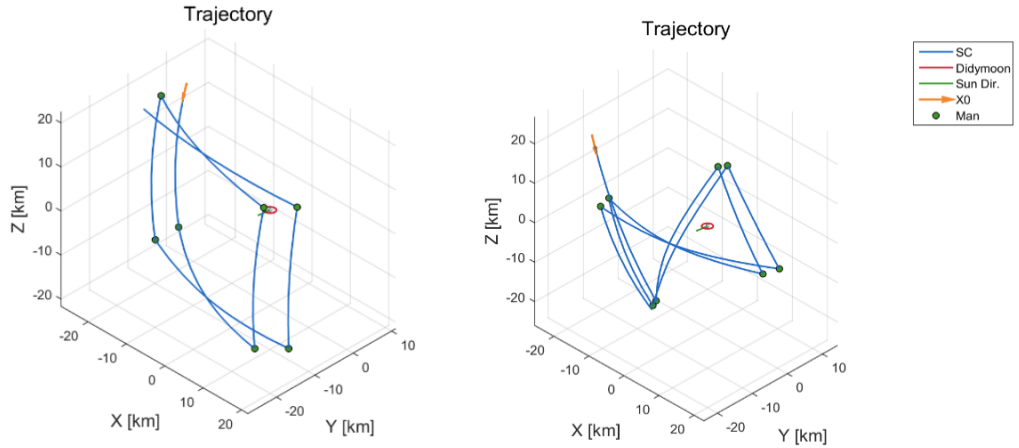
CLOSE PROXIMITY OPERATIONS

ASTEROID CHARACTERIZATION

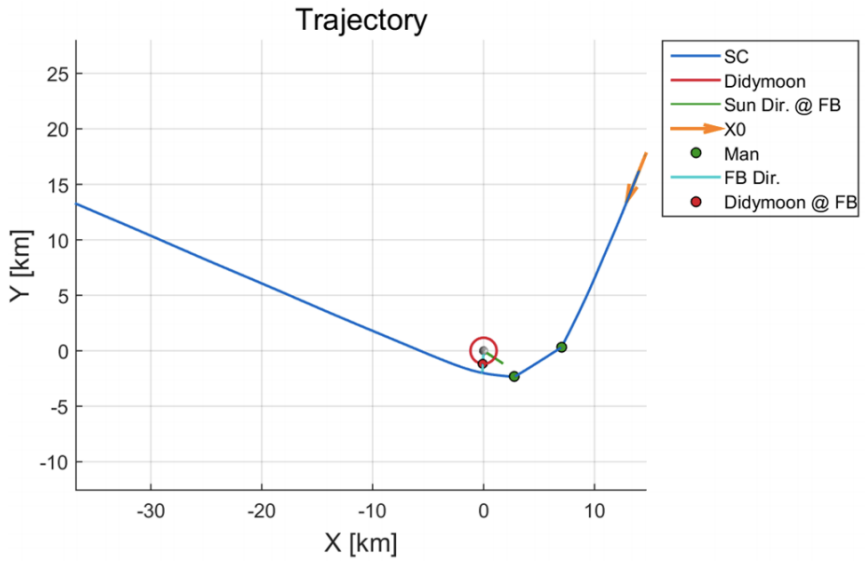
- At first, in the Early Characterization Phase, the SC is manually flown (~30 km)
- Getting closer (~ 10 km), ground based attitude profile leads to the loss of the asteroids from the FoV
- An autonomous correction of the spacecraft pointing will prevent that, using autonomous navigation and centroiding measurements

