



Japanese Space Program and Space Science Missions

Ikkoh Funaki
Professor, Director for
International Strategy and
Coordination,
ISAS/JAXA

EXPO 2025 (Czech Pavilion)
10th September 2025

Outline

1. Introduction

- Czech-Japanese Corporation in Space Science Activity

2. JAXA's Space Science Missions: Highlights

- Solar System Science
- Astrophysics and Space Science
- Earth Science

3. JAXA's Space Activities: A Brief Introduction

- How Science Missions contribute to the future Missions at JAXA

1. Introduction

- ▣ Czech-Japanese Corporation in Space Science Activities**

High-Level Diplomatic Meeting & Space Agency Collaboration

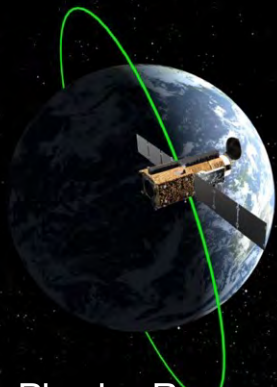


Prime Minister Fumio Kishida of Japan met with Czech President Petr Pavel on the sidelines of the NATO Summit in July 2023. Their mutual interests in science and technology pave the way for formal agreements and joint space initiatives.

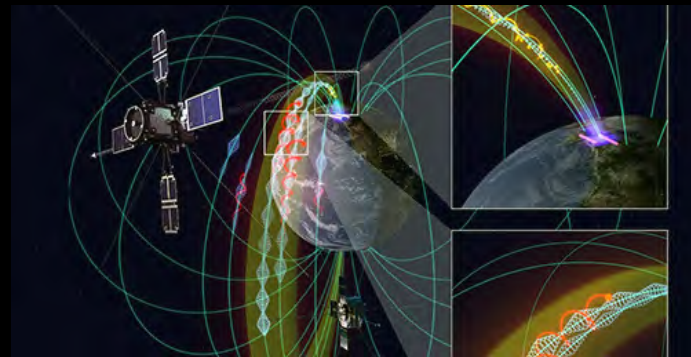


Representatives of JAXA held talks with officials from the Czech Ministry of Transport's space section, including Dr. Jan Kobera, head of the Czech space office. These official dialogues have led to memorandums of cooperation.

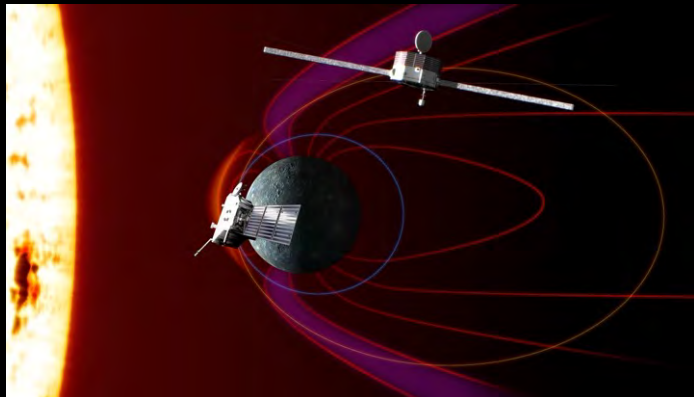
Space Science Missions: Czech and Japanese Collaboration



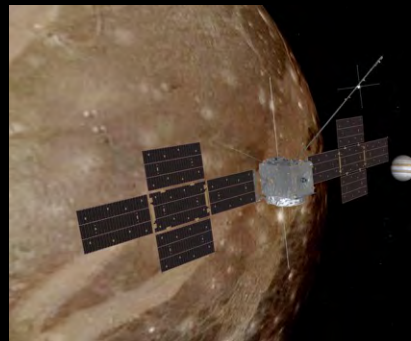
Solar Physics Research incl. JAXA Solar-B (Hinode)
AI-JAXA/NAOJ



