



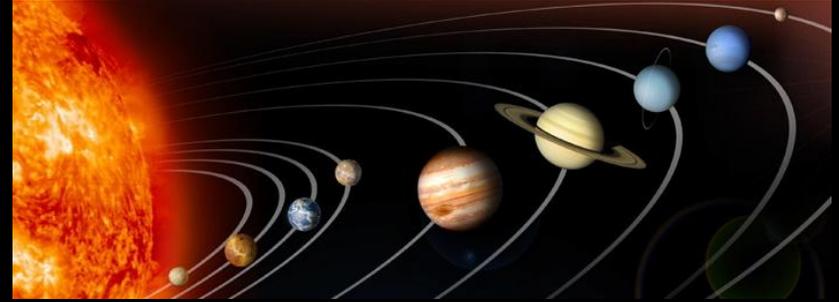
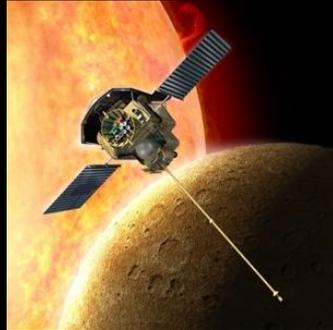
MESSENGER

Investigating Mercury

-Nick Taylor

Mercury: The Enigma of the Inner Solar System

- least explored inner solar system planet
- closest to the sun
- highest daily surface temperature variance (+430C -> -170C)
- before 2008, only Mariner 10 probe had captured Mercury in 1974/75

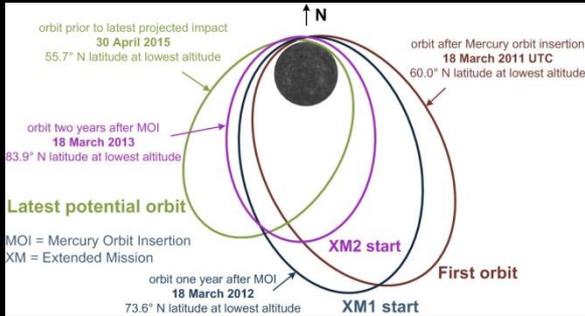


-MESSENGER (MERcury Surface, Space ENvironment, GEOchemistry and Ranging) launched 2004, arrived for flyby in 2008, orbit insertion 2011

-crashed into planet on April 30, 2015 after extending its life several times through creative use of helium fuel cells to adjust orbit

MESSENGER - Mission and Instrumentation

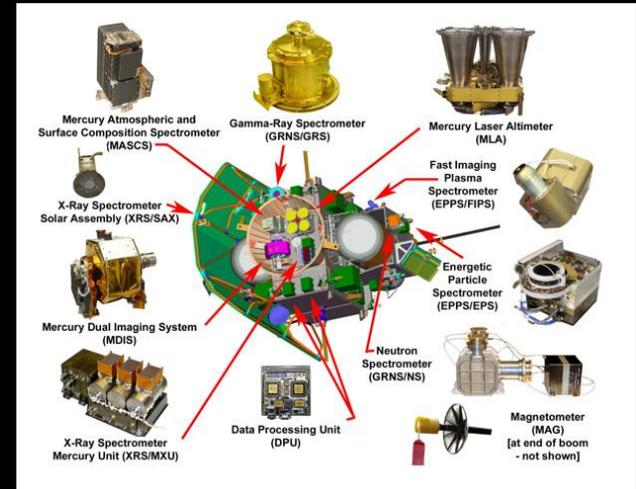
Mission: perform several flybys of Mercury then insert into offset polar orbit for extended documentation



-investigate planet density, magnetic field, atmosphere composition, polar material build-up and geologic history

MESSENGER's science payload includes 7 instruments and a radio experiment designed to measure gravity field and core composition

-MDIS images from visible through NIR up to 18m res



Earth vs Mercury

-Mercury's mass is about 5.5% of Earth's (volume almost the same)

-about 18 Mercurys could fit inside Earth!

-Gravity is 38% of Earth

-0.39AU from the sun

-1 Mercurian day = 176 Earth days

-1 Mercurian year = 88 Earth days



Scientific Findings

-Massive ice deposits over 2 km thick exist in permanently shadowed craters at both poles

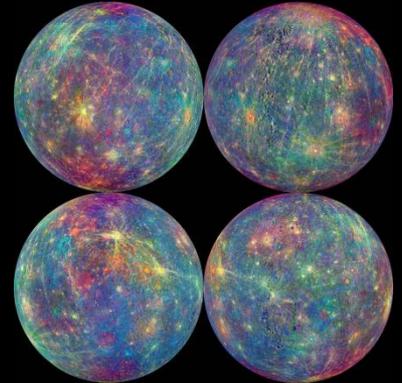
-Exosphere comprised of a thin veil of oxygen, sodium and hydrogen, along with traces of elements like magnesium and noble gasses

-Exosphere goes through seasonal phases, with the sun applying radiation pressure and forming a long tail of atmospheric particulate behind the planet

-Many volcanic features on the surface are universally shield volcanoes - meaning subsurface magma has high viscosity and low pressure

-Planet Pencil? Mercury's outer crust contains a high percentage of graphite

-Uneven magnetic field combined with solar wind generates numerous powerful magnetic currents in the atmosphere



Future Missions / Info Websites

-ESA's Bepicolombo probe to launch in 2017 and arrive in Mercury orbit in 2024

-Bepicolombo will further explore the planet's magnetosphere and investigate the deep trenches and craters permeating the surface

-MESSENGER home page: <http://messenger.jhuapl.edu/index.php>

-NASA's Mercury page: <http://solarsystem.nasa.gov/planets/mercury>

-ESA's Bepicolombo page: <http://sci.esa.int/bepicolombo/>

-Other tidbits of info found at <http://www.universetoday.com/>

-Bonus: Mercury as a .kmz file for viewing in Google Earth:

http://messenger.jhuapl.edu/the_mission/google.html