Hyperbolic Arcs



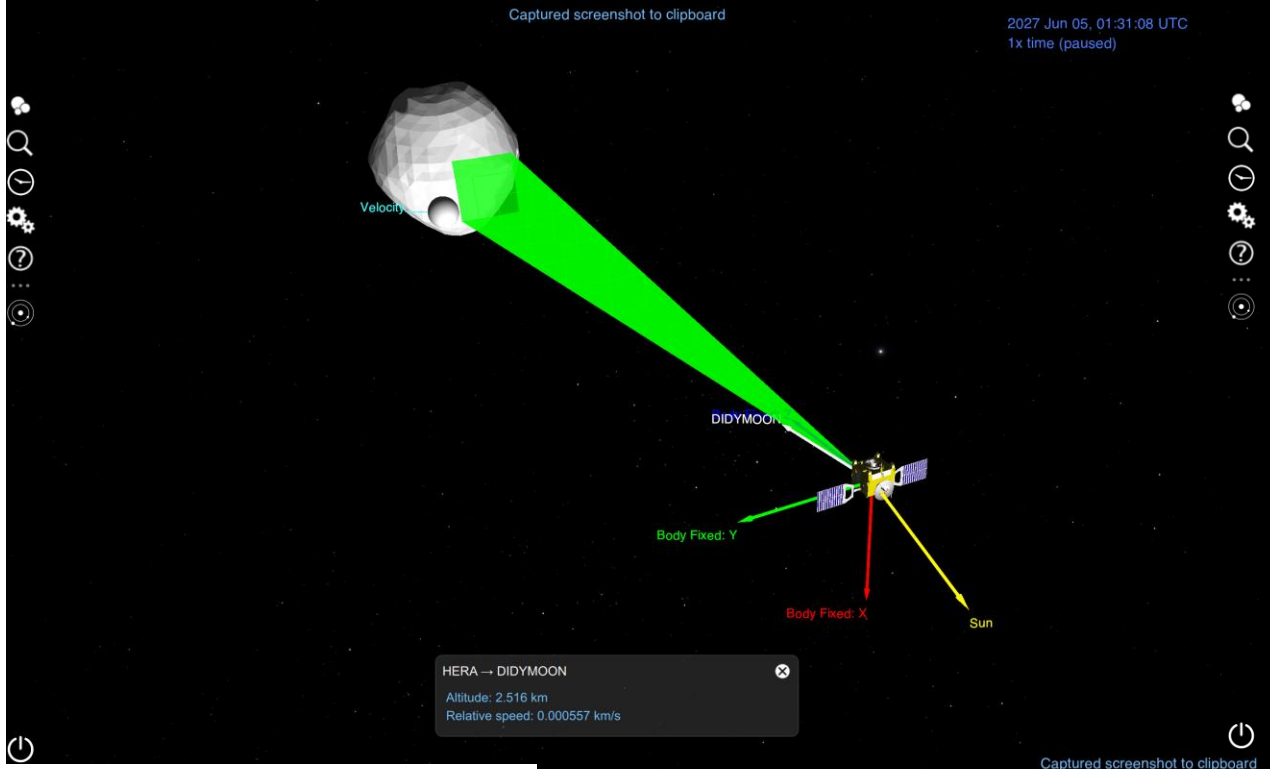
AUTONOMOUS GNC

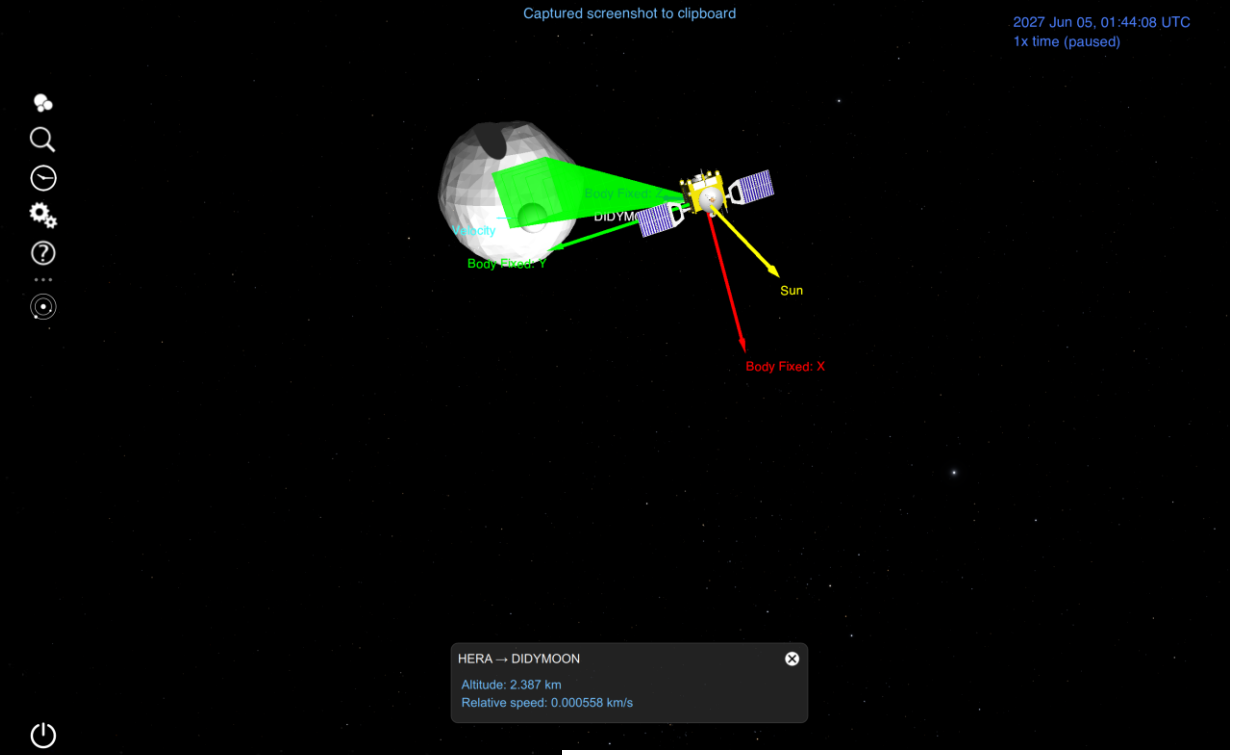
Close Fly-by (@1 km)

