JUVENTAS

Autonomous GNC System Design for Juventas

MISSION SUMMARY

OBJECTIVES

Main objectives:
- **Interior structure:** Study the internal structure of Dimorphos with a LFR (JURA).
- **Surface properties:** Study the surface properties of Dimorphos via uncontrolled bounces.
- **Gravity field:** Study the gravitational environment on the surface of Dimorphos.

Secondary Objectives:
- **Technology demonstration:** highly-autonomous landing.
- **Dynamical Properties:** Three body dynamics/SSTO.
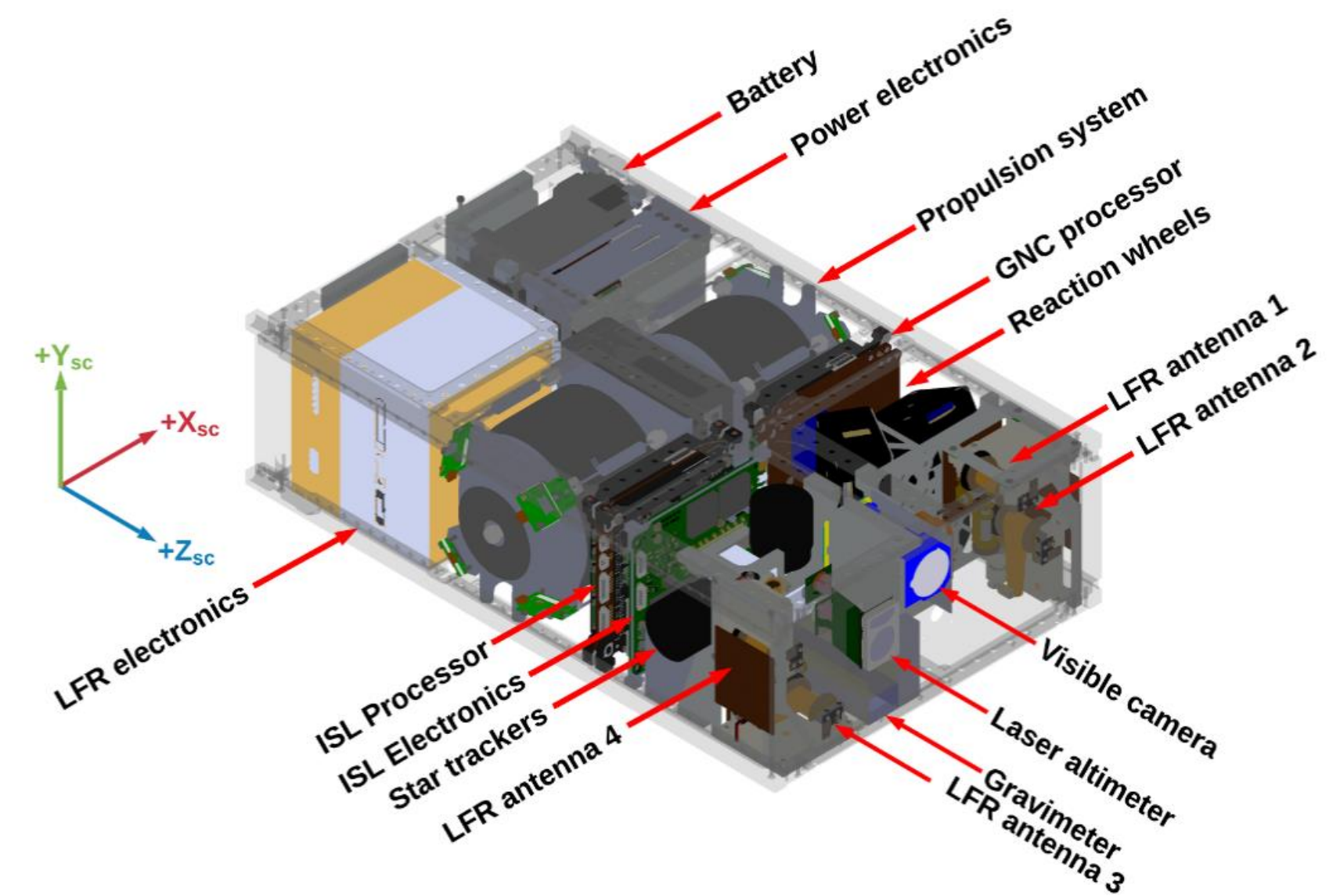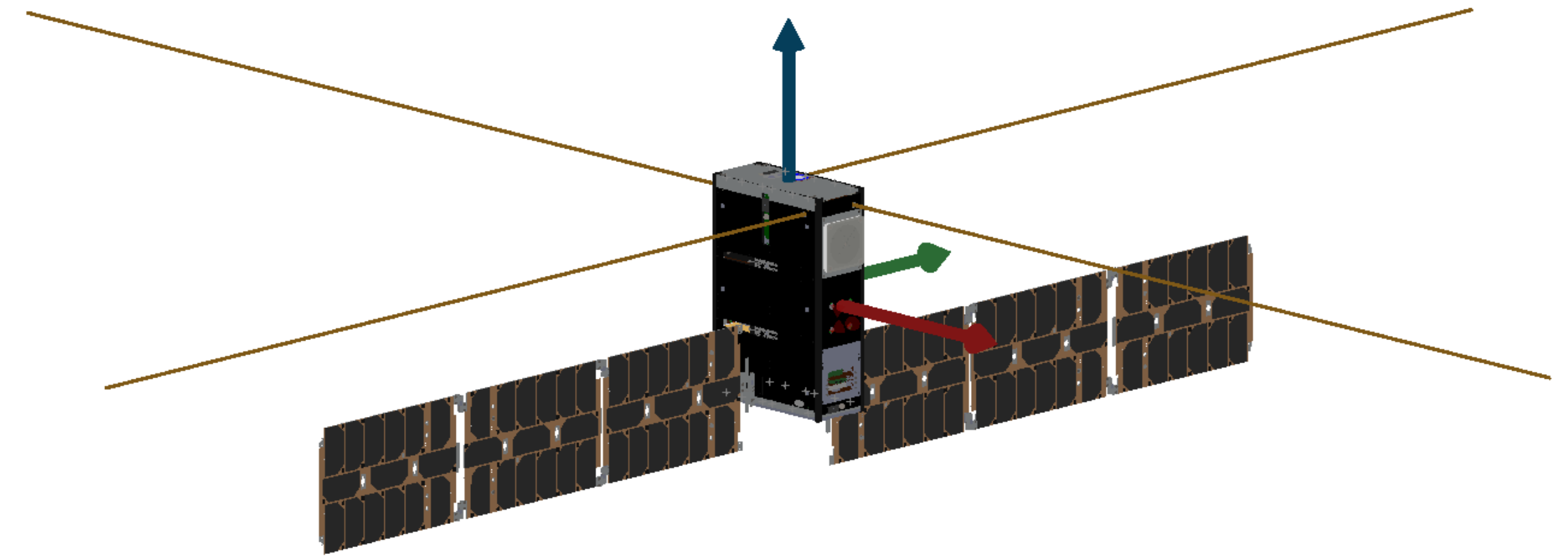
GOMSPACE   gmv

