

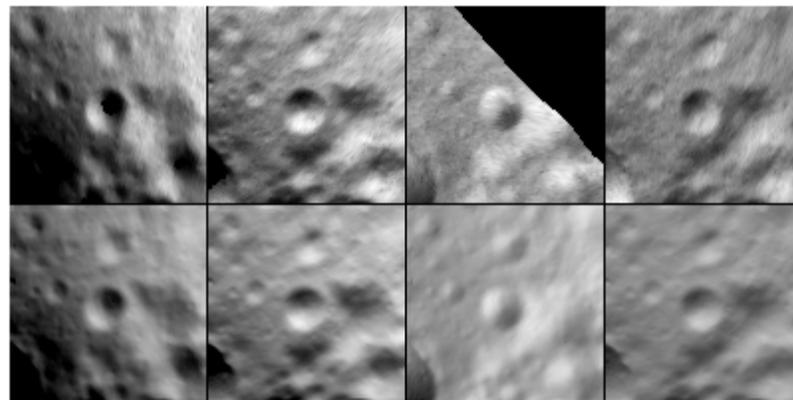
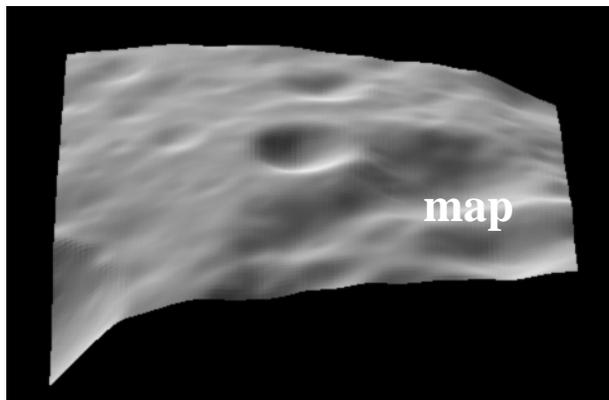


High Resolution Global Topography of Eros from NEAR Imaging and LIDAR Data

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¹JPL/Caltech, ²APL/JHU, ³U. Michigan,



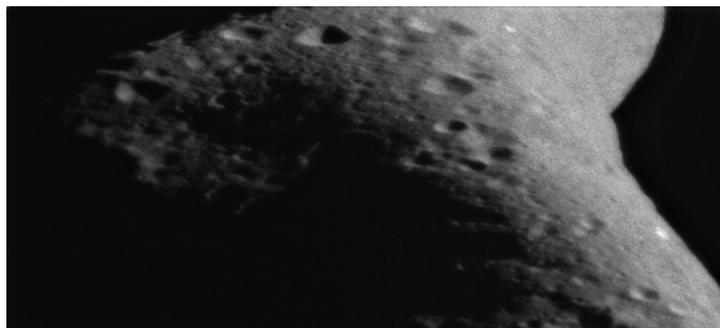
Synthesizing Topography from Imaging Data



Three dimensional maps are constructed from many images using stereo and photoclinometry

Projected and rescaled image data is correlated with illuminated map to determine camera pointing, s/c location, and landmark location