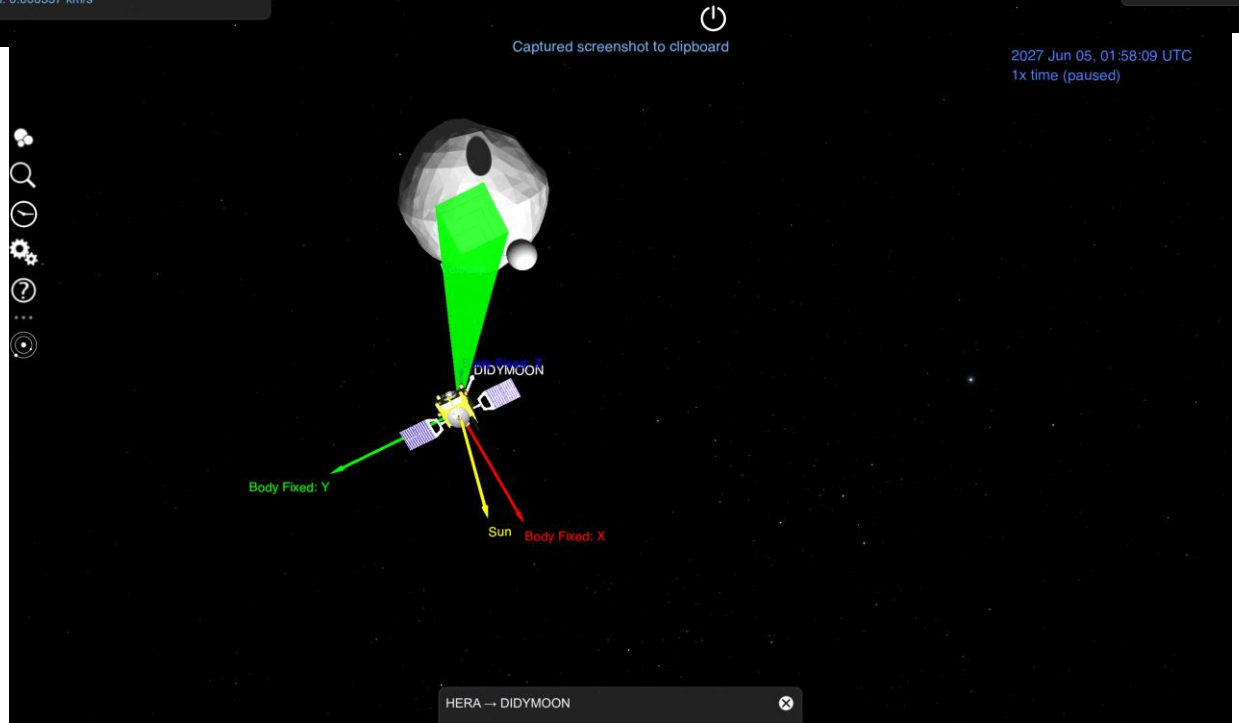


- In order to get even closer, to have high resolution data and maximize science, a sequence of retargeting maneuver will progressively reduce the pericenter of the hyperbolic arcs
- These maneuvers need fast reactions to SC state and have to be performed autonomously (required high precision autonomous navigation based on feature tracking image processing)

http://iaaweb.org/iaa/Scientific%20Activity/conf/pdc2019/IAA-PDC-19-05-08-pr.pdf


Captured screenshot to clipboard
2027 Jun 05, 01:31:08 UTC
1x time (paused)
Velocity
DIDYMOON
Body Fixed: Y
Body Fixed: X
Sun
HERA → DIDYMOON
Altitude: 2.516 km
Relative speed: 0.000557 km/s