JUVENTAS CUBESAT

SENSORS

AOCS Units
- ISL Antenna (±X)
- Visible Camera + Laser Altimeter (-Z)
- Star Tracker (-X)
- IMU
- Sun Sensors
- Infrared Sensors

Attitude strategy:
- Camera + Altimeter pointing to Didymain (+Z)
- Sun direction perpendicular to Y axis.
- -X face shadowed

GLOBAL & PROXIMITY OBSERVATIONS PHASES

SUN-STABILIZED TERMINATOR ORBITS

Equilibrium elliptical orbits perpendicular to sun direction due to high SRP perturbation.
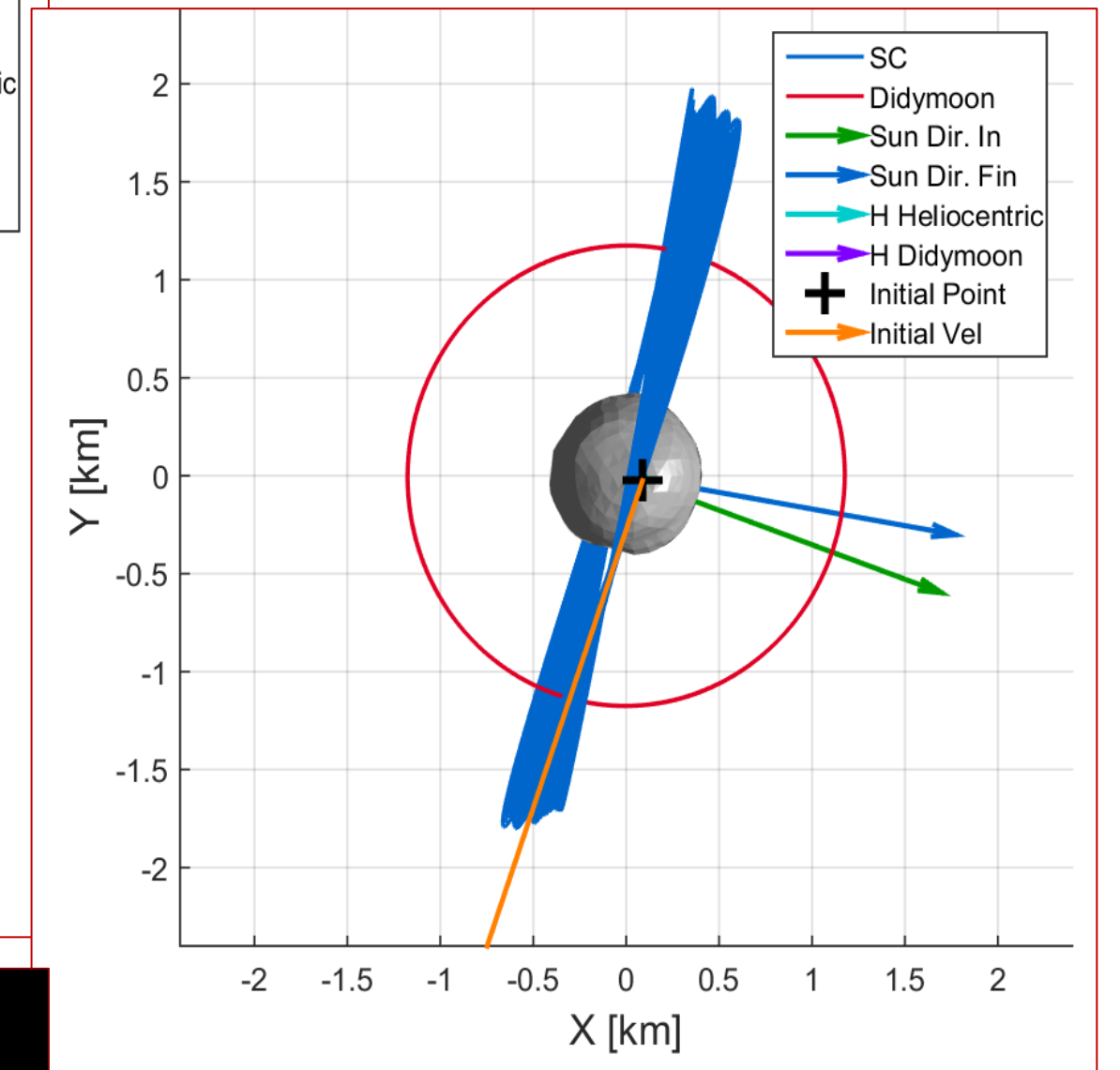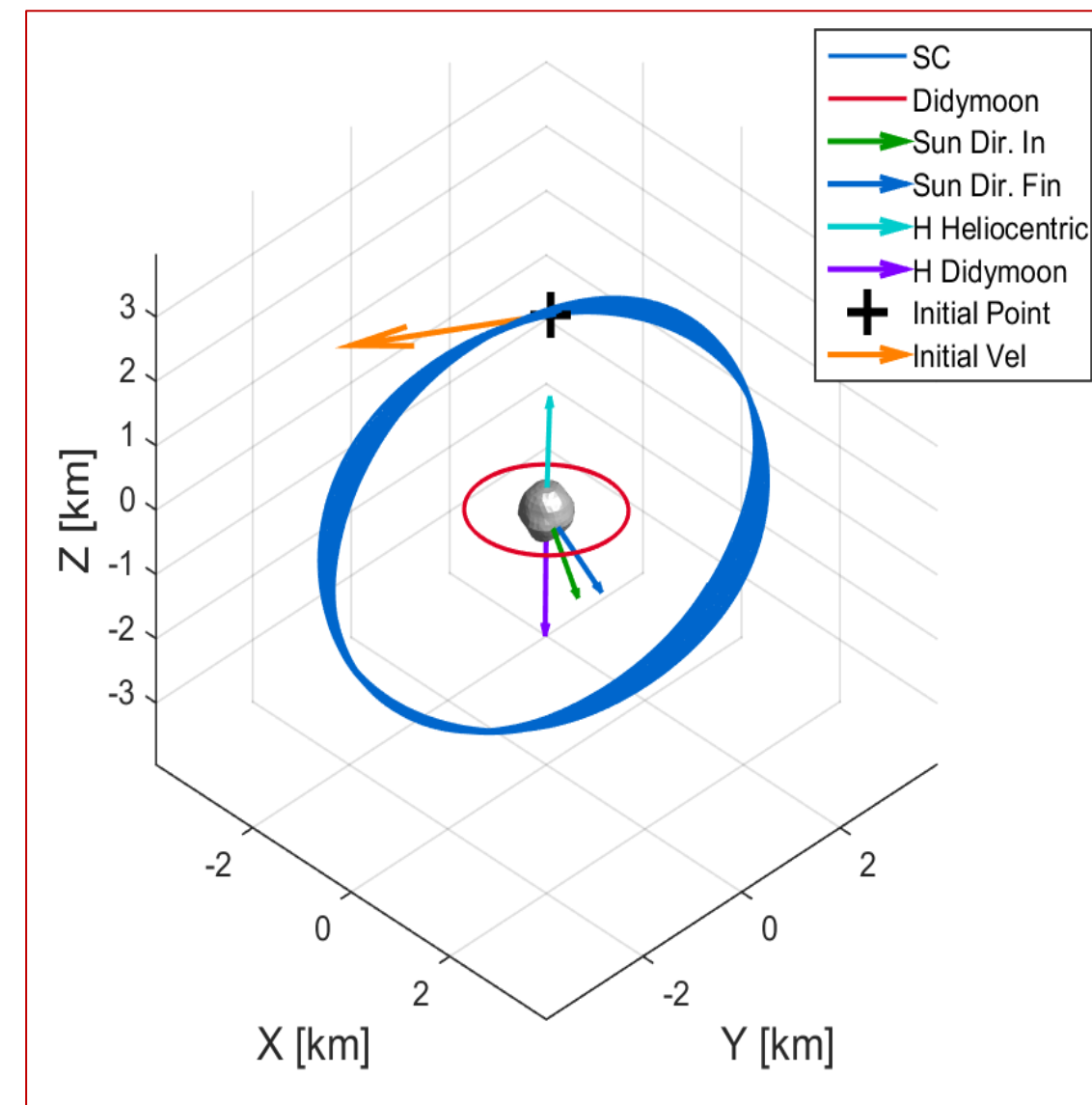
- Upper bound where the SRP drags the SC away From 7.5 km to 11 km

