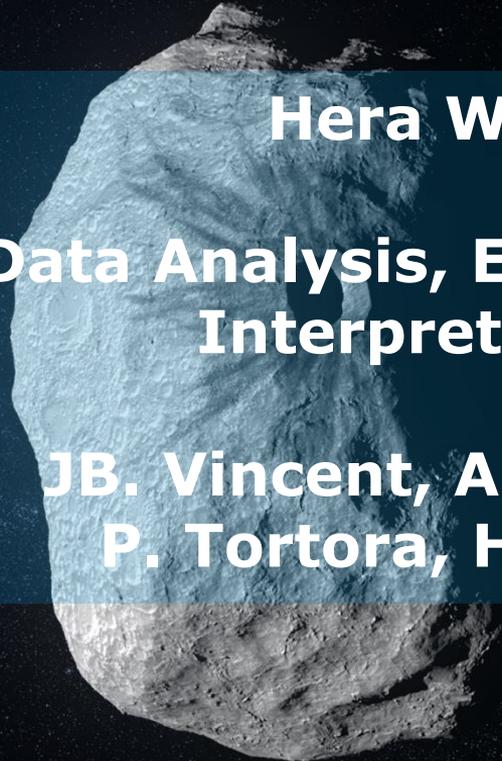
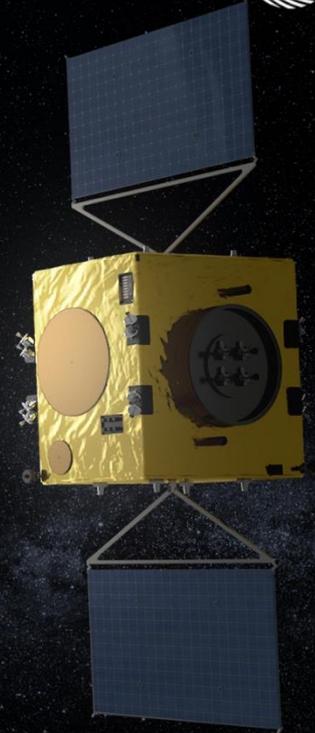




**Hera WG5**

**Data Analysis, Exploitation,  
Interpretation**

**JB. Vincent, A. Hérique,  
P. Tortora, H. Sierks**



# Working Group 5 Objectives



*Hera is ESA's contribution to the Asteroid Impact Deflection Assessment (AIDA) international cooperation, **to validate the "kinetic impactor" asteroid deflection technique.** Hera will also be the **first in-depth investigation of a binary asteroid** and will perform relevant measurements for the preparation of asteroid resources utilization.*

WG5 is responsible for the **data analysis, exploitation, and interpretation.**

In phase B1, we will define the processing pipelines necessary to produce and interpret the data relevant to the prime objectives of the mission.

We will work in close collaboration with WG4 (operations) and instrument teams.



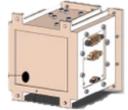
# Current payload



## **AFC** (Asteroid Framing Camera)

Inherited from the Dawn mission, data reduction chain available and well tested. Analysis tools and secondary products generation solutions exist, we need to assess their use for much smaller targets.

**Other instruments:** we are gathering information about their designs and data pipelines. Need to define interfaces between different software packages for the mission, and get simulated data sets for testing.



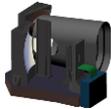
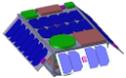
## **PALT** (planetary altimeter)

## **HYPTIRA** (VNIR/TIR imager)

## **Cubesats**

## **Radio science investigation**

...



See talks in this workshop

# Major tasks in phase B1



Define the payload data processing chain as obtained according to WG4 specifications, in order to achieve the mission objectives. In particular, the focus must be on an end-to-end data processing chain, including the interfaces between the different software tools.

Generate simulated raw data for each payload and extract the information that allows accomplishing mission objectives.



# Major task in phase B1



## Two main levels of data processing

- Calibration, primary products:

What data is being produced by the instruments ? Are the calibration pipelines ready/well defined ? What is missing ? Are operational scenarios compatible with instrument design (e.g. image cadence, closest fly-by distance, ...) ? If not, what should be improved (instrument capabilities ? trajectories ?). Close interaction with WG4 required.

- Secondary products, interpretation:

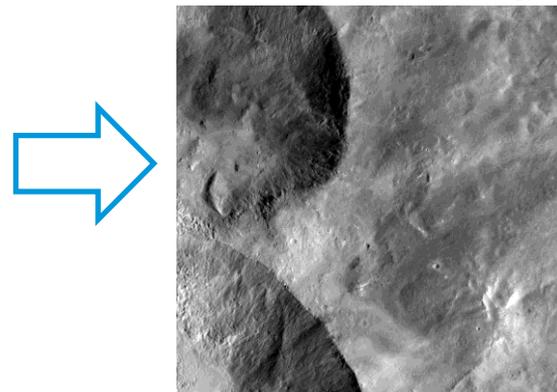
Maps, topographic profiles, temperature variations, 3D shape model, boulder size distribution, ...

What do we need to measure in order to reach the prime objectives ? Do we have the tools/algorithms to do so from the calibrated data. Feedback to WG4.



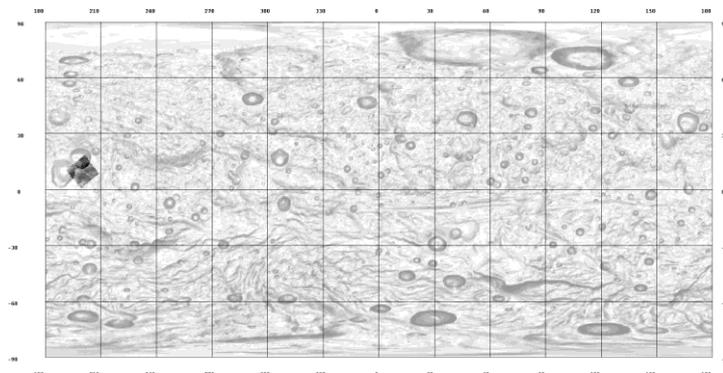
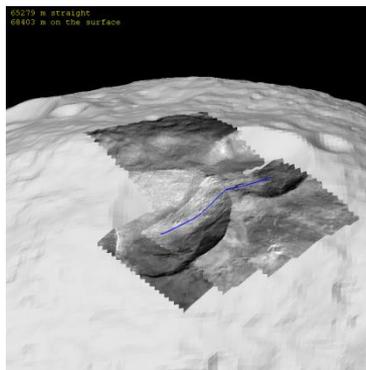
# Example (Dawn FC data, comparable to AFC)

Raw data + calibration  
(geometric, radiometric, header generation, ...)  
*e.g. boundary Marcia/Calpurnia craters on Vesta*



Secondary products for  
data analysis:

- shape model,
- data projection, maps
- topographic profiles
- ...



# Work to do



- Simulate data for the current mission scenario(s)
- Demonstrate that we have the tools to achieve our goals

Do we have all necessary input (instr. specs, trajectory, attitude, ...) ?

Establish communication interfaces with WG4 and instrument teams. This workshop is a good place to start.

Identify missing elements (information, software, ...)