Many such maps are used to construct shape and topography models

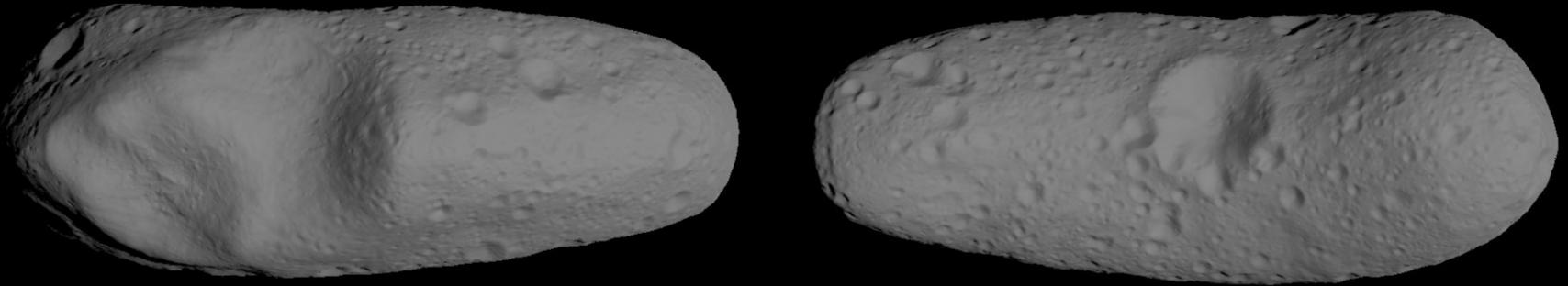


NEAR image



Shape model

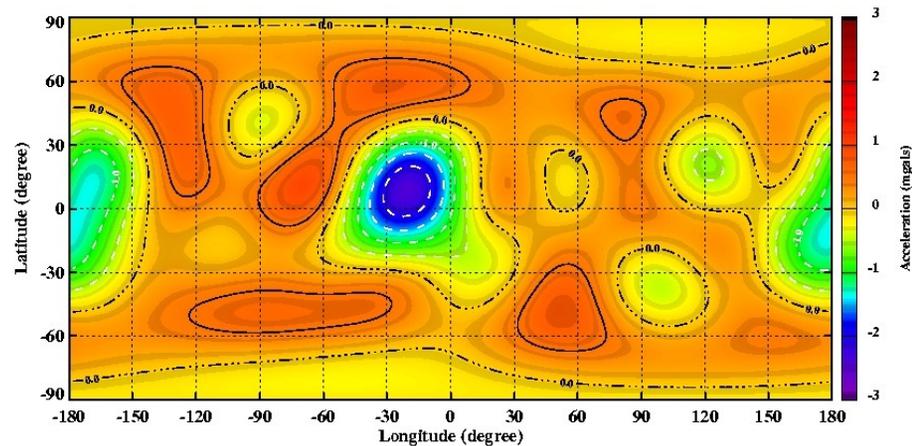
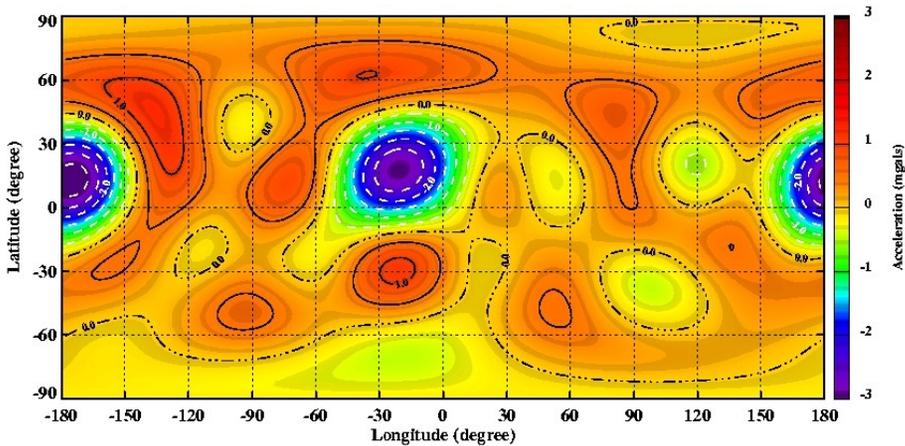
Global Topography Model (GTM)