Two phases:
- Global Observations Phase: 3.3 km
- Proximity Observations Phase: 2.0 km

Attitude strategy:
- Camera + Altimeter pointing to Didymain.
- Sun direction perpendicular to Y axis.
- Solar panels rotated to maximize solar exposure 90º
- ISL +X mainly facing HERA
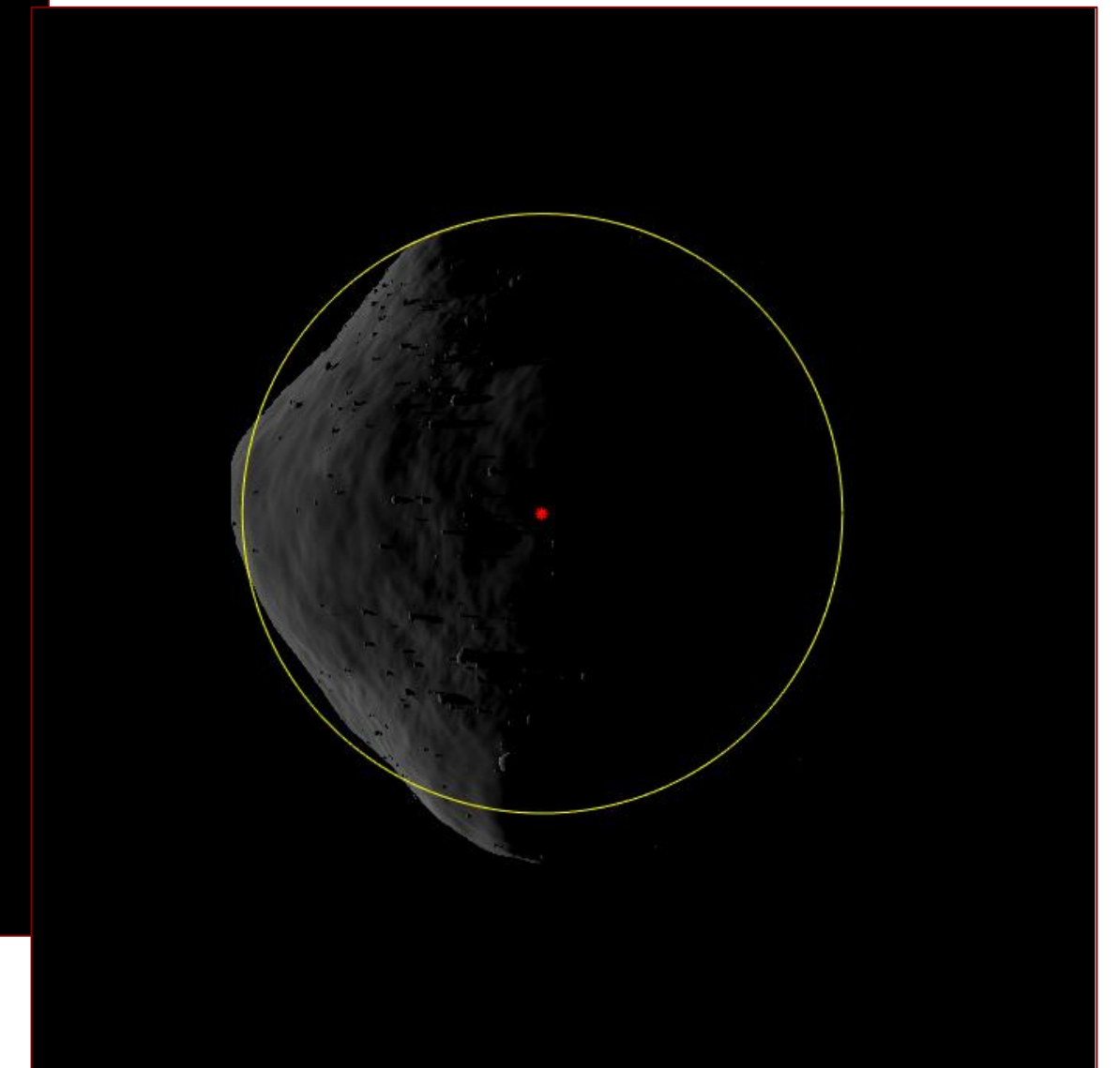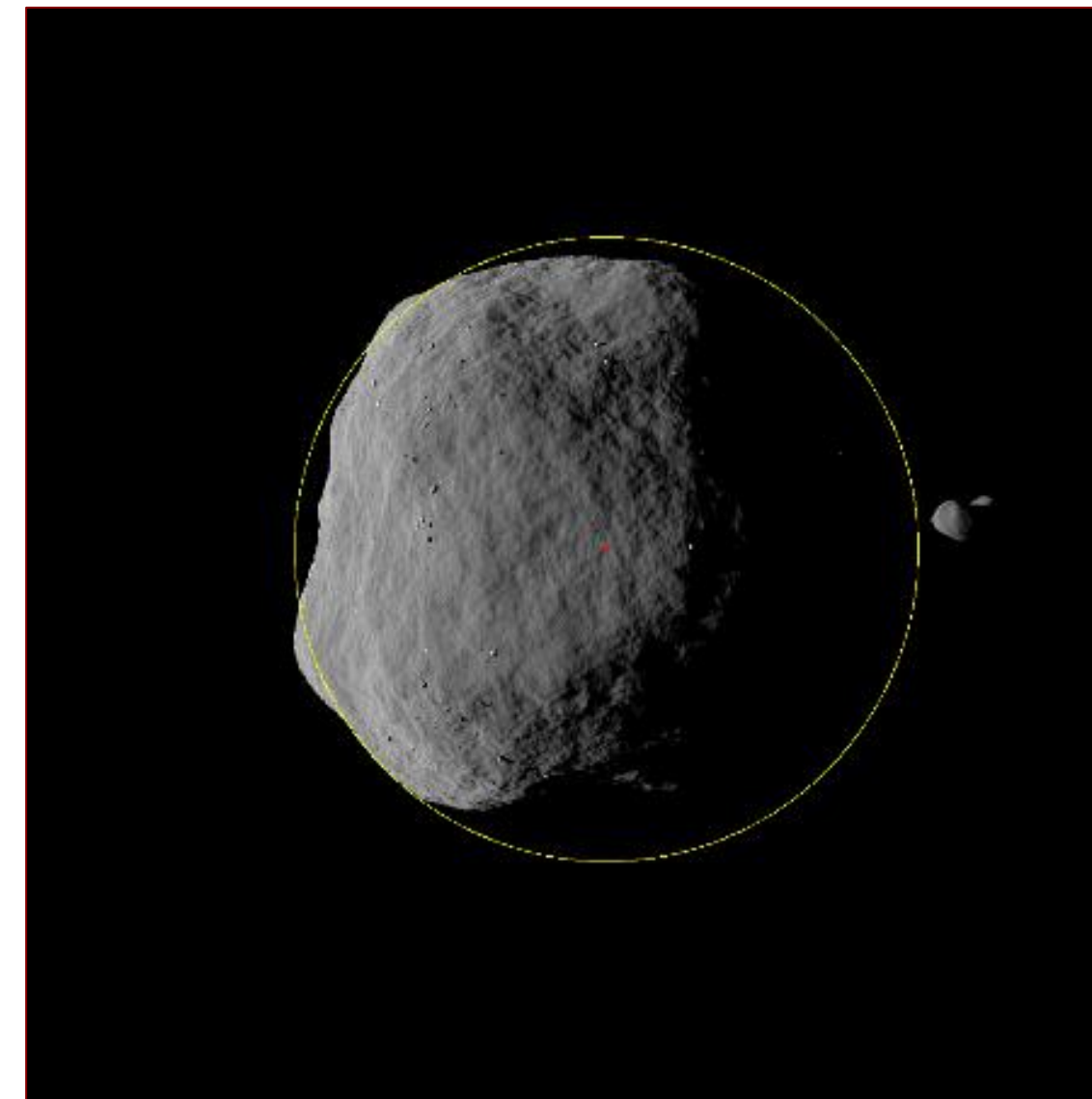
LANDING STRATEGY

