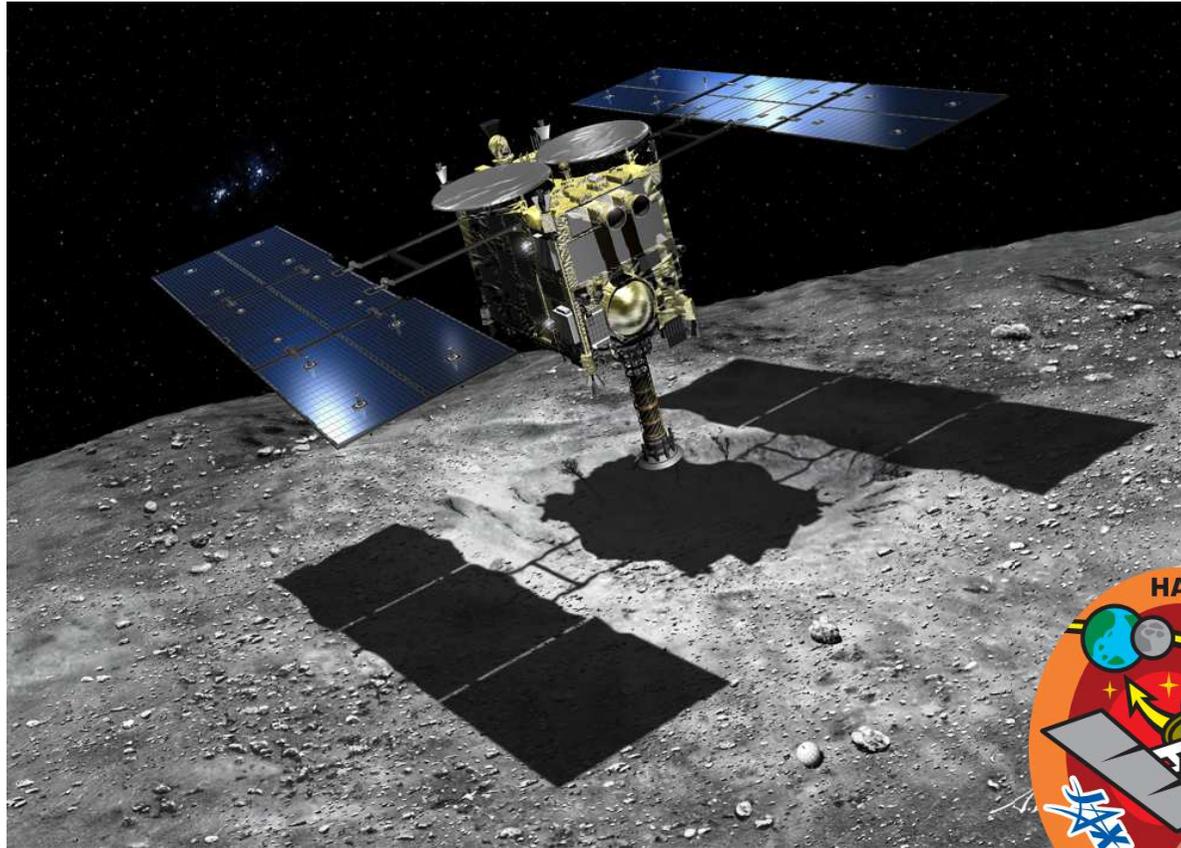


Status Update of Hayabusa2



COPUOS 2015

4 February 2013, Vienna, Austria

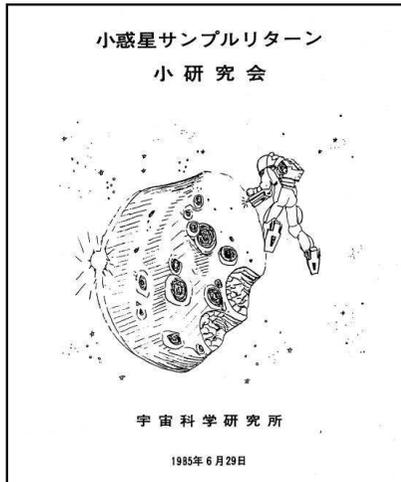
Makoto Yoshikawa

Hayabusa2 Project Team, JAXA

Japan's Asteroid Explorations

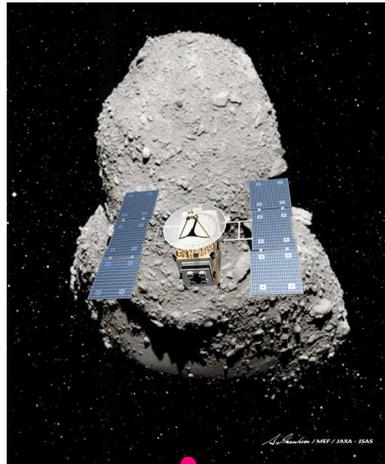
Past, Present, and Future

**Starting Point
1985**



"Small Meeting for Asteroid Sample Return Mission"