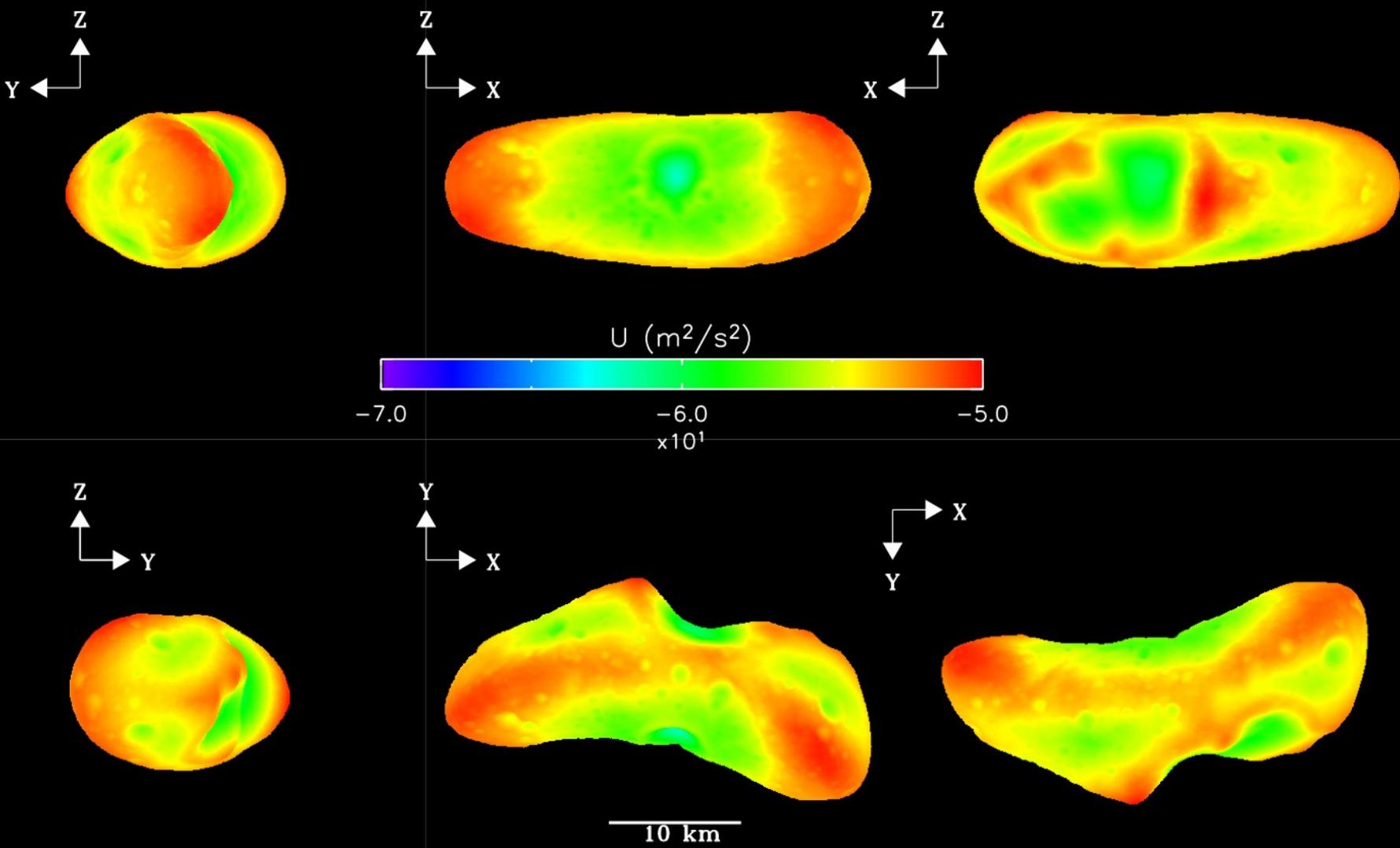
5400 individual maps, representing more than 50 million vectors went into constructing this 1.57 million vector global model.

RMS position residuals less than 4 meters from 418,000 measurements.