STRATEGY

- Direct landing
- Indirect landing through L2

DRIVERS

- Maneuver execution errors
- Duration of the trajectory
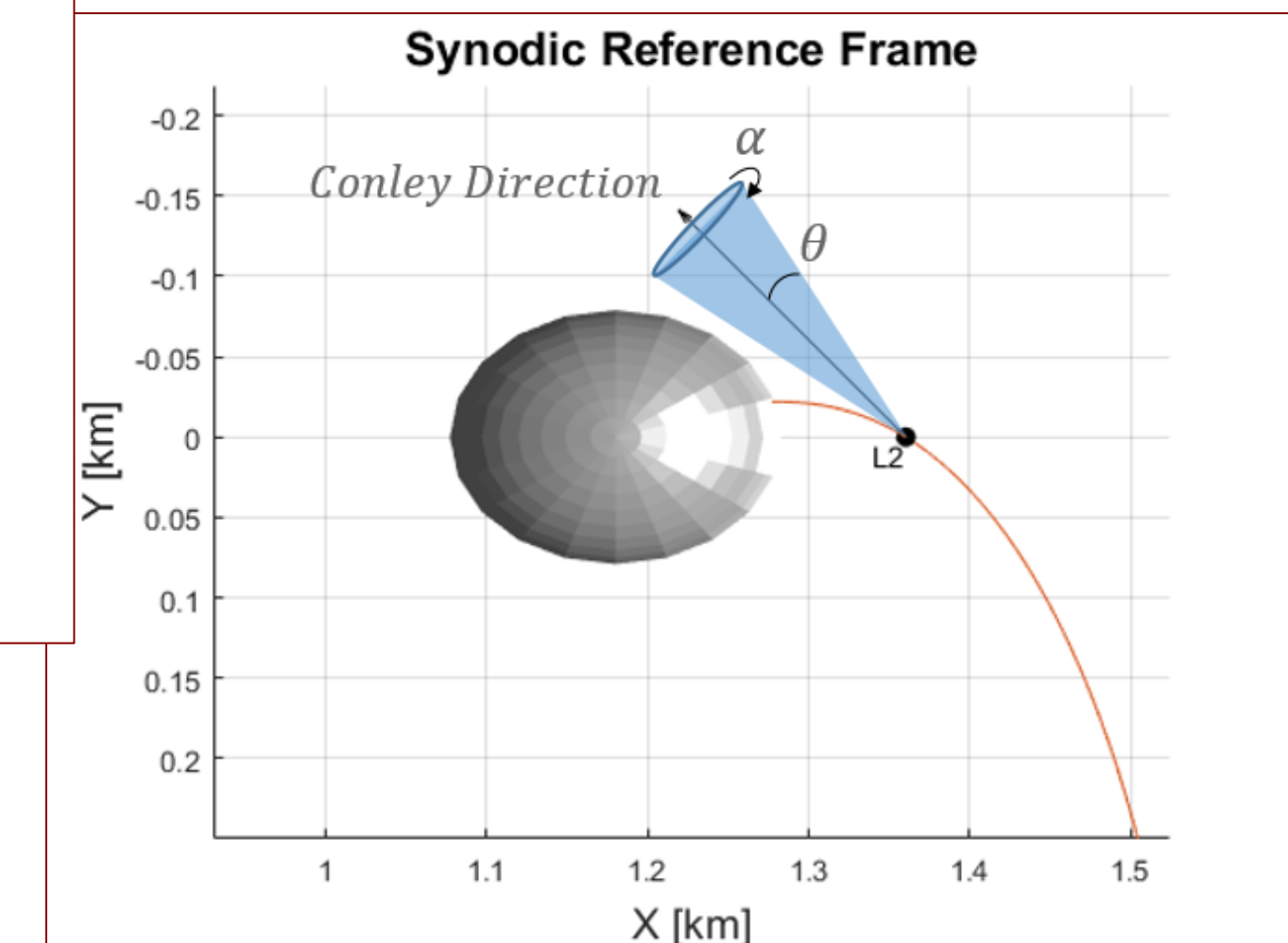