

Dawn to shed light on solar system's origin

NASA's latest space mission will study two of the largest objects in the asteroid belt in an effort to discover clues to our solar system's origins. Using ion propulsion, the *Dawn* probe will visit *Ceres* and *Vesta*, rocky bodies believed to have remained largely unchanged for 4.6 billion years

SPACECRAFT SYSTEMS

Optical camera
Maps surfaces of Ceres and Vesta

Antenna dish

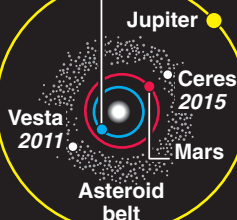
Gamma ray and neutron detector
Measures chemical composition of asteroids

Spectrometer
Detects visible and infrared light to identify surface minerals

MISSION
Launch
Jul 2007

Ion thruster
Three in total, used one at a time. Ten times faster than chemical rockets

Earth and asteroids to scale



Ceres

Diameter: 930km
Biggest asteroid, reclassified as "dwarf planet" in 2006



Vesta

Diameter: 525km. Fourth largest object in asteroid belt, visible from Earth

1 Propellant:
Xenon gas enters discharge chamber

4 Electrostatic grid: Pulls ions to back of chamber and out into space at high speed, thrusting craft forward

ION DRIVE

2 Cathode: Emits negatively-charged **electrons**, which collide with Xenon atoms

3 Impact: Atoms lose electrons of their own, becoming positive **ions**

Discharge chamber

Ions focused into beam

5 Neutralizer: Emits electrons into ion exhaust to prevent craft from acquiring electric charge