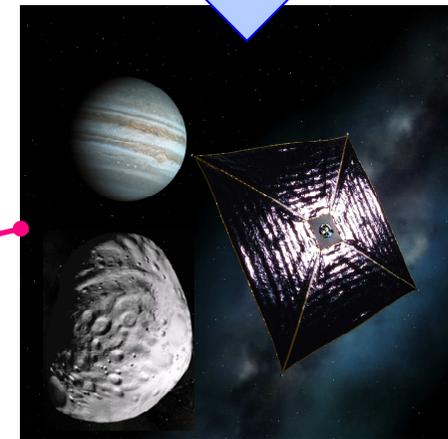
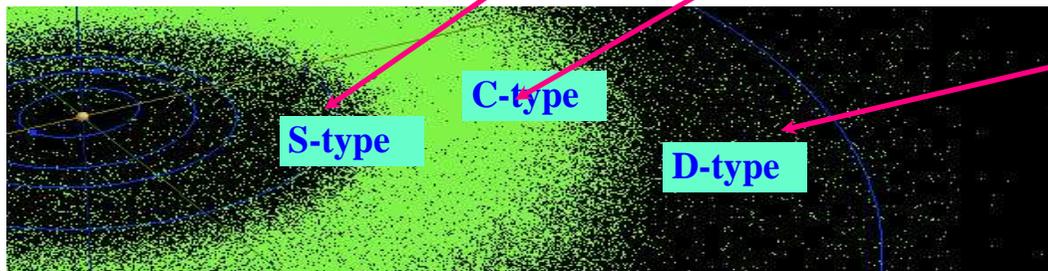
**Hayabusa
2003-2010**



**Hayabusa2
2014-2020**



Asteroid Belt



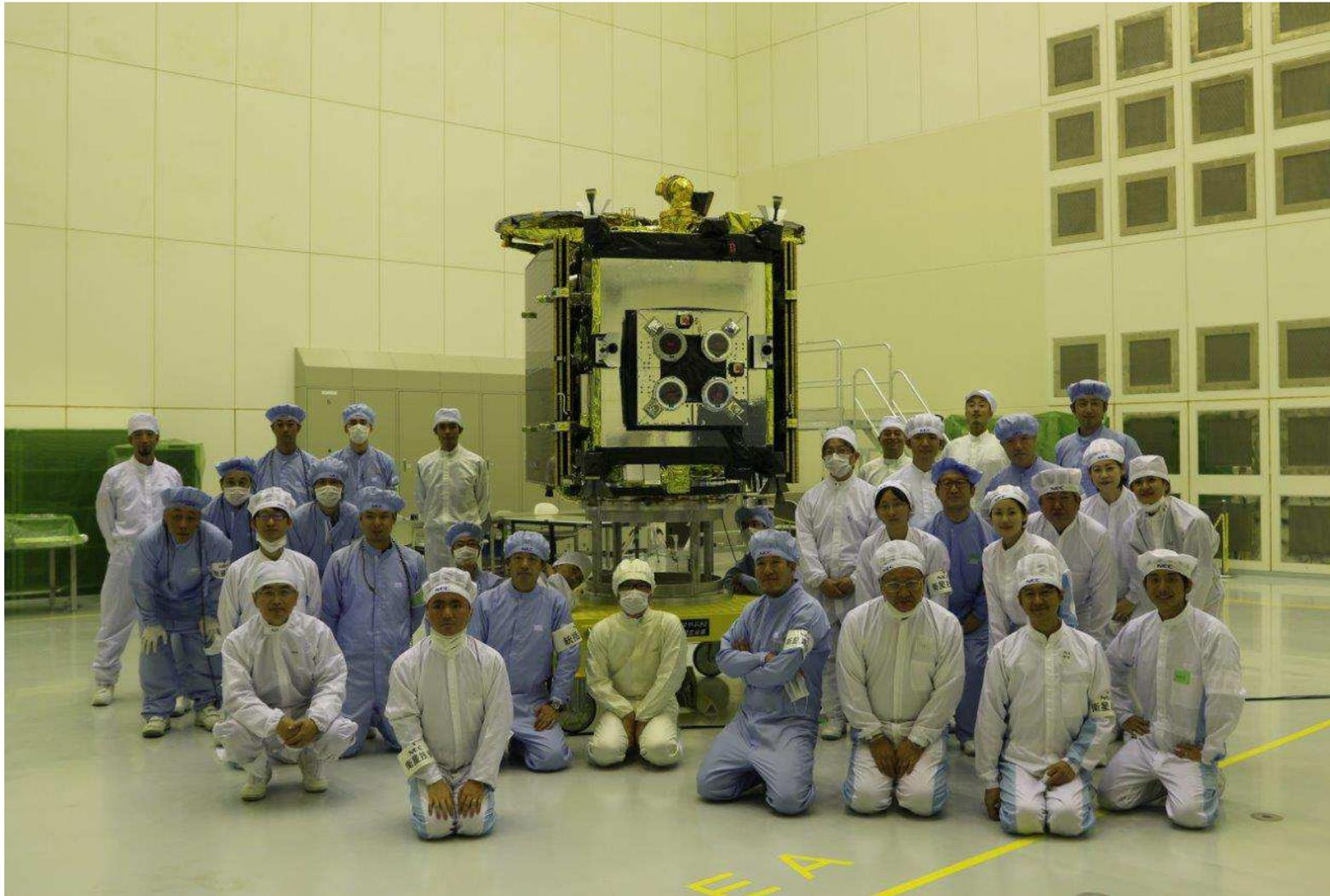
to Trojans ?



