaboration with DLR for Dust Analyzer.

Demonstration and Experiment of Space Technology for INterplanetary voYage with Phaethon fLyby and dUst Science

2015: Proposal submitted
2016: MDR, ΔMDR
2017: Selected !
2018-19: Phase-A study, ΔMDR
2020: SRR, RFP, SDR
2021: JAXA project approved
2022: PDR
2023: CDR
2024: Launch
2028: Phaethon flyby

Engineering Goals

- Expand the range of applications for electric propulsion
- Acquire advanced flyby exploration technologies

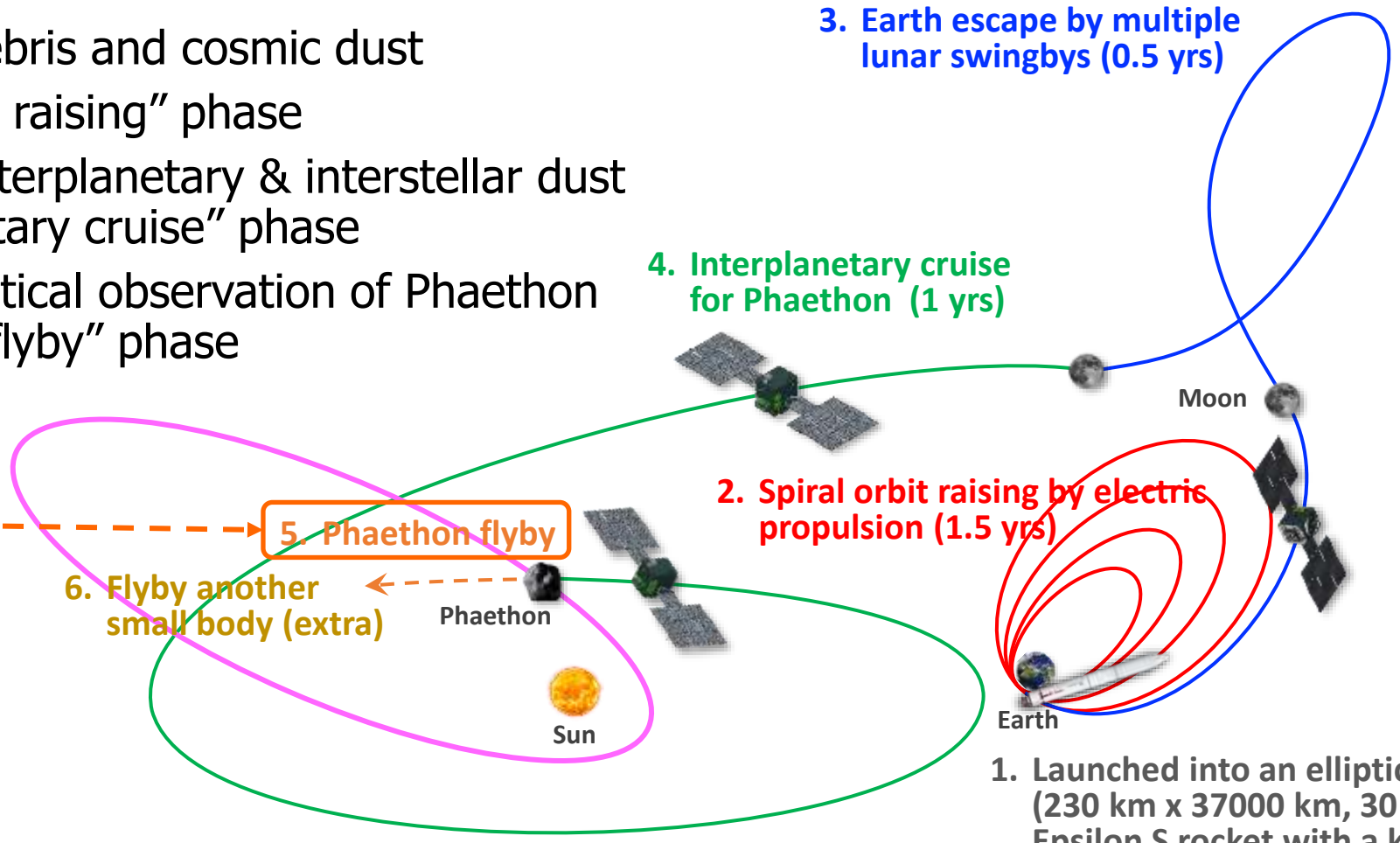
Science Goals

- Characterize cosmic dust en route to Earth (before atmospheric entry)
- Understand geology of Phaethon, Geminids parent and active asteroid

