MIT Project Apophis: The SET Mission
Surface Evaluation & Tomography

On April 13, 2029, the asteroid Apophis will pass by Earth at approximately 1/10 Lunar distance. This is a once-in-a-thousand year event in which nature is providing a direct experiment revealing how asteroid surfaces and interiors respond to tidal stress.

The asteroid Apophis is named after the Egyptian god of chaos and evil who was thwarted by the god Set riding a solar boat. Like Set, Mission SET will ride upon Solar Electric Propulsion to meet Apophis at which time the spacecraft will characterize the asteroid inside and out before and after the Earth flyby event.

Launch: August 2026
Apophis Rendezvous: March 2028
Earth Flyby Event: April 2029
Tracking Mission Ends: 2033

The SET Mission: Spacecraft and Instruments

LORRI:
Pan-Chromatic (B&W) High Resolution Imager
Ralph:
Color & Spectral Imager
TES:
Thermal Emission Spectrometer
RRT:
Radio Reflective Tomography

The SET Mission: The Objectives

Mission Objective 1: Bulk Physical Properties
Focussed on the surface properties and orbital characteristics, this objective will improve the scientific community’s understanding of asteroids as well as inform planetary defense strategies.

Mission Objective 2: Internal Structure Changes
Measuring the internal structure of Apophis before and after an Earth Close Encounter will allow for a better understanding of not only how asteroids are constructed, but how tidal stresses affect them.

Mission Objective 3: Yarkovsky Tracking
By following Apophis for multiple orbits and measuring the thermal emissions and orbital characteristics, the components of the Yarkovsky Effect can be decoded, improving our ability to track this Potentially Hazardous Asteroid.