HERA vision based GNC

PRELIMINARY DESIGN

7th IAA Planetary Defense Conference 2021

gmv INNOVATING SOLUTIONS

The HERA mission

and the challenging proximity operations!

What is HERA

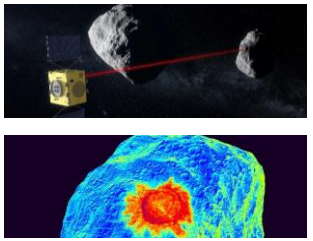
HERA is a European mission of opportunity in the frame of planetary defense, with the main objective of demonstrating the kinetic impactor technique on a binary asteroid system. It is part of AIDA, an international NASA- and ESA-supported collaboration that will combine the data obtained from NASA's DART mission (which includes ASI's LICIACube) and ESA's Hera mission to produce the most accurate knowledge possible from the first demonstration of an asteroid deflection technology.

HERA autonomous vision based GNC

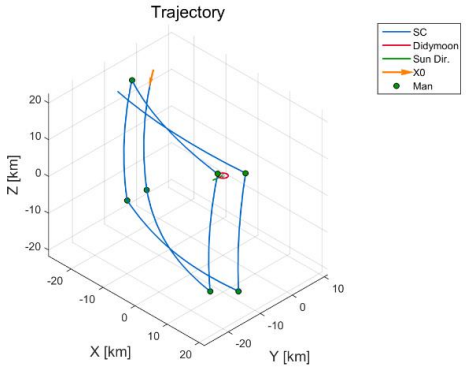
Using autonomous navigation and centroiding measurements HERA will not lose the asteroids from the FoV

Kinetic impactor technique demonstration

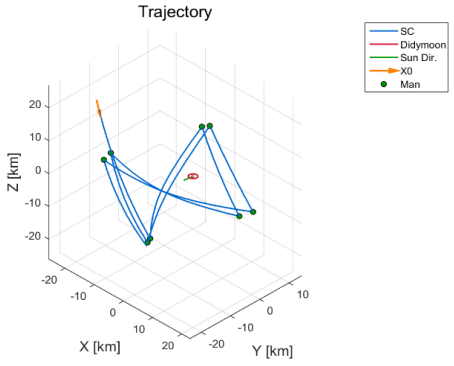
Technology demonstration & Science



Hyperbolic Arcs



Distances between 20 and 30 km

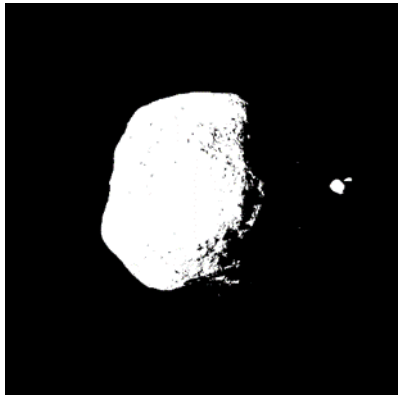


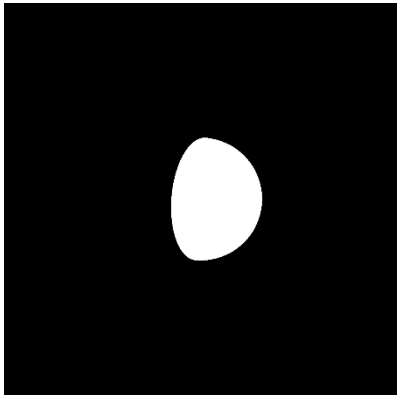
Distances between 10 and 23 km

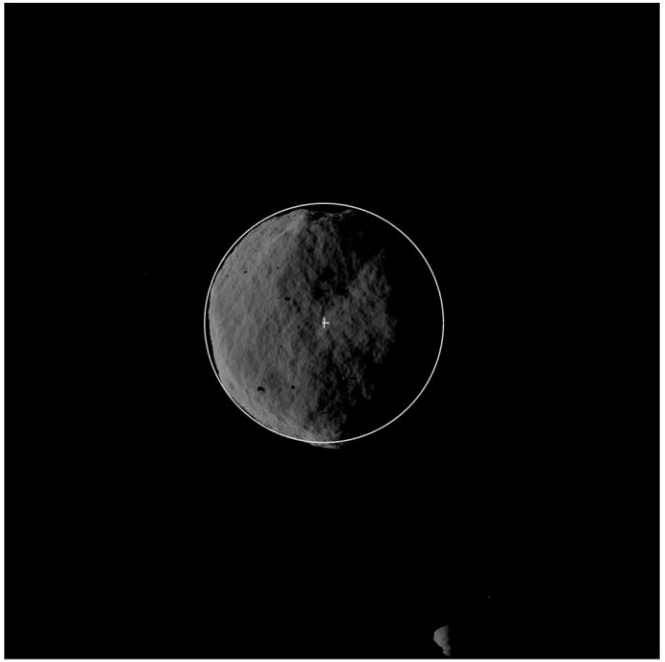
Centroiding based navigation

Robust technique that can be used when the asteroid is entirely in the FoV

- To be robust to the illumination condition a correlation with the Lambertian sphere is performed
- Robustness to the presence of the secondary in the FoV has been demonstrated