Captured screenshot to clipboard
2027 Jun 05, 01:44:08 UTC
1x time (paused)
Sun
Body Fixed: X
HERA → DIDYMOON
Altitude: 2.387 km
Relative speed: 0.000558 km/s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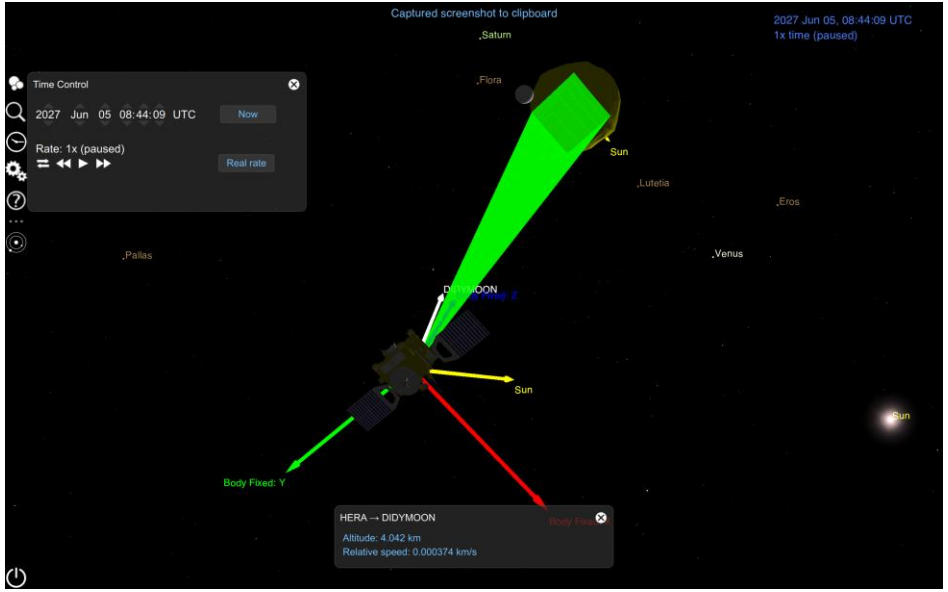
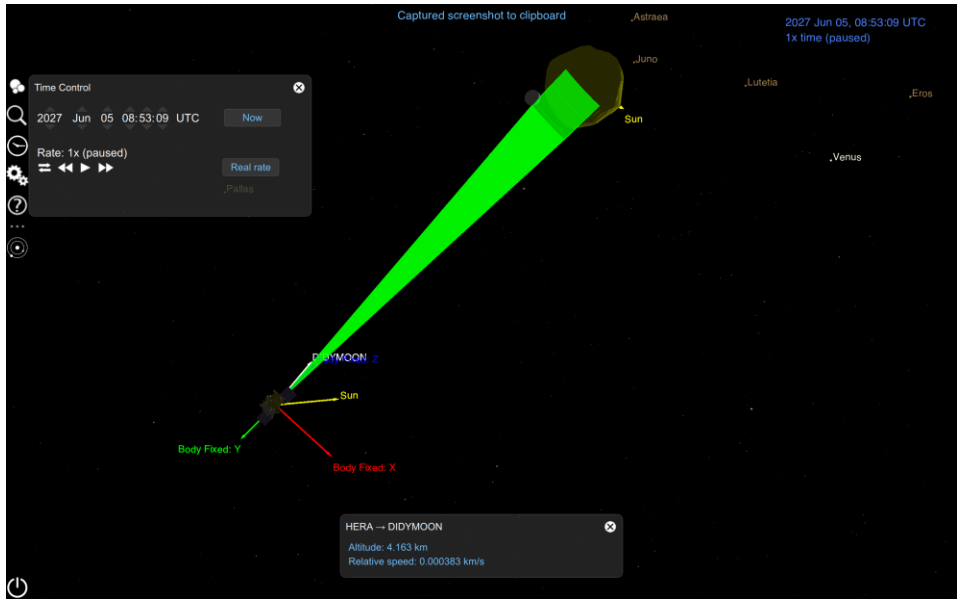
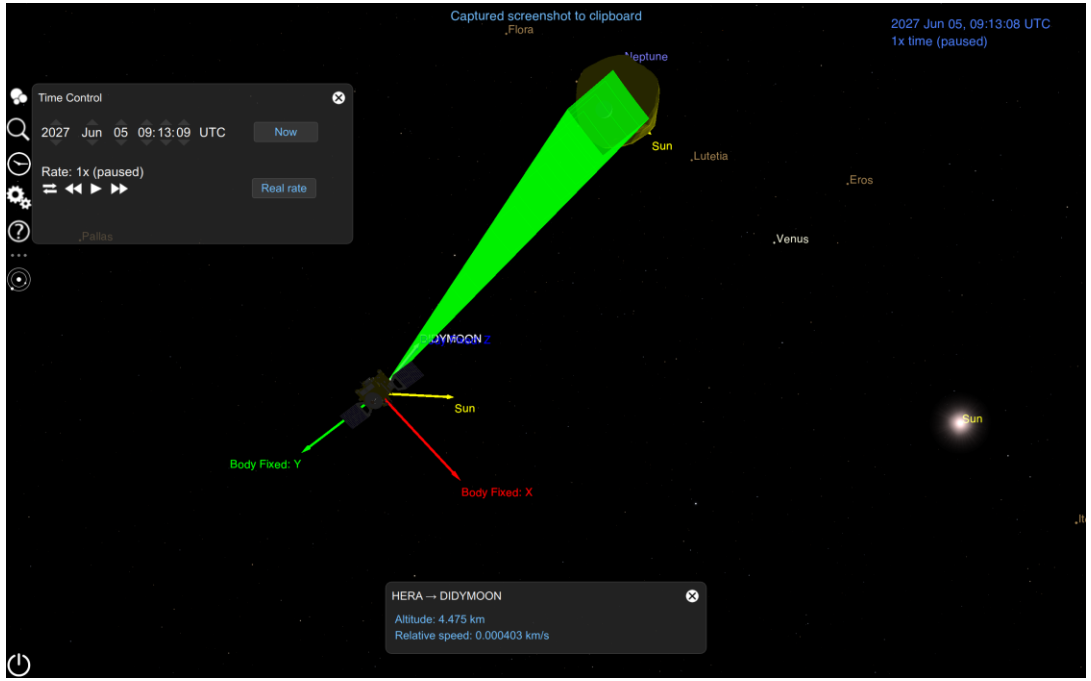