4 February 2015

COPUOS 2015

Flight model of Hayabusa2



27 October 2014 in Tanegashima Space Center



4 February 2015

COPUOS 2015

Launch of Hayabusa2

3 December 2014



Launch by H-IIA

Spacecraft Separation

One hour and 47 minutes after the launch...



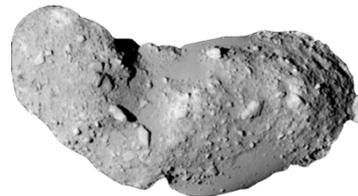
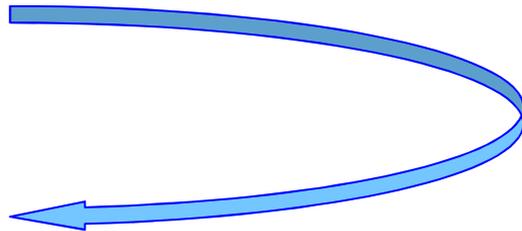
Target Markers



bottom side

Technology and Science of Asteroid Sample Return

Technology : round-trip to asteroid

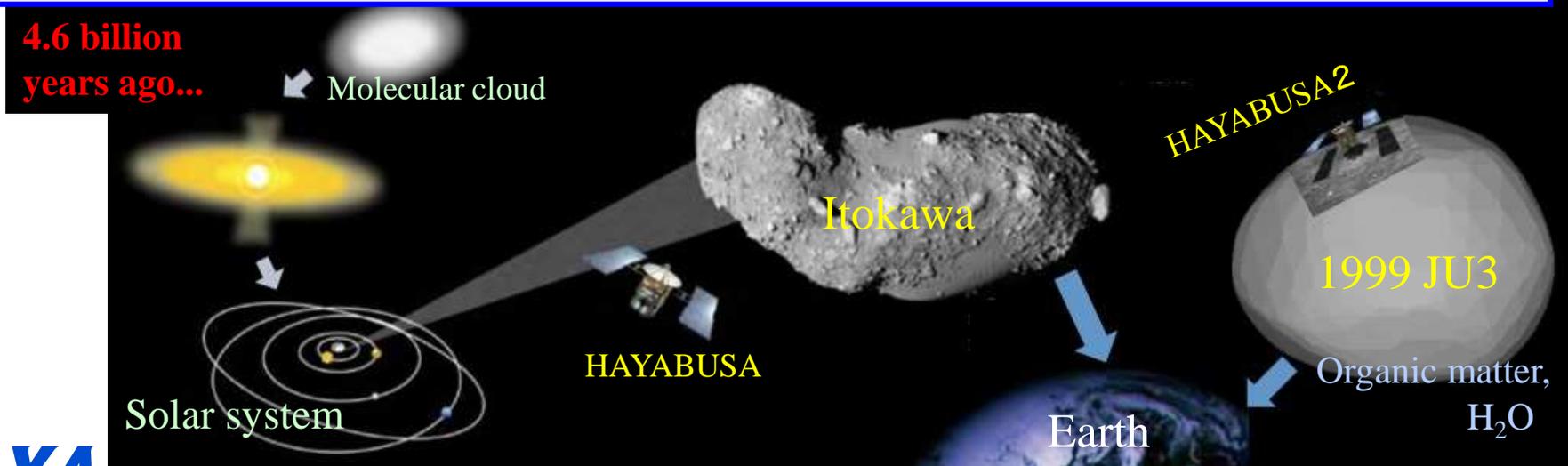


New technologies

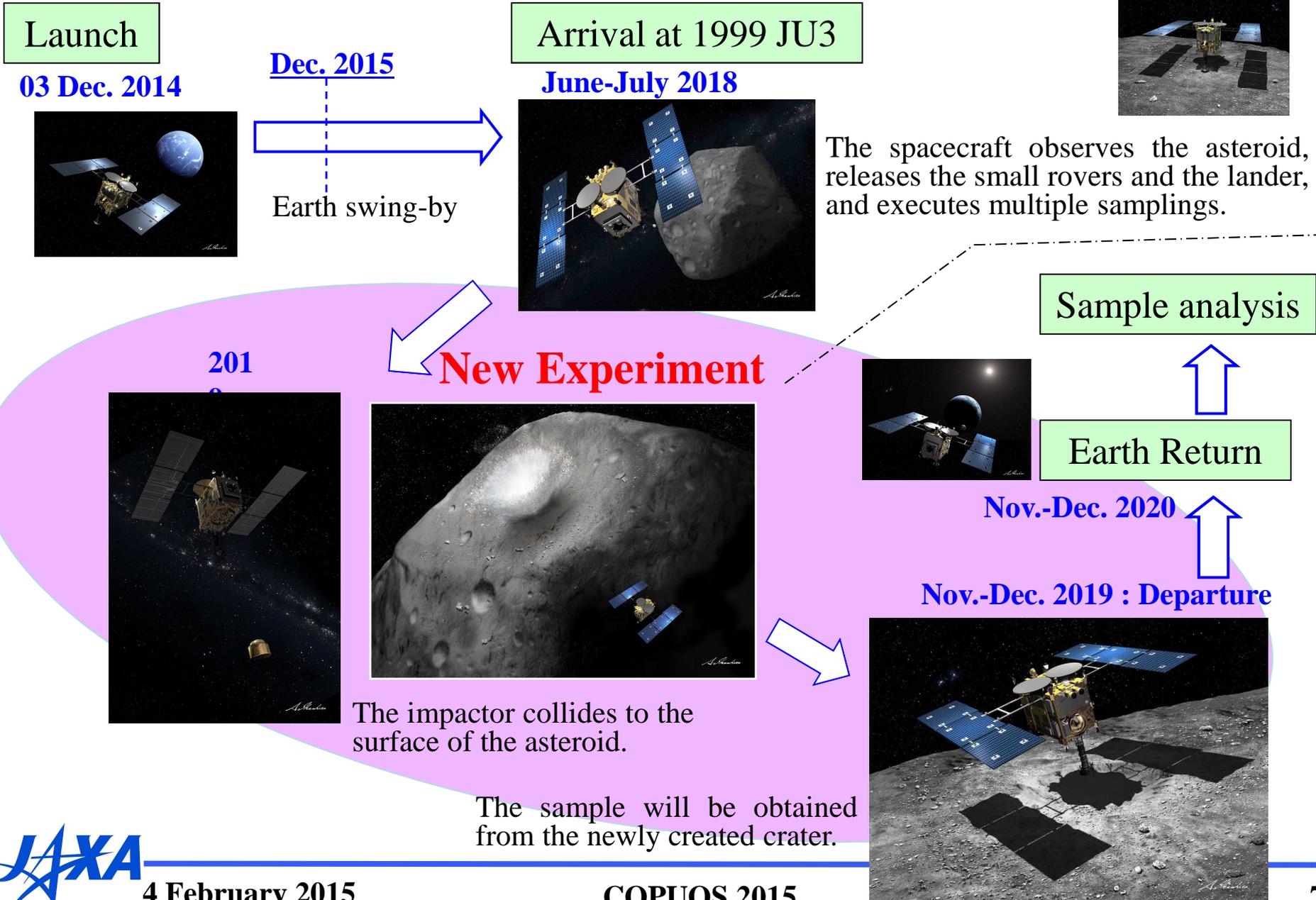
- Ion engine
- Autonomous navigation
- Sample collection system
- Reentry capsule
- Impactor system
- Ka-band communication etc.

Science : origin and evolution of the solar system and life

4.6 billion years ago...