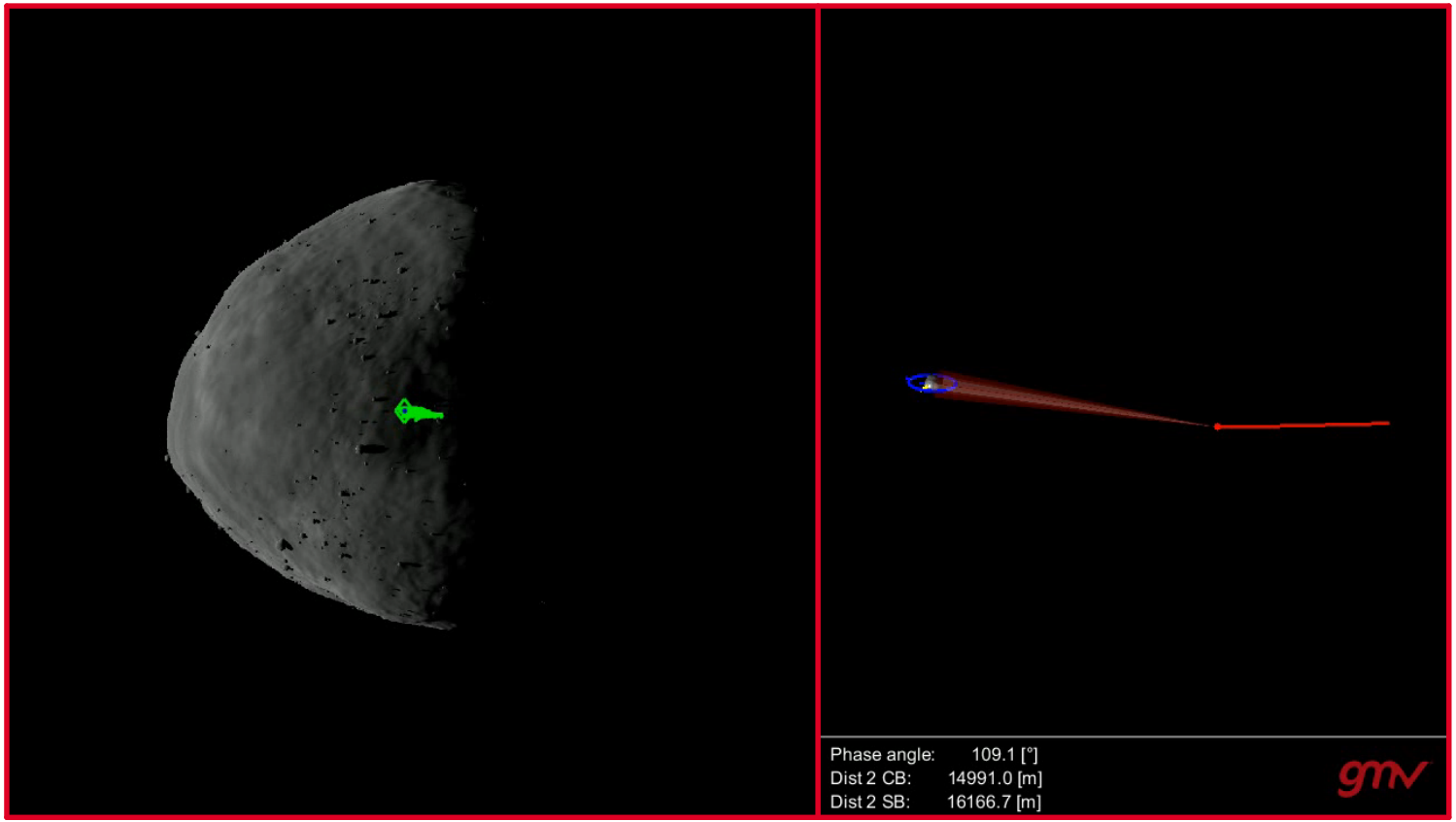






Feature Tracking based navigation in the EXP phase

Getting closer, using autonomous manoeuvres and state of the art vision based technologies



Thank you

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