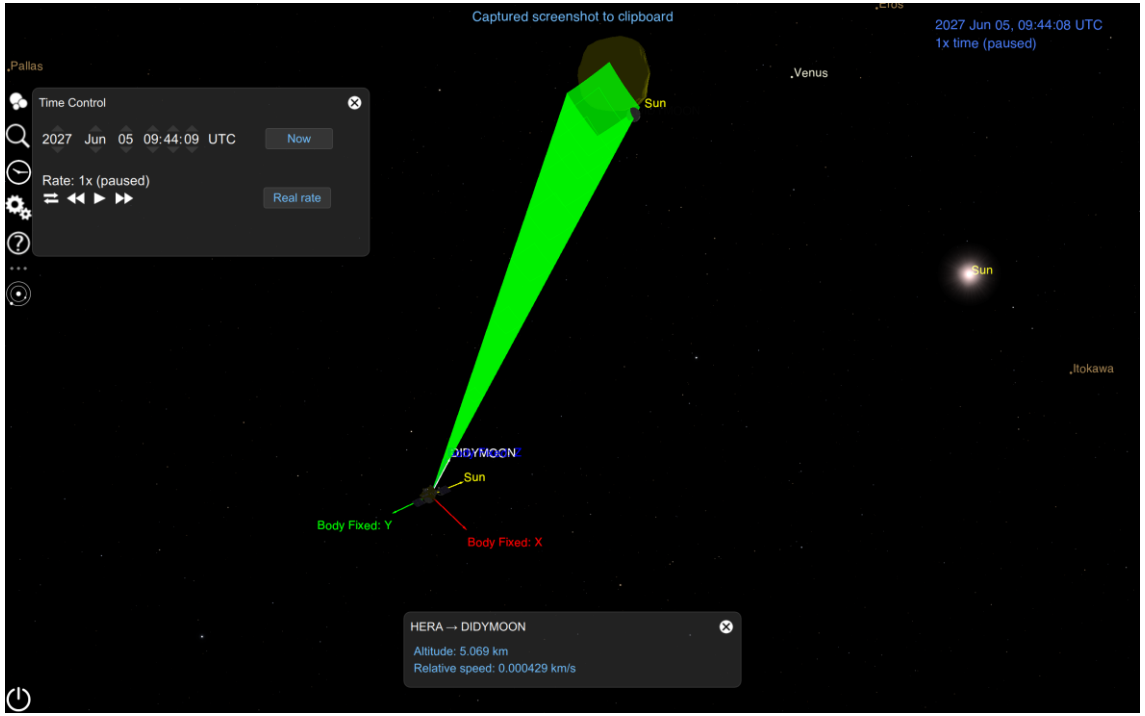
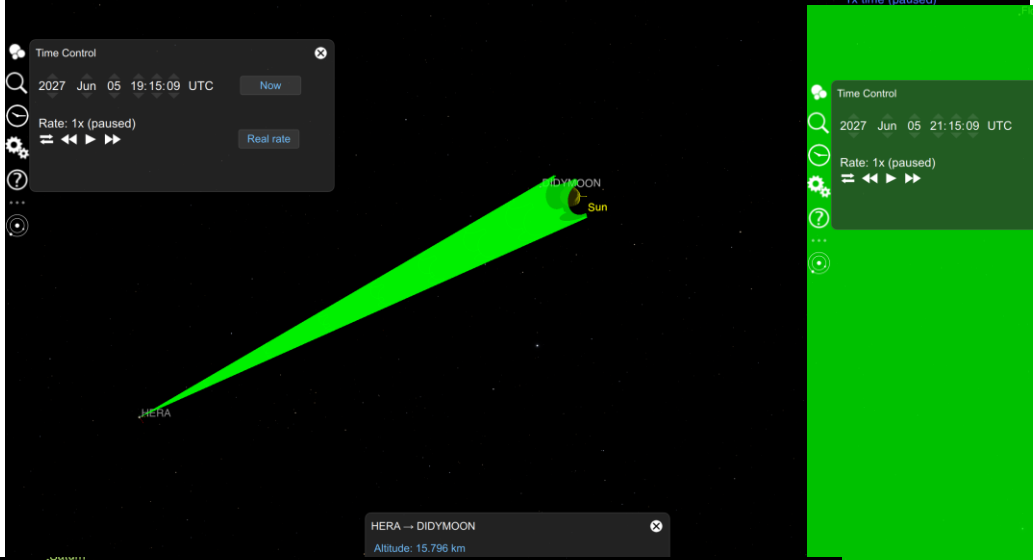
2027 Jun 05, 01:58:09 UTC
1x time (paused)
DIDYMOON
Body Fixed: Y
Sun
Body Fixed: X
HERA → DIDYMOON

