NEXT Update for the Primitive Bodies Panel, Decadal Survey

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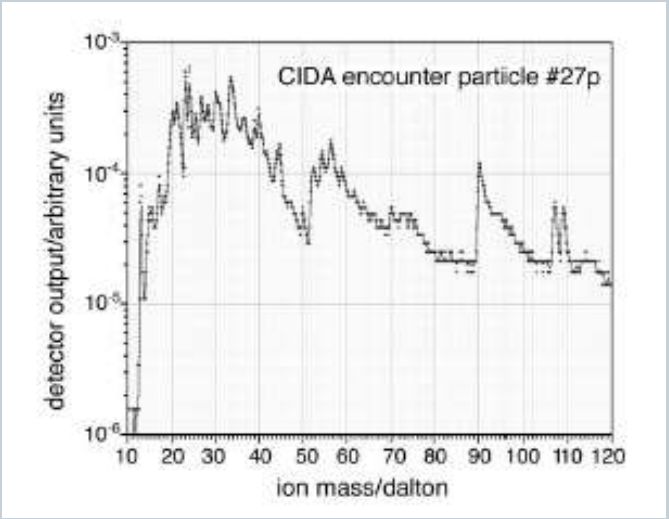
SEPTEMBER 10, 2009
WASHINGTON, D.C.

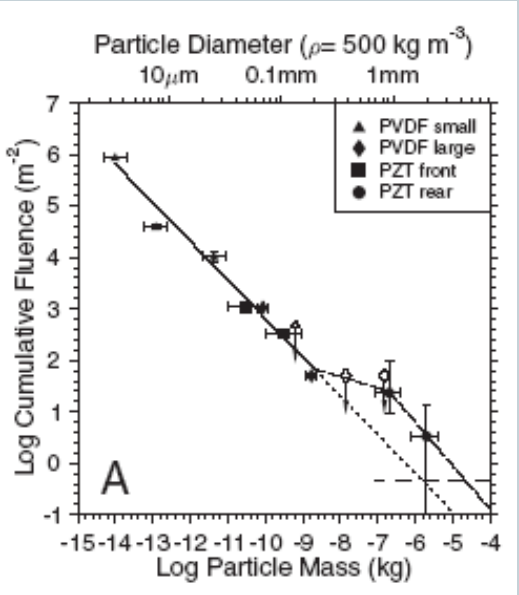
What is NExT?

- A mission of opportunity (MOO) to Comet Tempel 1 using the Stardust spacecraft.
- Mission approved in June 2007.
- Planned flyby of Tempel 1 at 200 km on Feb. 14, 2011.

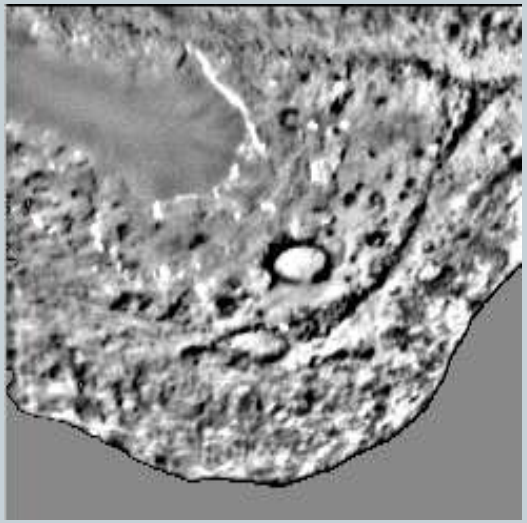
Capable Payload

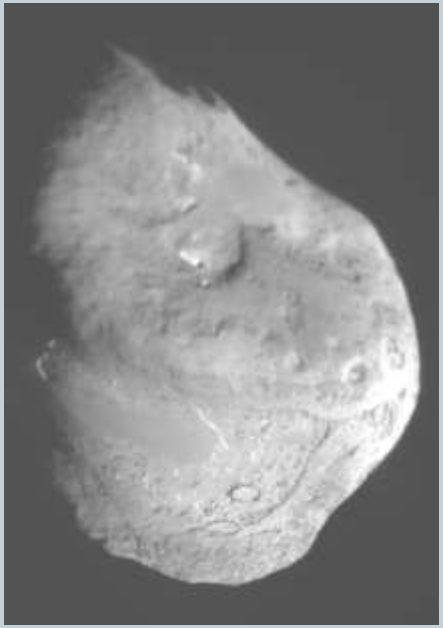
- Three-instrument payload
  - Camera (NAVCAM)
  - Comet Interstellar Dust Analyzer (CIDA)
  - Dust Flux Monitor Instrument (DFMI)