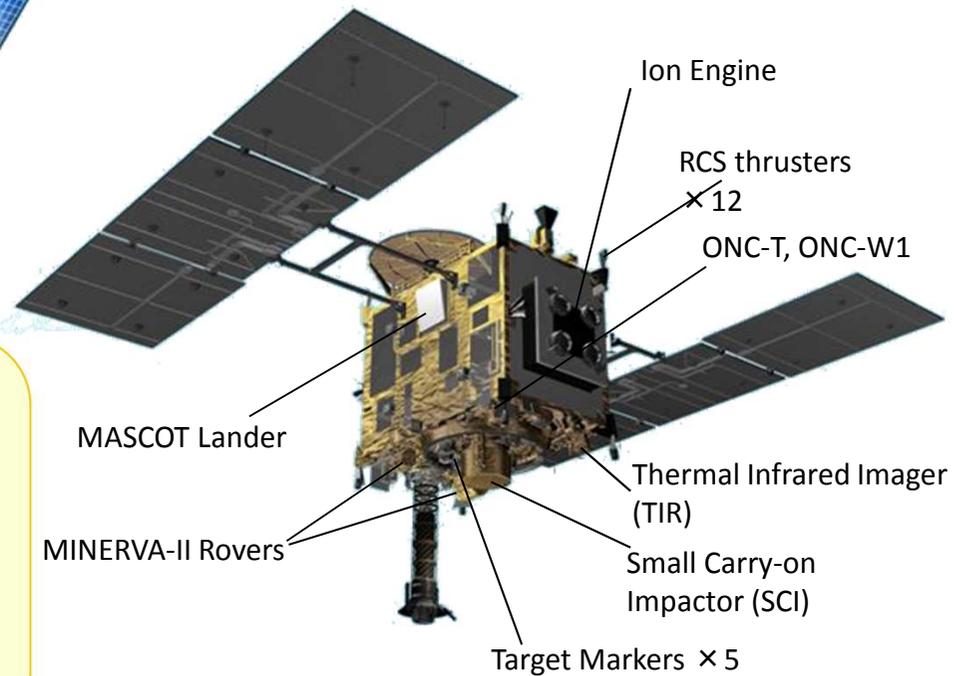
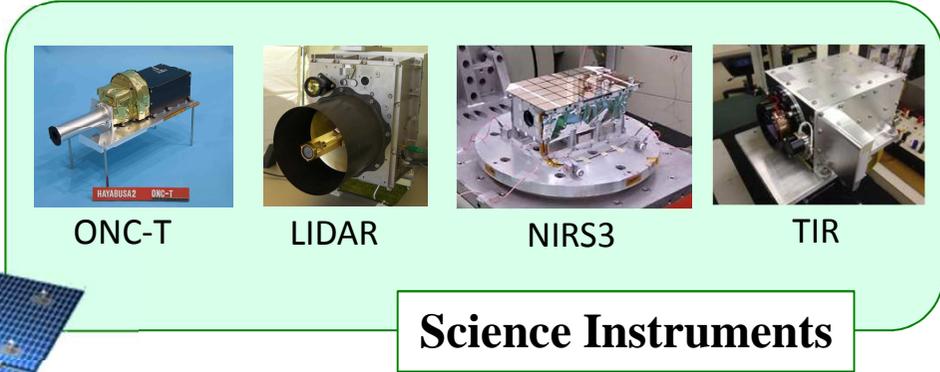
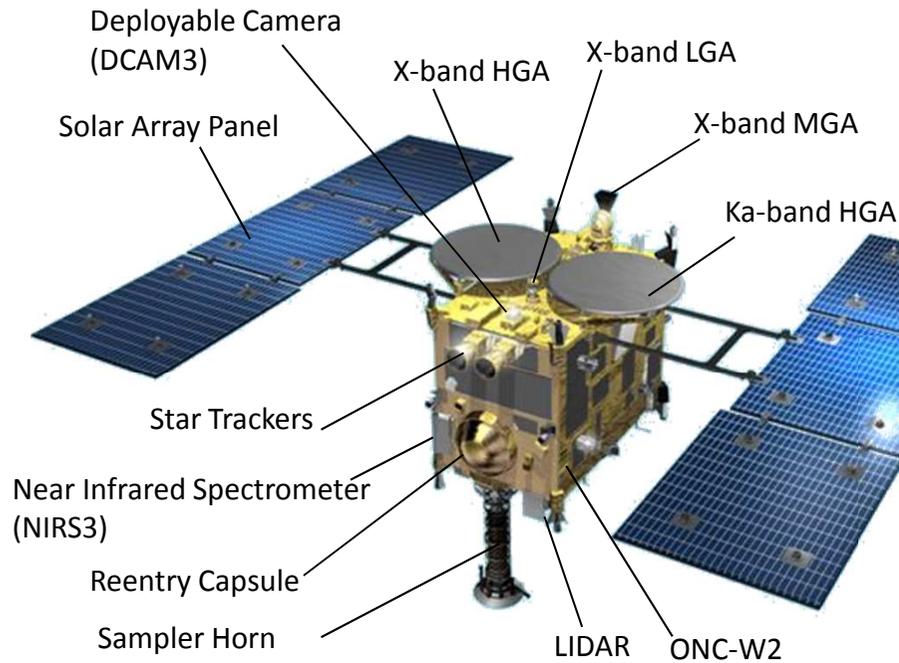