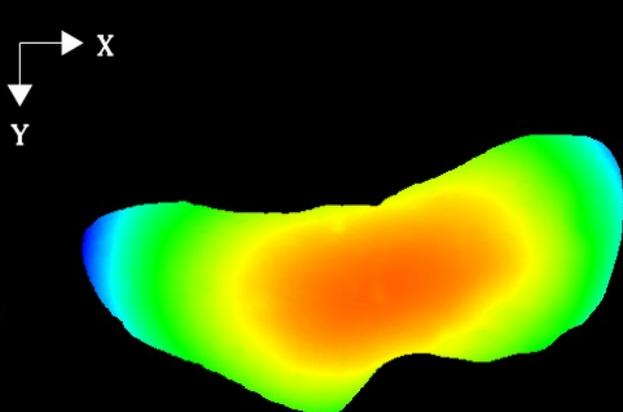
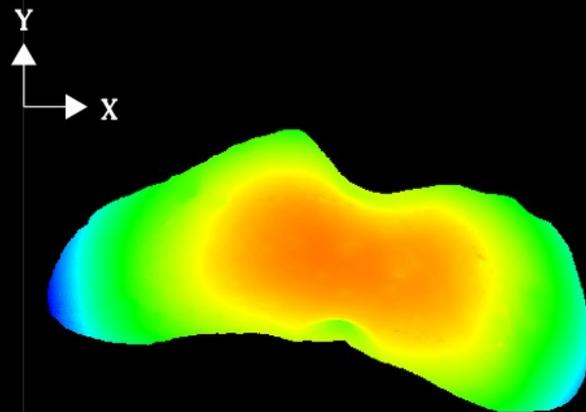
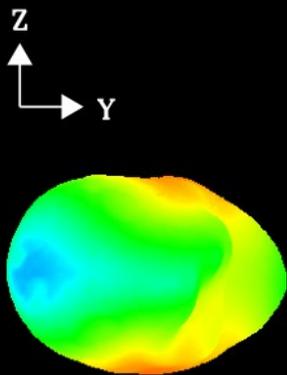
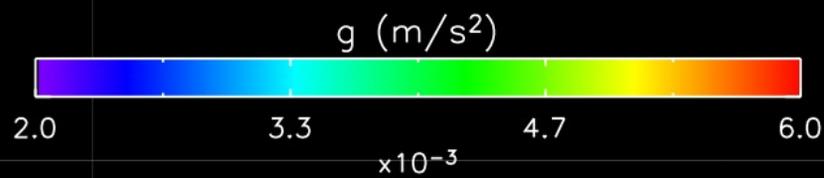
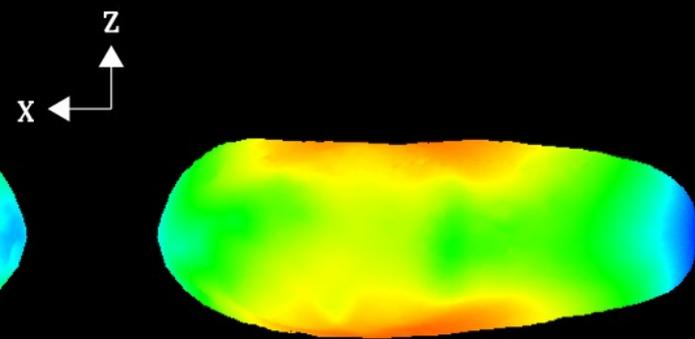
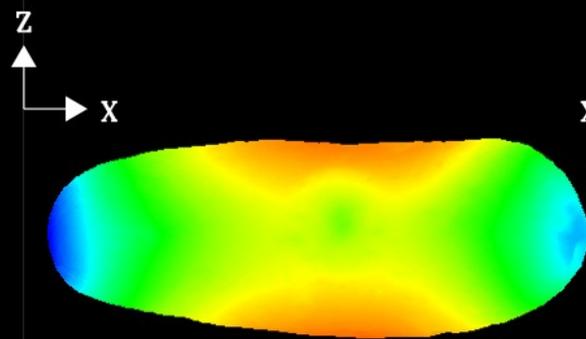
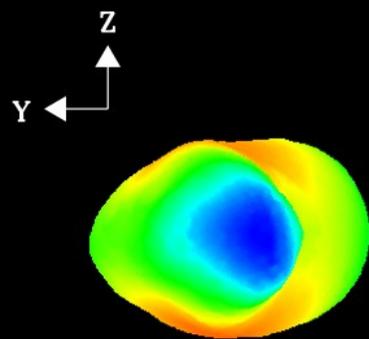
Bouguer anomalies significantly reduced over NLA shape model.



Gravitational/Rotational Potential (100k vector model)