JAXA ERG (Arase)
Nagoya Univ. and Czech Researchers Collaborate



BepiColumbo/MIO ESA-JAXA
Charles Univ joins MPPE Development



JUICE ESA-JAXA
Czech Research Group joined RPWI Development

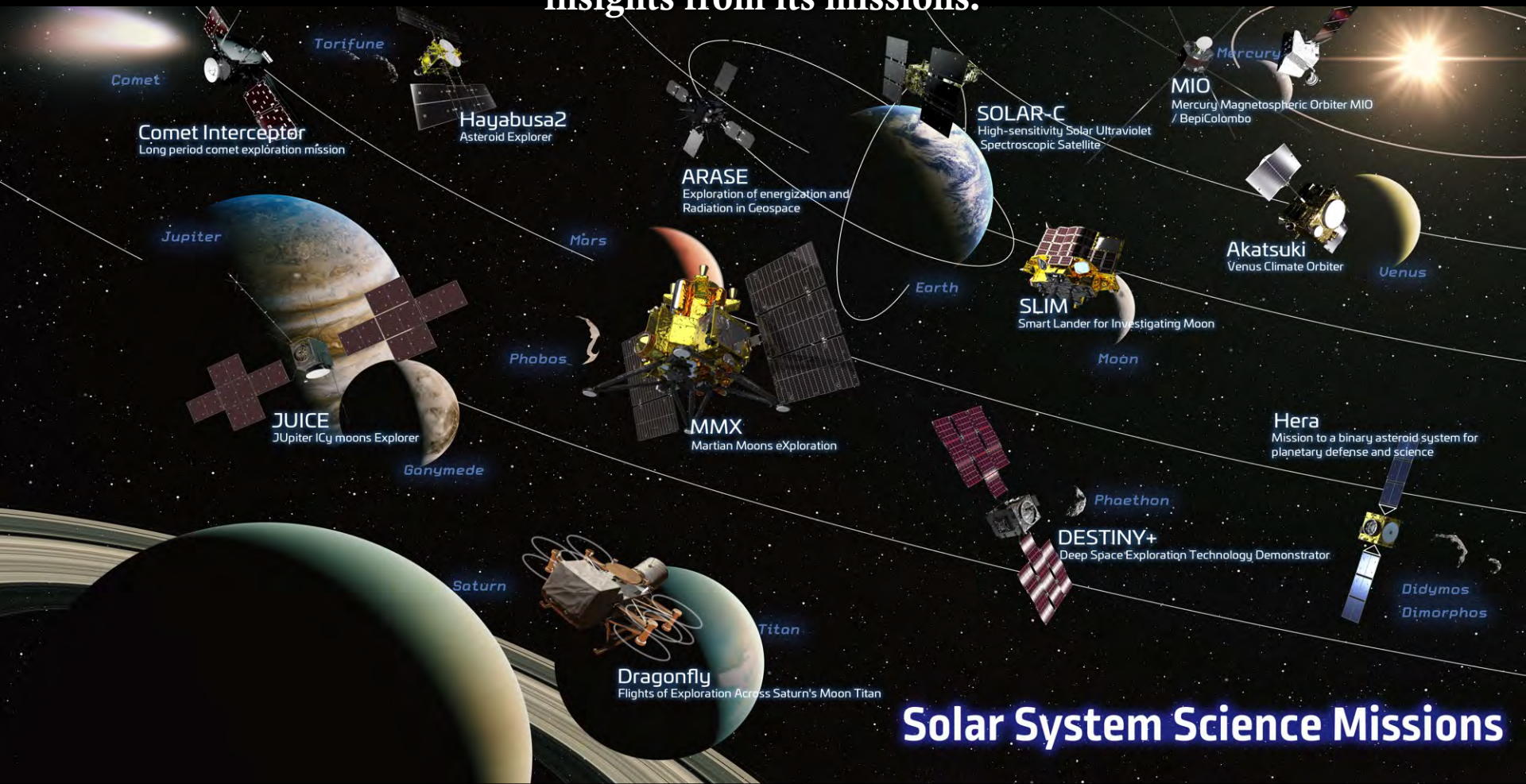
2. JAXA's Space Science Missions: Highlights

- Solar System Science**
- Astrophysics and Space Science**
- Earth Science**

JAXA's Space Sciences: Goals and Approach

- **To reach every part of the solar system to explore planets and moons to find the history of their formation, and the origin of life**
- **To understand the beginning of the universe and its evolution**
- **These goals will be pursued:**
 - **with aggressive and continuous research and development efforts in new technology**
 - **through intensive collaboration with academia, industry, and international partners**

JAXA aims to contribute to global space science efforts by providing valuable data and insights from its missions.



Solar System Science Missions

HAYABUSA2



launched in December
2014



First touchdown in Feb 2019



Return to the Earth
on December 6, 2020
Woomera, Australia



Amino acids & carbonated
water found in samples



Thank you for long-lasting and fruitful collaboration!