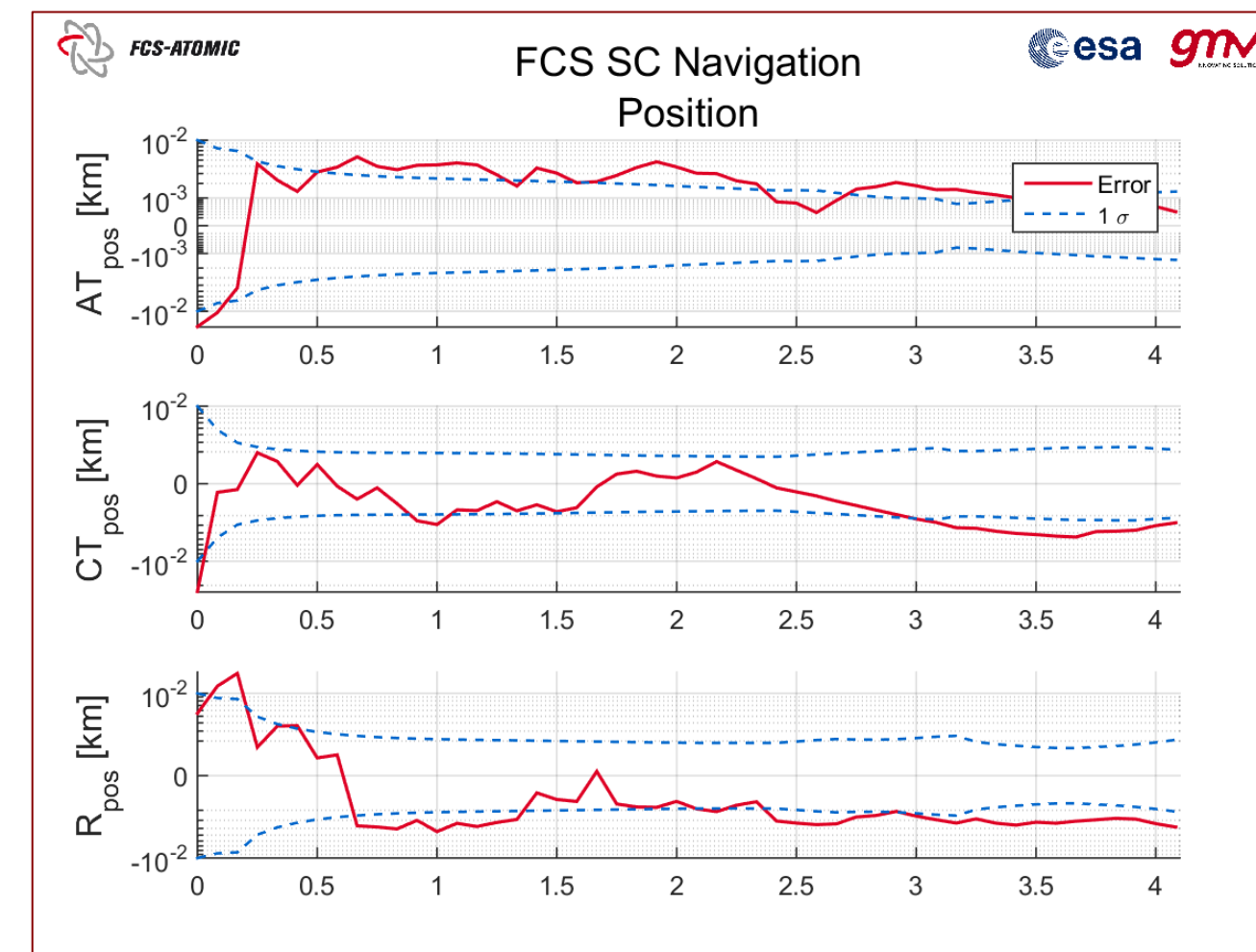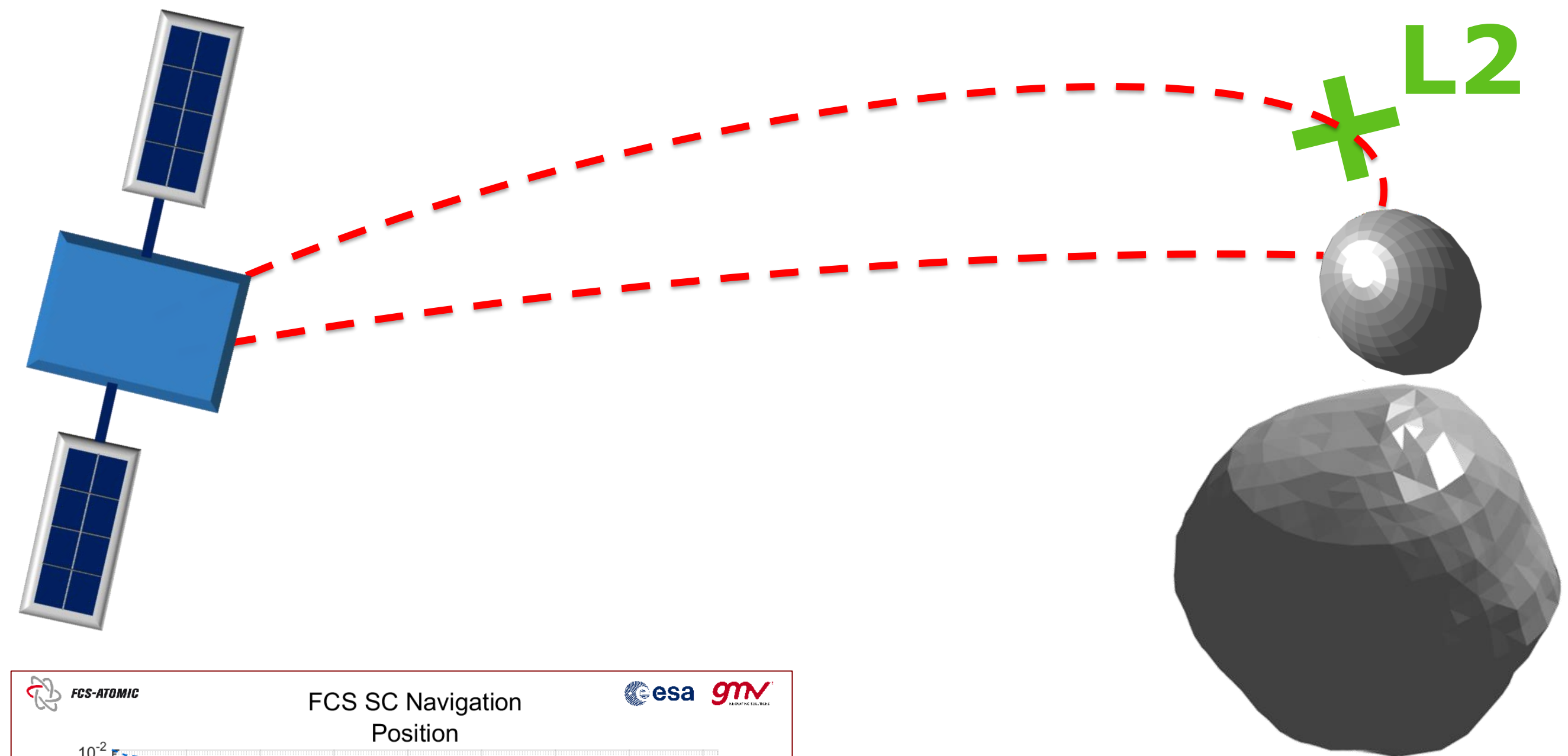- Touchdown velocity/incidence angle

GNC STRATEGY

- **Navigation:**
  - Centroiding on Didymoon until FoV Saturation.
  - Altimeter.
- **Guidance:**
  - Adaptive based on current known dispersion.
  - Braking maneuver.

Thank you

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