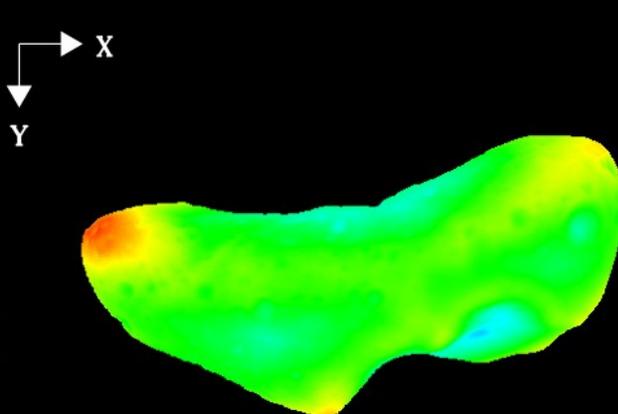
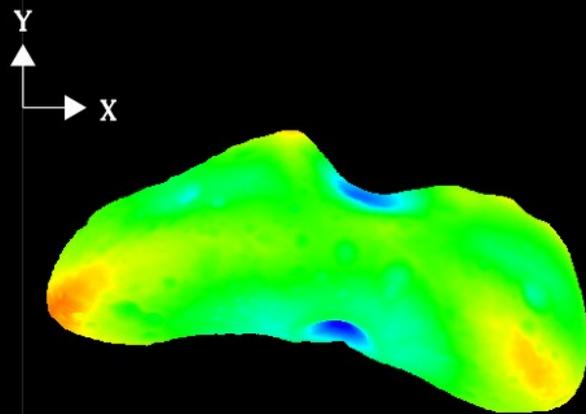
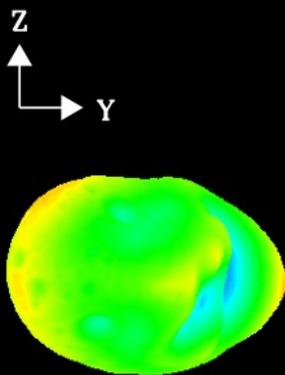
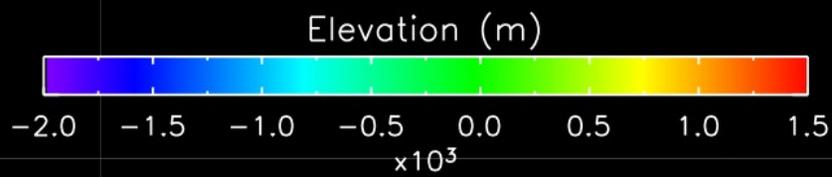
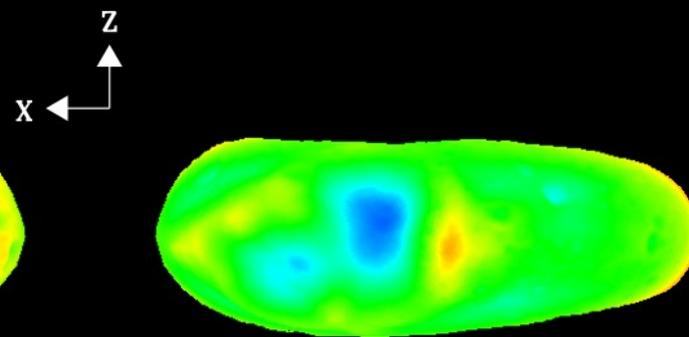
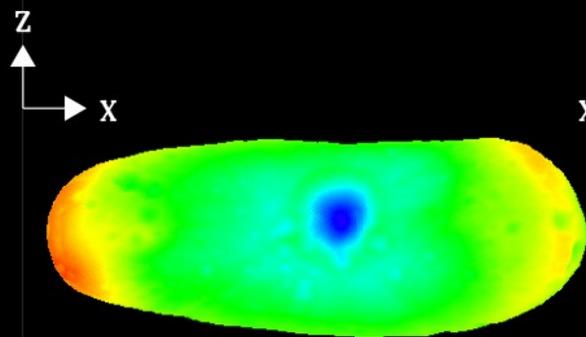
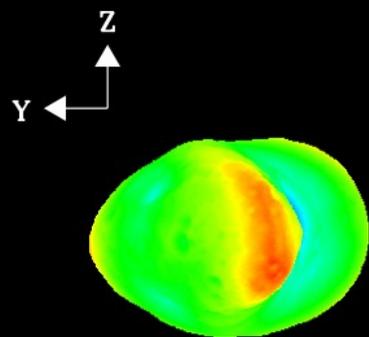


Surface Gravity (10^{-3} m/s^2)