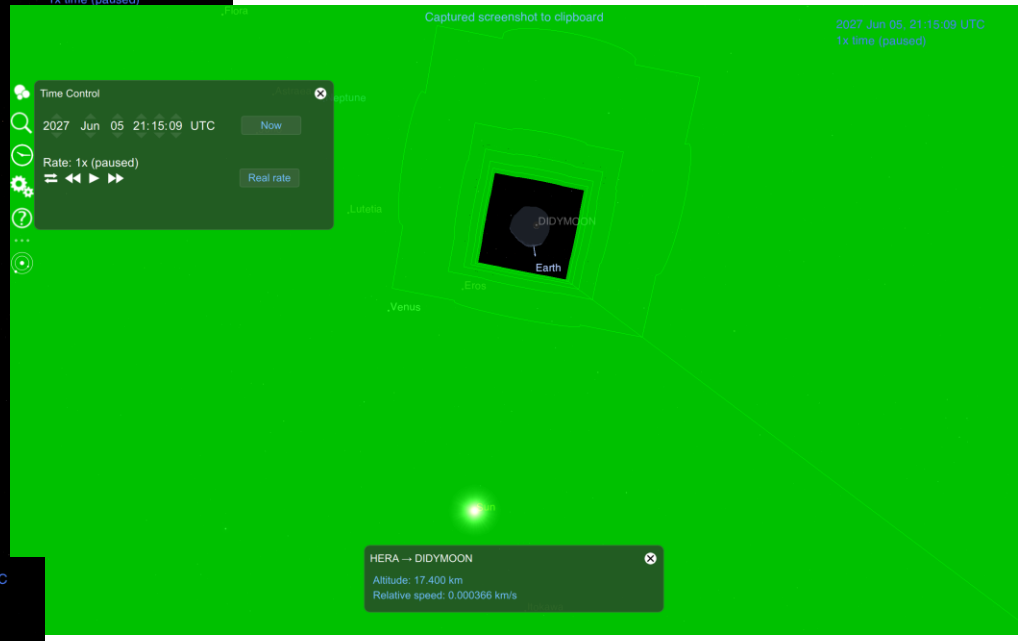

Captured screenshot to clipboard
2027 Jun 05, 08:44:09 UTC
1x time (paused)
Saturn
Flora
Sun
Lutetia
Eros
Pallas
Venus
Time Control
2027 Jun 05 08:44:09 UTC
Now
Rate: 1x (paused)
Real rate
DIDYMOON
Sun
Sun
Body Fixed: Y
HERA → DIDYMOON
Altitude: 4.042 km
Relative speed: 0.000374 km/s


Captured screenshot to clipboard
2027 Jun 05, 08:53:09 UTC
1x time (paused)
Astraea
Juno
Lutetia
Eros
Sun
Venus
Time Control
2027 Jun 05 08:53:09 UTC
Now
Rate: 1x (paused)
Real rate
Pallas
DIDYMOON Z
Sun
Body Fixed: Y
Body Fixed: X
HERA → DIDYMOON
Altitude: 4.163 km
Relative speed: 0.000383 km/s


Captured screenshot to clipboard
2027 Jun 05, 09:13:08 UTC
1x time (paused)
Flora
Neptune
Sun
Lutetia
Eros
Pallas
Venus
Time Control
2027 Jun 05 09:13:09 UTC
Now
Rate: 1x (paused)
Real rate
DIDYMOON Z
Sun
Sun
Body Fixed: Y
Body Fixed: X
HERA → DIDYMOON
Altitude: 4.475 km
Relative speed: 0.000403 km/s


Captured screenshot to clipboard
2027 Jun 05, 09:44:08 UTC
1x time (paused)
Pallas
Venus
Sun
Itokawa
Time Control
2027 Jun 05 09:44:09 UTC
Now
Rate: 1x (paused)
Real rate
DIDYMOON Z
Sun
Body Fixed: Y
Body Fixed: X
HERA → DIDYMOON
Altitude: 5.069 km
Relative speed: 0.000429 km/s


Time Control
2027 Jun 05 19:15:09 UTC
Now
Rate: 1x (paused)
Real rate
DIDYMOON
Sun
HERA


Captured screenshot to clipboard
2027 Jun 05, 21:15:09 UTC
1x time (paused)
Time Control
2027 Jun 05 21:15:09 UTC
Now
Rate: 1x (paused)
Real rate
DIDYMOON
Earth
Venus
HERA → DIDYMOON
Altitude: 17.400 km
Relative speed: 0.000366 km/s


HERA → DIDYMOON
Altitude: 15.796 km
Captured screenshot to clipboard
2027 Jun 05, 23:19:09 UTC
1x time (paused)
Time Control
2027 Jun 05 23:19:09 UTC
Now
Rate: 1x (paused)
Real rate
Flora
Neptune
Astraea
Juno
Lutetia
Eros
DIDYMOON
Earth
Venus
Sun
Itokawa
Mercury
Body Fixed: X
HERA → DIDYMOON
Altitude: 20.273 km
Relative speed: 0.000458 km/s


Captured screenshot to clipboard
2027 Jun 06, 08:20:09 UTC
1x time (paused)
Time Control
2027 Jun 06 08:20:09 UTC
Now
Rate: 1x (paused)
Real rate
Eros
Venus
Earth
HERA → DIDYMOON
Altitude: 29.604 km
Relative speed: 0.000263 km/s