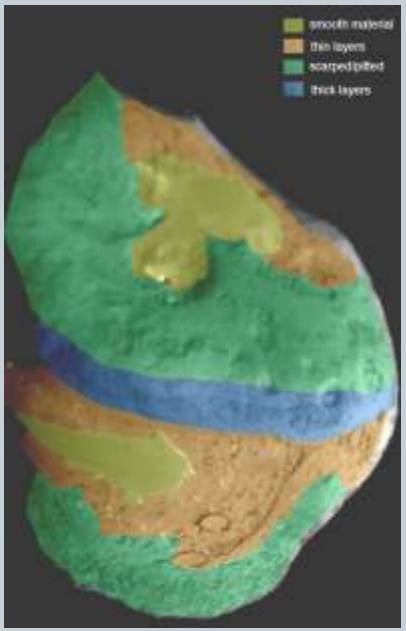


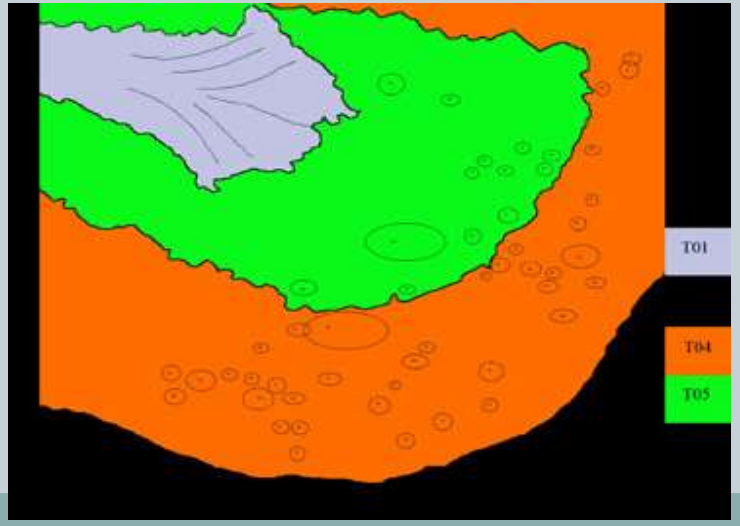


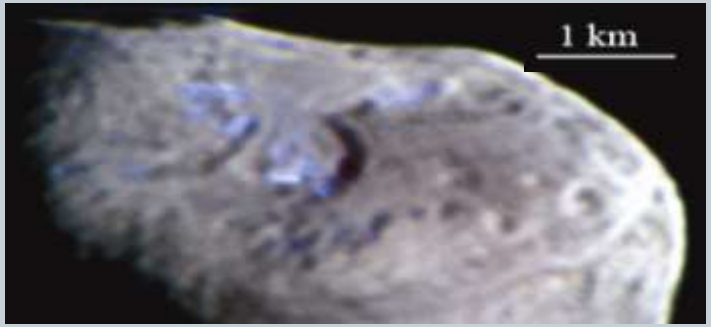
What Deep Impact Saw









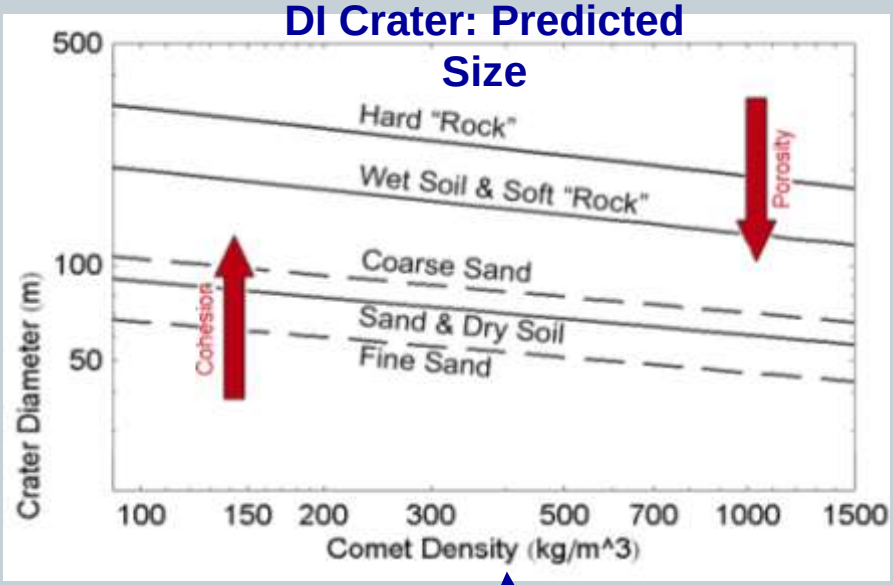


Major Objectives

1. Document surface changes between two perihelion passages.
2. Extend geologic mapping to elucidate nature of layering and constrain models of interior structure.
3. Extend study of smooth flows to understand sources and origin.
4. Image the Deep Impact crater to understand crater formation on comets and derive further information of the structure of the outer layers of the nucleus.

What We Will Lean: DI Crater

- What do fresh craters on comets look like.
- How big is the DI crater.
- Size will better constrain mechanical properties (porosity, cohesion of surface).
- How well preserved and extensive are ejecta on the the surface.
- Crater could provide additional information on layering.



Tempel 1 Density ~ 400 (kg/m^3)

Other Goals

- Carry out dust measurements using DFMI and CIDA for comparison with Wild 2.
- Monitor comet activity on approach and departure.

Mission Status

- Earth swingby successfully executed in January 2009 to target S/C to Tempel 1.
- Time of Arrival (TOA) correction burn scheduled for February 2010.
- Targeting to a 200 km flyby distance at 10.9 km/sec on February 14, 2011.

TOA at Tempel 1

- Plan to arrive at comet so that DI crater is well positioned for imaging.
- Must predict rotation rate and phase of nucleus about 1 year before arrival.
- Program of earth-base telescopic observations (and HST observations) is continuing to monitor Tempel 1's rotation state.