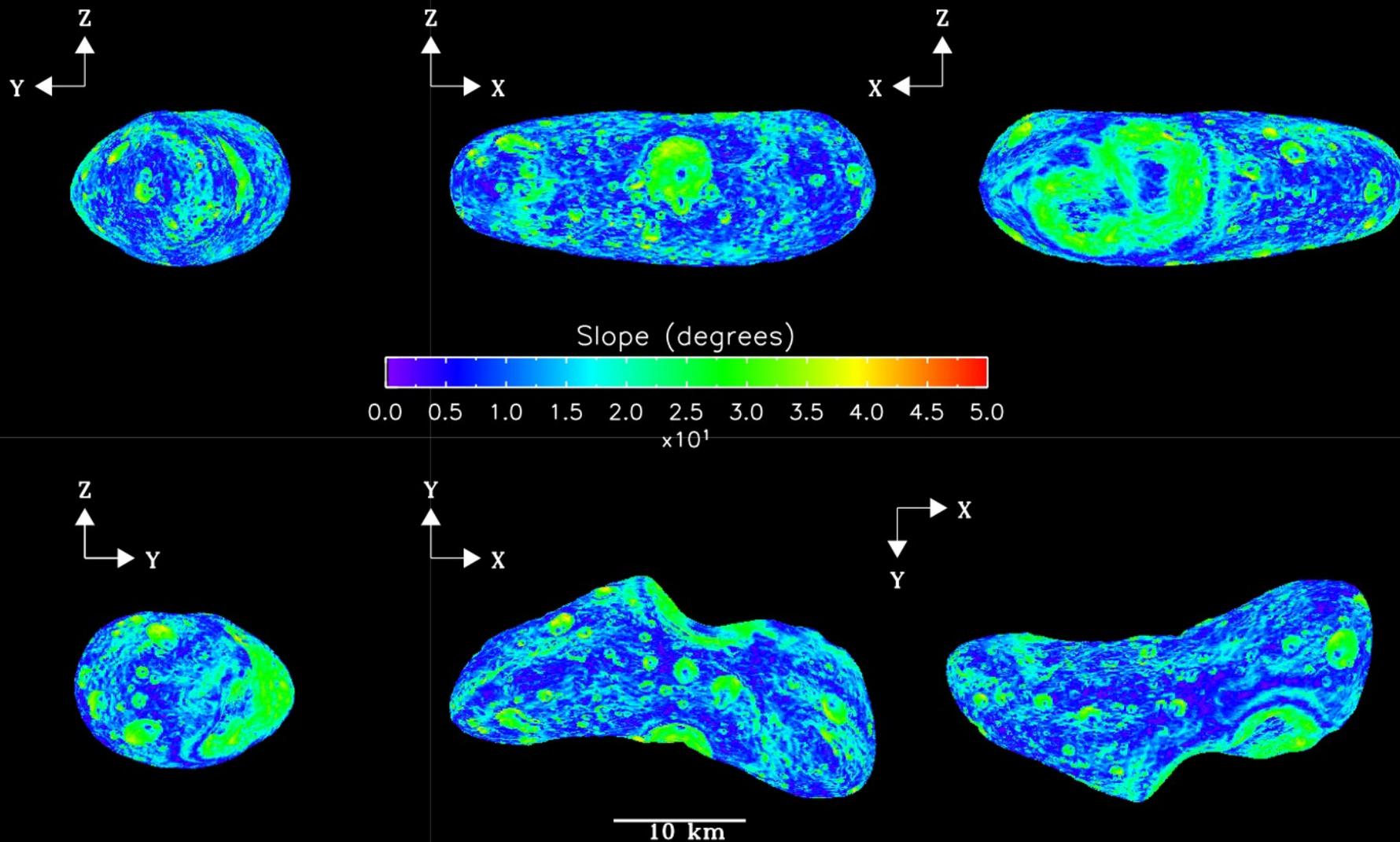
10 km

Geoid Relative Elevation (km)

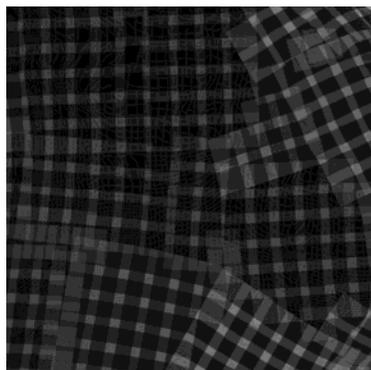


10 km

Geoid Relative Slope (x 10 degrees)