Primary Mars Exploration Missions

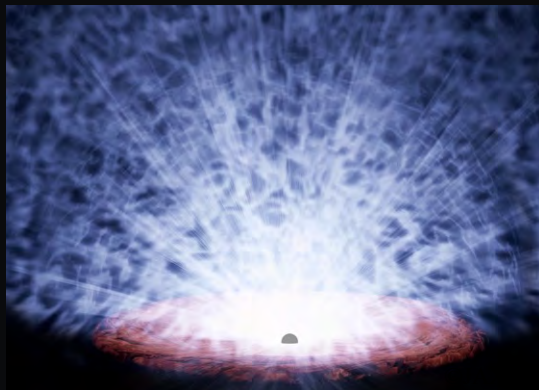


Martian Moons eXploration (MMX) : - Sample return mission from Martian moon -

Launch Target: 2026
Earth Return : 2031



A 3D rendering of the Suzaku X-ray observatory satellite. The satellite has a gold-colored cylindrical body with various instruments and sensors. It has two large solar panel arrays extending from the sides. The background is black, and the text "OJAS" and "XRISM" are visible in the bottom left and right corners respectively.

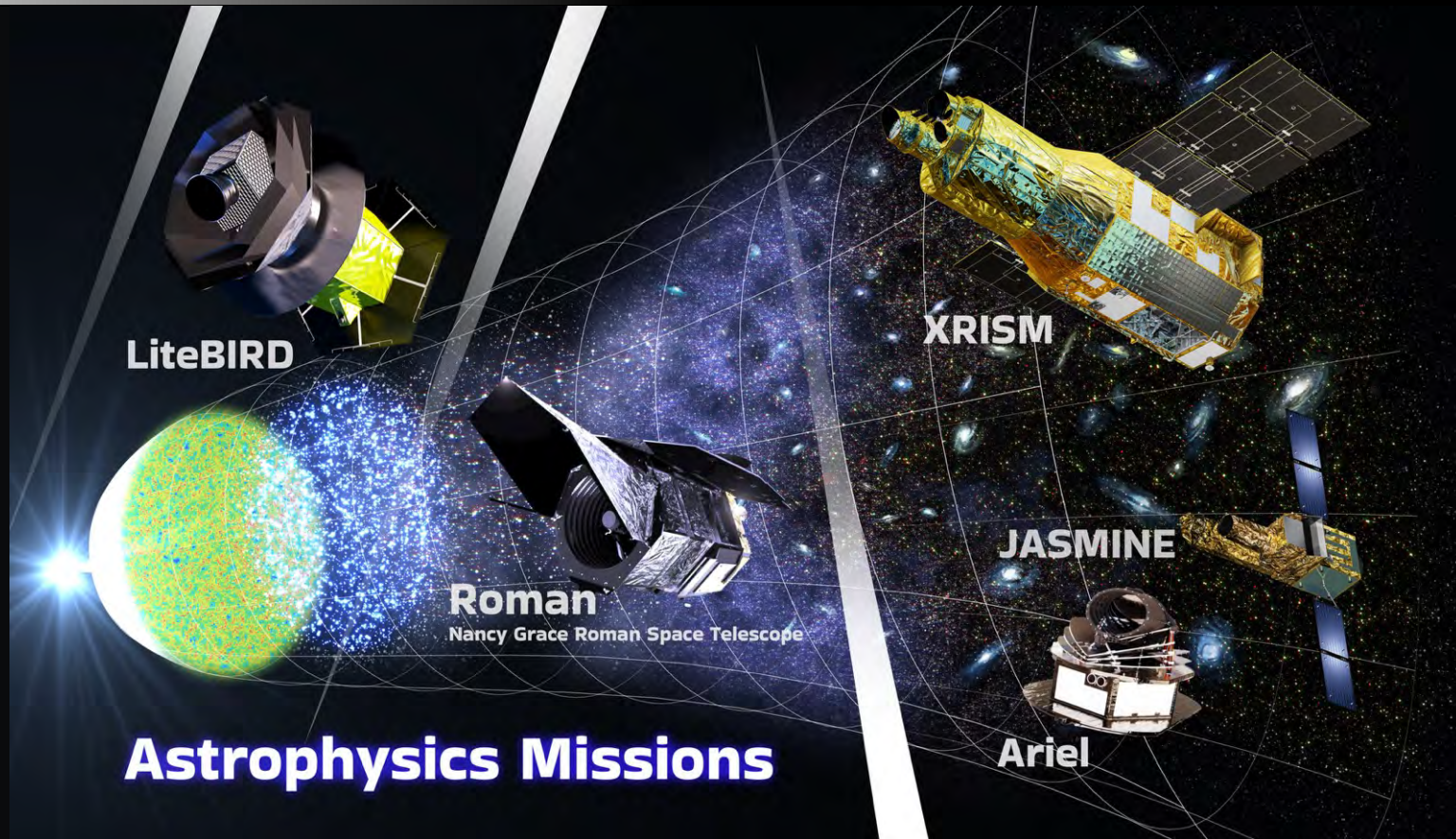


Artist's impression of the supermassive black hole PDS 456. High-speed winds—illustrated in white—are being ejected from the vicinity of the black hole

high-temperature gas. The white indicates galaxies, and the reddish brown indicates low-temperature gas.