Summary Data Return

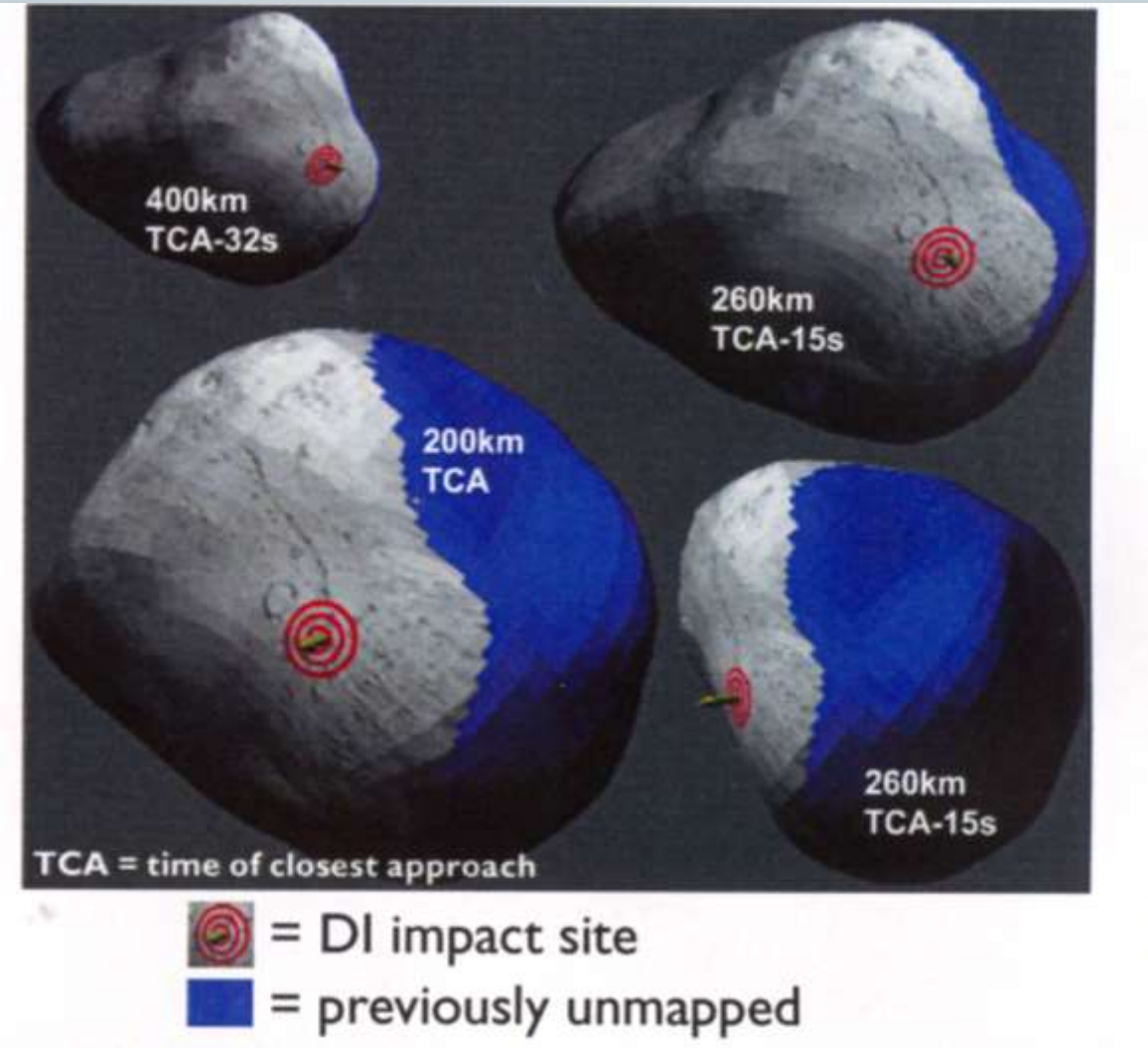
IMAGING

- Distant Imaging begins at -60 days
- Total Number of Images = 5760 200 x 200 Subframes
- Encounter Imaging = 72 images (600 Mbits)
- Best Resolution = 12 m/pxl
- Number Images Better Than 80 m/pxl = 40