Mission Scenario of Hayabusa2



Hayabusa2 Mission CG

Hayabusa2 Spacecraft



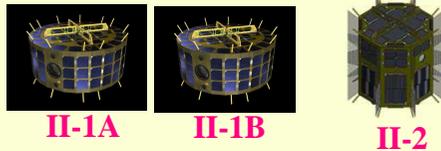
Small Lander and Rovers

MASCOT



by DLR and CNES

MINERVA-II



II-1 : by JAXA MINERVA-II Team

II-2 : by Tohoku Univ. & MINERVA-II consortium

**Size : 1m × 1.6m × 1.25m
(body)
Mass : 600kg (Wet)**



Target Asteroid : 1999 JU3

Asteroid (162173) 1999 JU3

Discovered in May 1999 by LINEAR Team

Shape : almost spherical

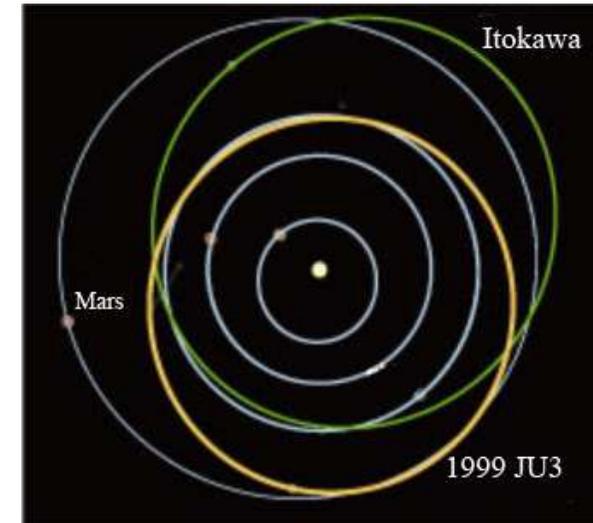
Size : 900 m

Rotation period: 7.6 h

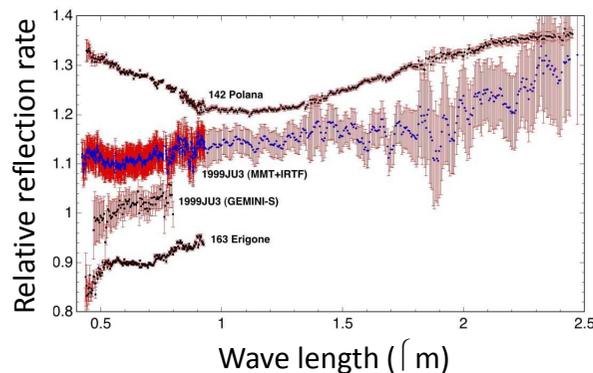
Albedo : 0.05

Type : Cg

Orbit

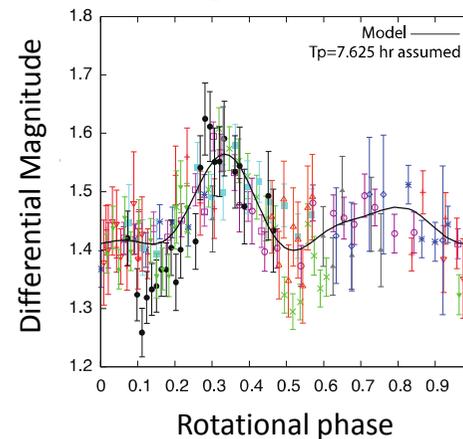


Spectrum



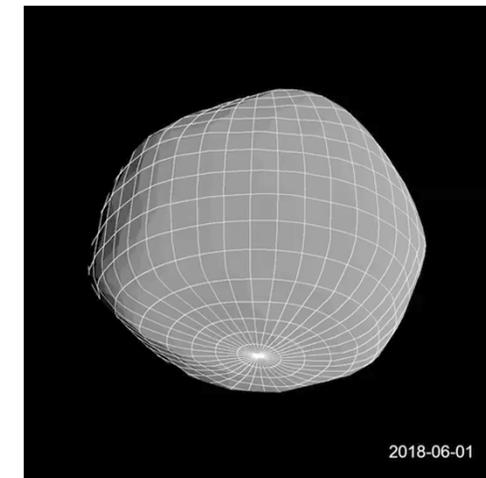
(Data by Viras 2008, Sugita+
2012, Abe+ 2008)

Light curve



(by Kim, Choi, Moon et al.
A&A 550, L11, 2013)