Highlight Achievements by XRISM

JAXA Astrophysics Missions with International Partners



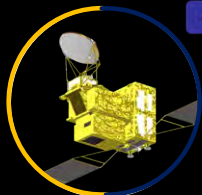
Astrophysics Missions

In Astrophysics, Make the precursor/stepping-stone to open up a new horizon...XRISM, LiteBIRD.
Go for a big fruit that cannot be reached JAXA-led missions...RST, HWO.

JAXA Earth Observation Satellites Contributing to Diverse Fields

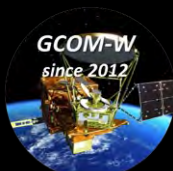


Greenhouse Gases



GOSAT-GW
Since 2025

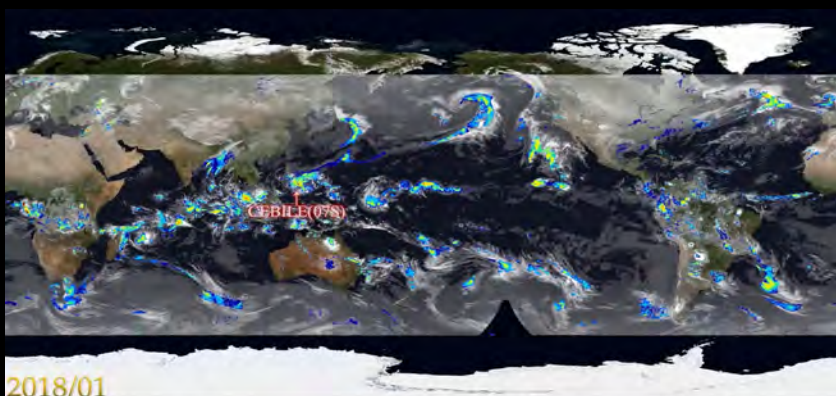
Precipitation/ Water Cycle



Disaster/ Forest

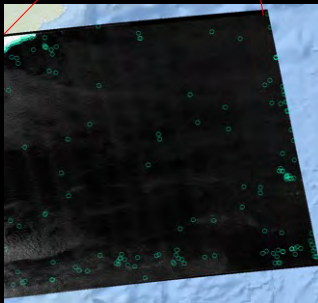
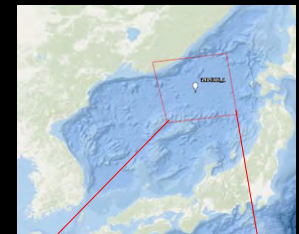


Cloud/Aerosol/Vegetations



2018/01

2018 / 01 / 01 00:00 Z GSMap Global Satellite Mapping of Precipitation



○ Detected Ships

Right: Observation of CO2 Concentration (GOSAT series)
Middle: Global Satellite Mapping of Precipitation (GCOM-W, GPM-Core)
Left: Ocean Monitoring (Ship Detection) (ALOS series)

3. JAXA's Space Activities: Brief Introduction

- ▣ How Sci. Missions contribute to enhance future Missions at JAXA**

JAXA Missions



JAXA's Moon-Mars Exploration Roadmap



2020



MMX

2030



MIM/Entry Probes
(Under concept Study with IPs)

2040

MARS

Robotic Tech Demo

Expanding Human Presence

Crewed Missions



Kaguya



SLIM



LUPEX



LNSS demo



HTV-XG



Cargo Lander



Gateway



Pressurized Rover



Fuel-Plant (demo)



Lunar Base

MOON

Robotic Missions

Crewed Missions

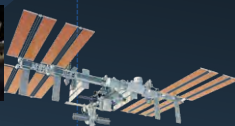
Surface Infrastructure

Sustainable Exploration

Sustainable Lunar Activities



Kibo (JEM)



HTV-X

ISS Operations



Post-ISS

Sustainable LEO

LEO

Commercializing Space Activities

HTVs

SLIM
JFY2023-2024

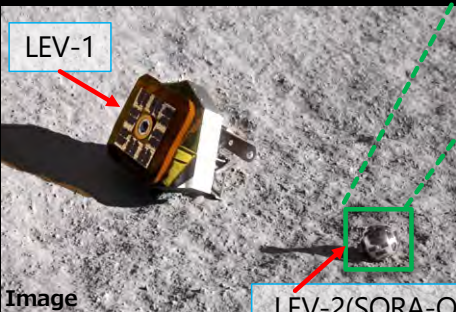
**SLIM pinpoint landed on
the moon and survived
three nights.**