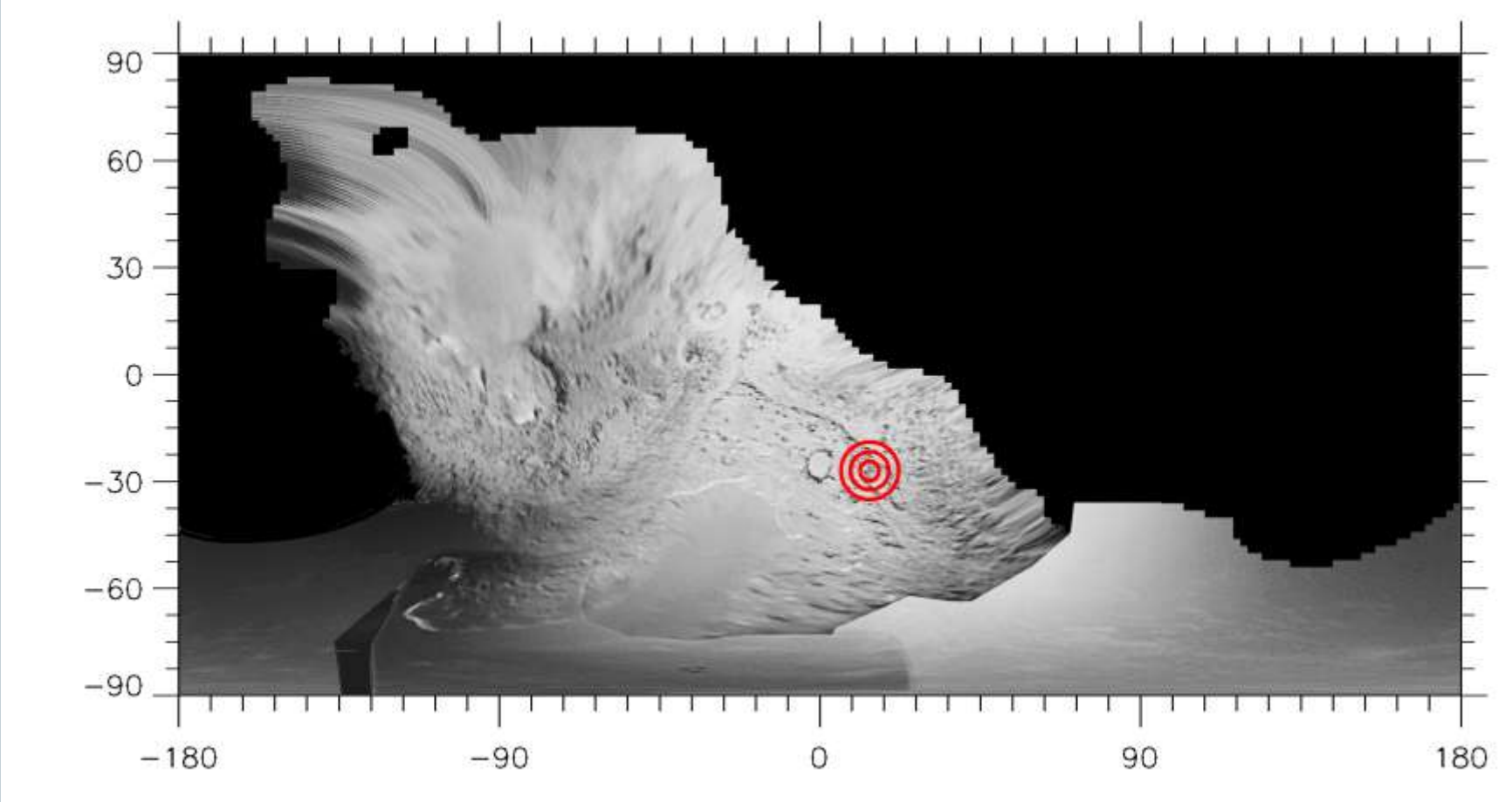
DUST SCIENCE

- Dust Counter (DFMI): 16 Mbits from -15 to +15 minutes
- CIDA: 104 Mbits from -1 to +1 hour