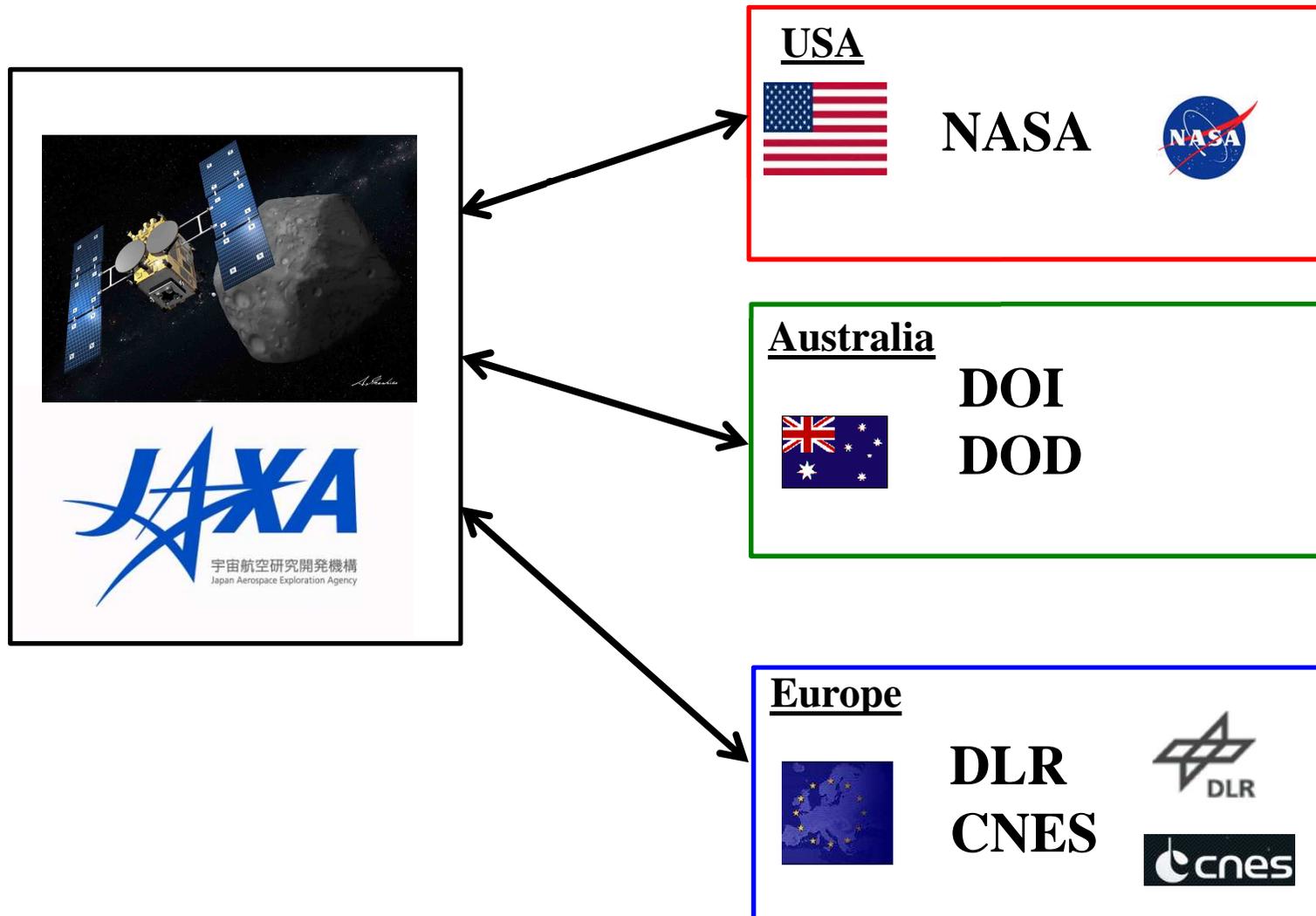
Shape



(by Mueller et al.)