Ref. Conclusion of Luner Activities this August



©JAXA/TOMY/Sony Group Corporation/Doshisha University

JAXA/Tokyo University of Agriculture and
Technology/Chuo University



LEV-1

Image

LEV-2(SORA-Q)



Swarming Exploration
by Multiple Small Robots

Mass: 250g

Size: 80mm diameter in storage
120mm wide, 90mm high
in deployment

Comm:Bluetooth

JAXA/TOMY/Sony Group Corporation/Doshisha University

Artemis

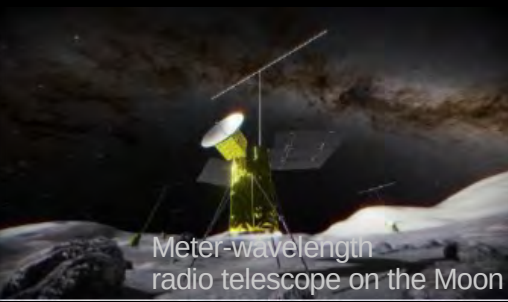
Science



Lunar Seismic Network

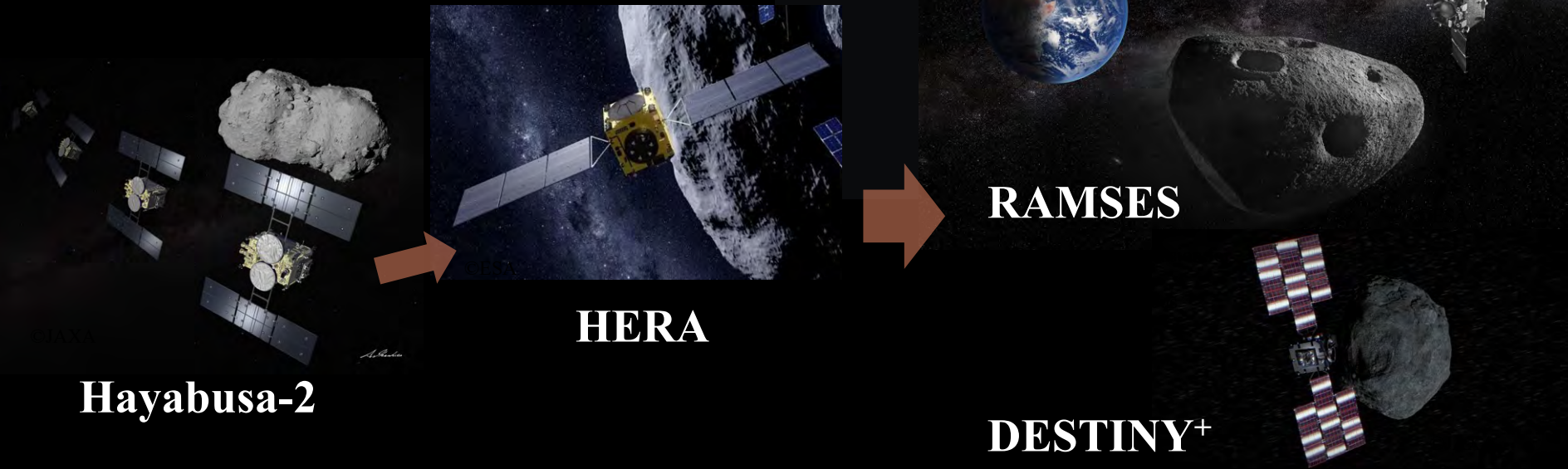


Lunar chronology



Meter-wavelength
radio telescope on the Moon

- ✓ Currently, small body probes have the meaning of not only planetary science but also planetary defense.
- ✓ Following HERA, ESA and JAXA discuss the cooperation of DESTINY⁺ (Apoheis and multiple-asteroids flyby) and RAMSES (Apoheis rendezvous) to advance planetary defense technology.



Hayabusa2

Hayabusa2#

HERA

RAMSES

JAXA Planetary Defense



PLANETARY DEFENSE

A composite image of the Moon, Earth, and Mars in space. The Moon is on the left, Earth is in the center, and Mars is on the right. The background is a deep blue space with the Milky Way galaxy visible.

We look forward to continued cooperation between the Czech community and JAXA on various occasions in today's global society.

Thank you for your attention