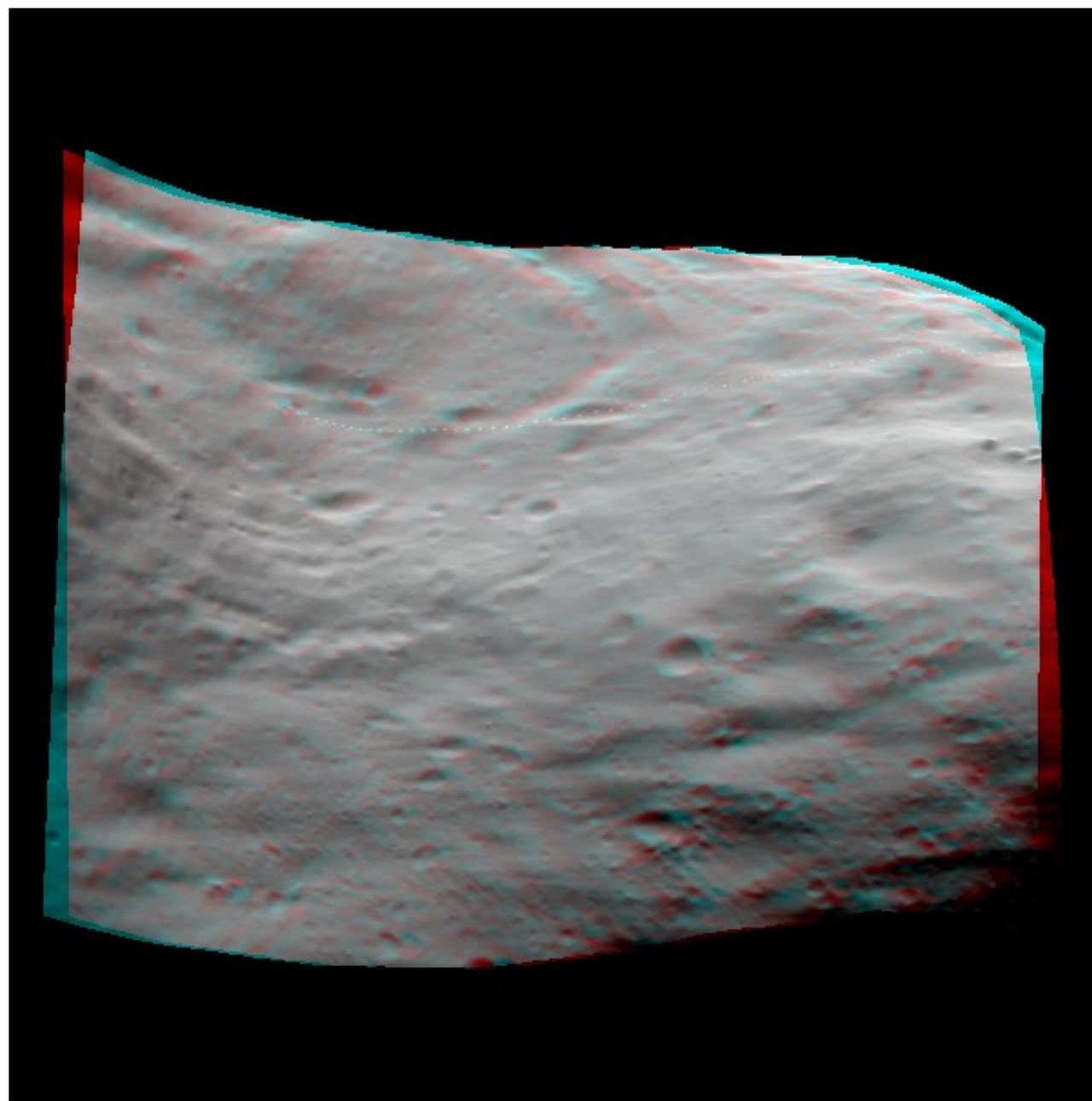
High Resolution Regional Topographic Maps



More than 400 individual maps went into making this 1025x1025 composite at 6 meter resolution of Himeros Regio.

Composite map made by averaging slopes and re-integrating, using sparse sampling of averaged heights to constrain the Monte Carlo process.

Predicted range along NLA track differs from measured by 4 ± 13 meters.



X00001 Lt= 4.47N Ln=268.99W Rd= 5.807 Sz=6.150 km

Summary

Principal Data Products: Ensemble of L-maps from SPC, Spacecraft state, Asteroid pole and rotation.



Secondary Products:

Global topography model, inertia tensor, gravity.

Composite high resolution topography.

Three dimensional image maps.