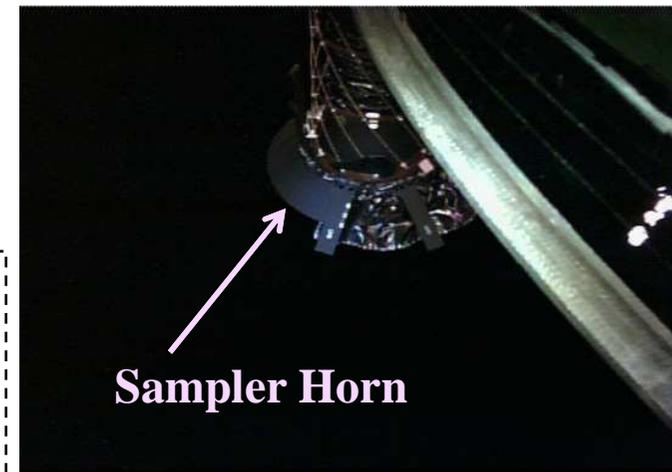
International Cooperation on Hayabusa2



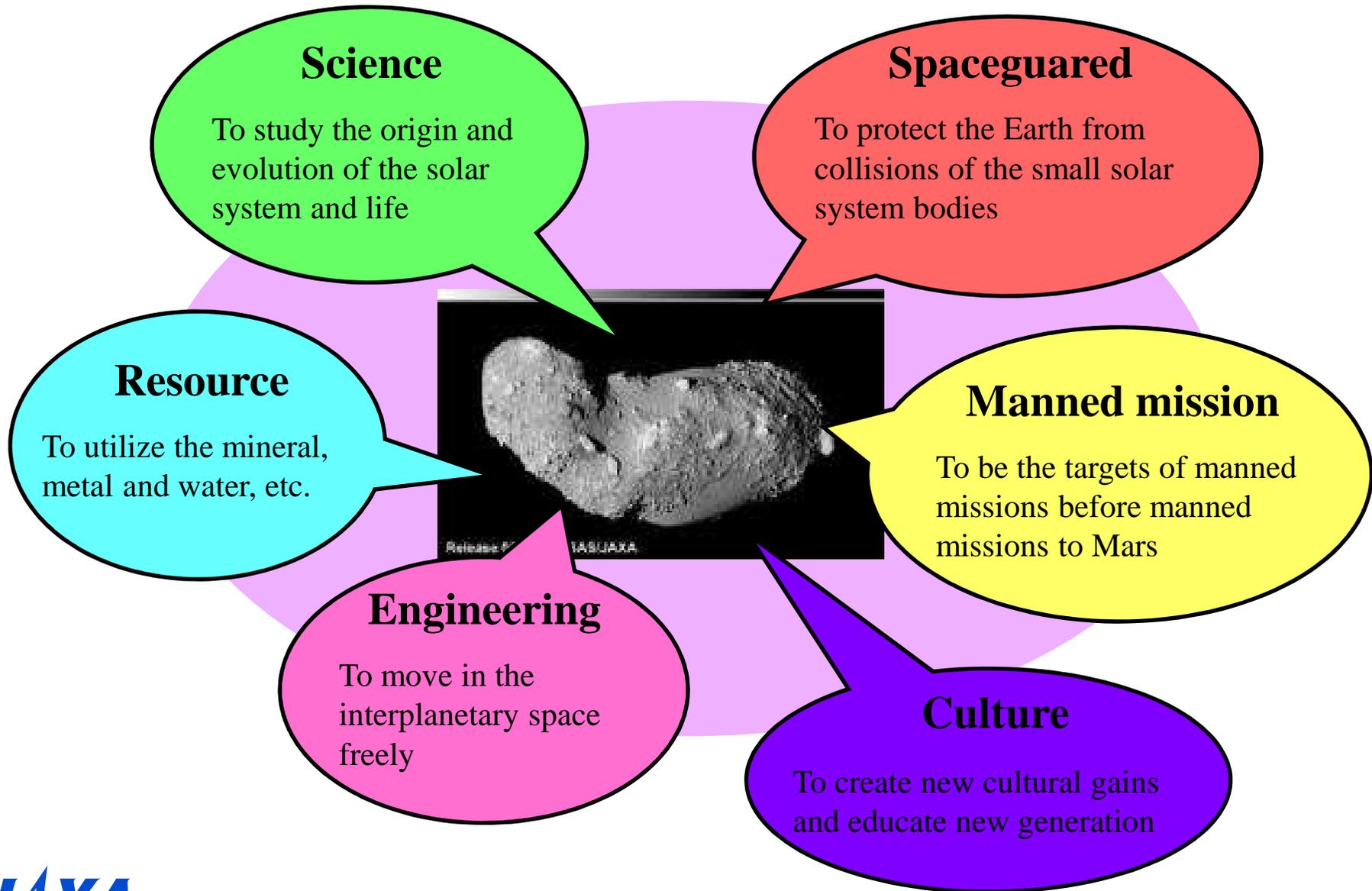
Current Status

- After its launch (3 Dec. 2014), its critical operations were successfully carried out and then the initial check operations are continuing today.
- Up to now, the following functions were verified: power generation, communication (X and Ka band), ion engines, attitude control, orbit determination, and some of the scientific instruments.
- The initial check will continue up to the end of February this year, and then the normal operation will start.
- The next important event is the Earth swingby in Dec. 2015.

Sampler horn was extended in the critical phase. This photo was taken by a small camera, which was installed on board by public donation.



Significance of Asteroid Exploration



Summary

- Hayabusa2 was launched successfully on 3 Dec. 2014, and the operation of the spacecraft is going well as scheduled.
- With the Hayabusa2 mission, Japan will contribute not only to the science for the solar system and the life but also to the social issues related to NEOs.

Thank you!