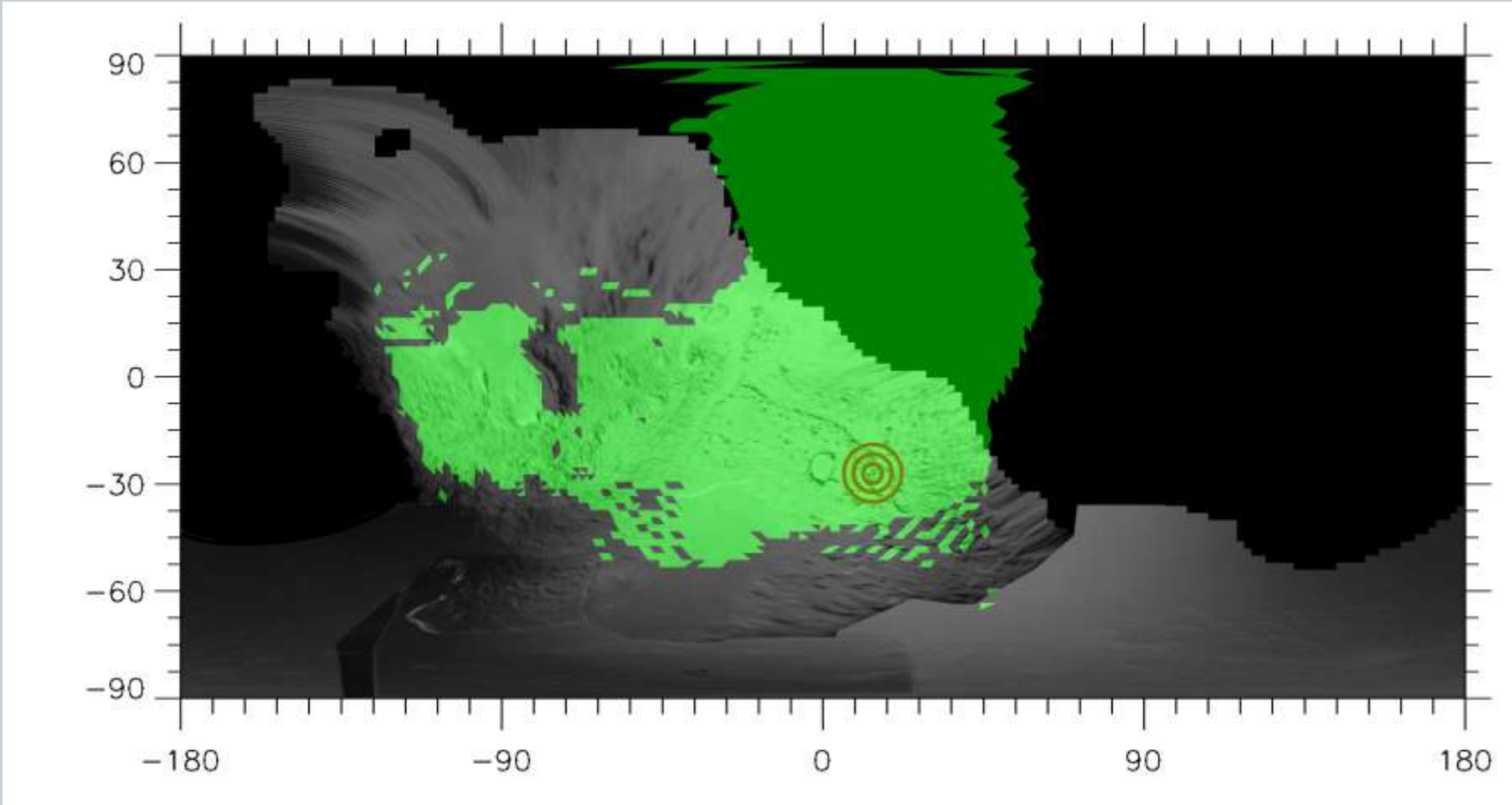
What We Expect to See



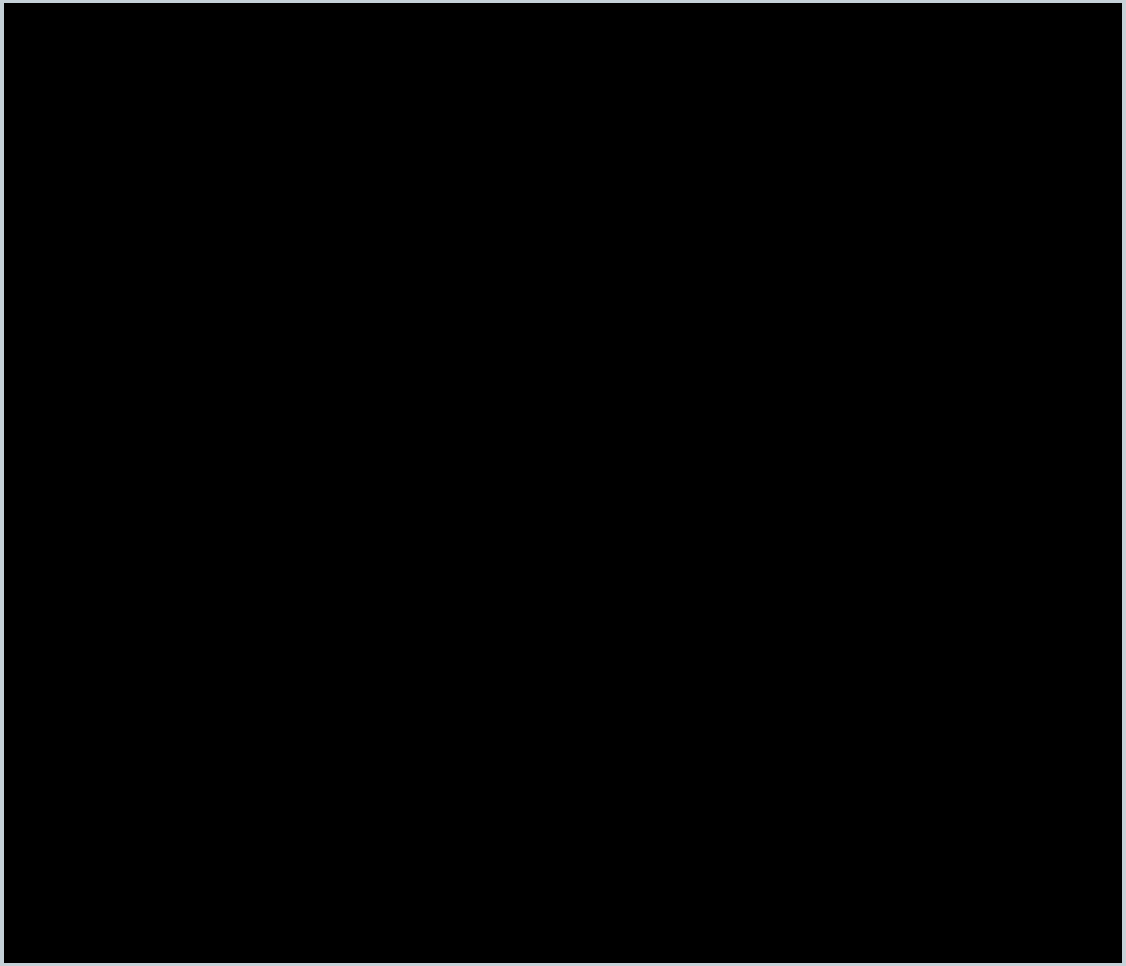
Deep Impact Coverage



Planned NExT Coverage



Flyby Animation



Guidelines

- Science before missions.
- Science goals must be achievable with existing instruments or techniques.
- A mission is defined by its science payload.