Mission Profiles and Scenarios

Science activities

- In-situ analyses of debris and cosmic dust during "2. Spiral orbit raising" phase
- In-situ analyses of Interplanetary & interstellar dust during "4. Interplanetary cruise" phase
- Dust analyses and optical observation of Phaethon during "5. Phaethon flyby" phase



Phaethon flyby point:
Geocentric distance: 0.33 au
Heliocentric distance: 0.91 au
Flyby speed: 36 km/sec

Science goals and objectives

Science goals	Science objectives
1. Characterize dust en route to Earth (before atmospheric entry)	a. Determine mass, speed, arrival direction, and chemical composition of IDPs around 1 au to constrain their origin: asteroidal or cometary.
	b. Determine chemical composition (esp. organics) of interstellar dust around 1 au.
	c. Determine chemical composition of dust from Geminids-parent Phaethon and the dust trail.
2. Understand geology of Phaethon : Geminids parent and active asteroids	d. Constrain dust ejection mechanism from active asteroids.
	e. Understand global surface material distribution.

Science objectives and payloads

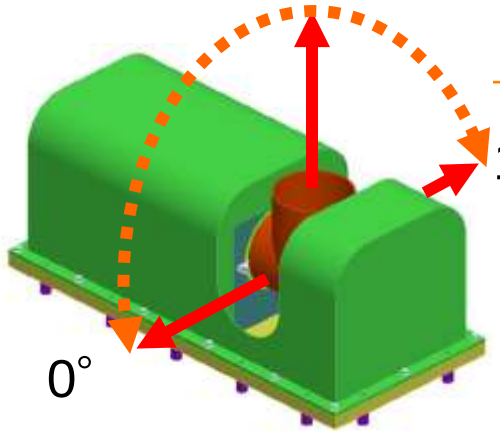
Phaethon imaging

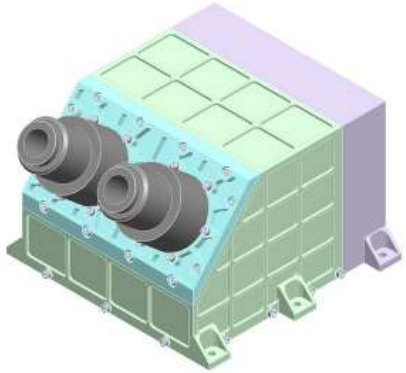
★Developed by PERC, Chiba Inst of Technology

- 3D shape
- Surface geology <10 m/pix
- VIS-NIR spectral variation <100 m/pix

→ **Telescopic CAmera for Phaethon (TCAP)**

→ **Multiband CAmera for Phaethon (MCAP)**



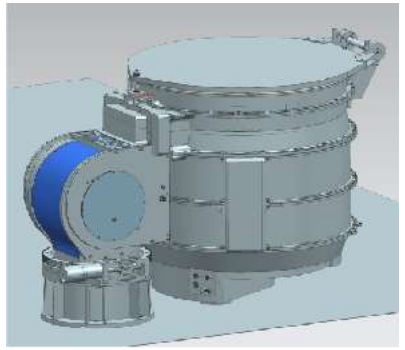


Dust analyses

★Developed by Univ. of Stuttgart

- Physical & Chemical properties of IDPs and interstellar dust
- Physical & chemical properties of nearby Phaethon & dust trails

→ **DESTINY⁺ Dust Analyzer (DDA)**



Flyby imaging sequence

- 5 days prior to flyby、optical navigation starts with TCAP images.
- By 7.5 hr before the closest flyby, trajectory correction maneuver is complete, autonomous maneuver starts.