Captured screenshot to clipboard

2027 Jun 13, 23:20:04 UTC
10x time (paused)

Itokawa

Mercury

Earth

Pluto

Ixion

HERA

Time Control

2027 Jun 13 23:20:04 UTC

Now

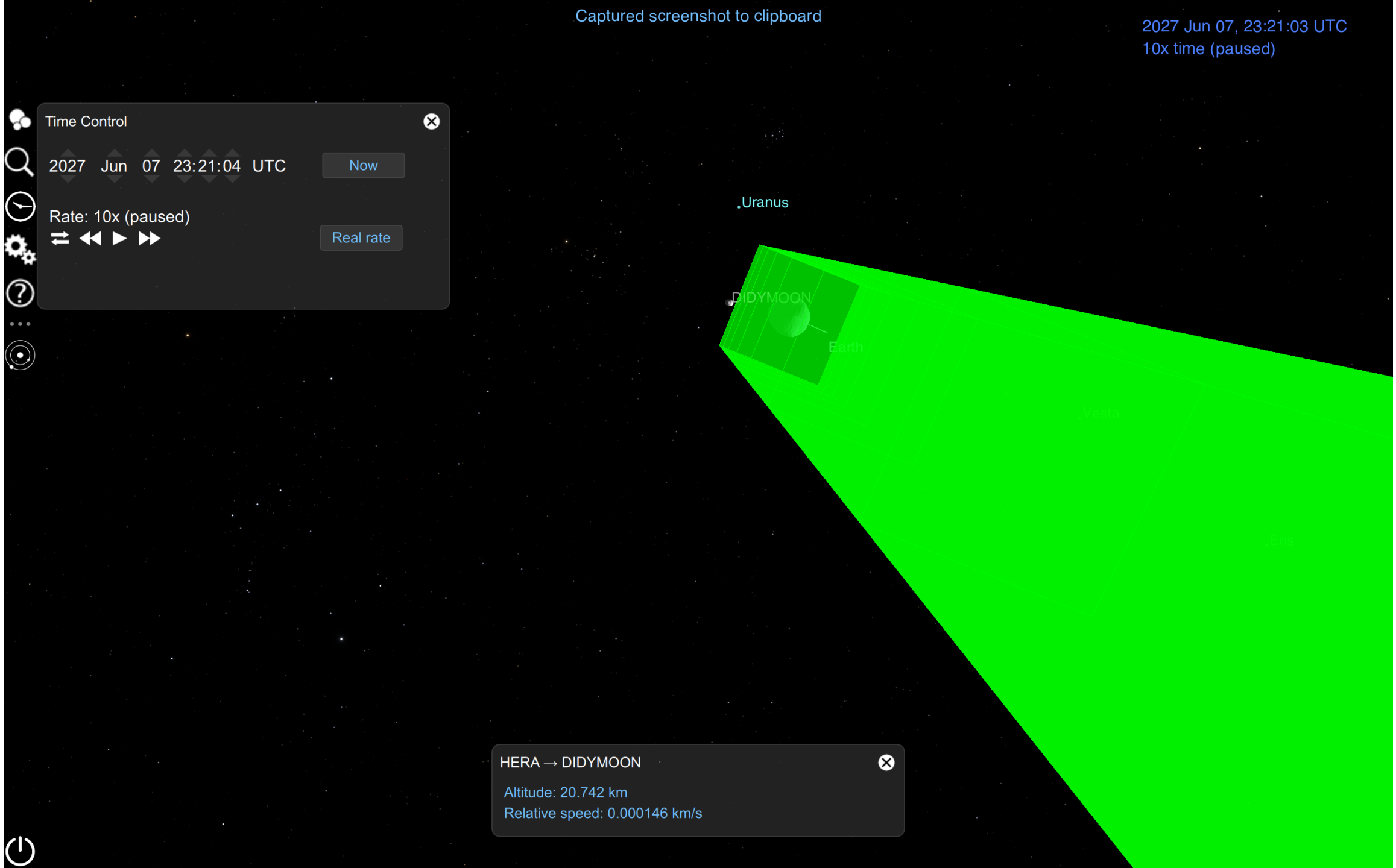
Rate: 10x (paused)

Real rate

HERA → DIDYMOON

Altitude: 18.794 km

Relative speed: 0.000093 km/s


Captured screenshot to clipboard
2027 Jun 07, 23:21:03 UTC
10x time (paused)
Time Control
2027 Jun 07 23:21:04 UTC
Now
Rate: 10x (paused)
Real rate
Uranus
DIDYMOON
Earth
Vesta
Eris
HERA → DIDYMOON
Altitude: 20.742 km
Relative speed: 0.000146 km/s