

Exemplos de Satélites Artificiais e Sondas Interplanetárias

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1.1 – Satélites artificiais ou sondas interplanetárias: Definições

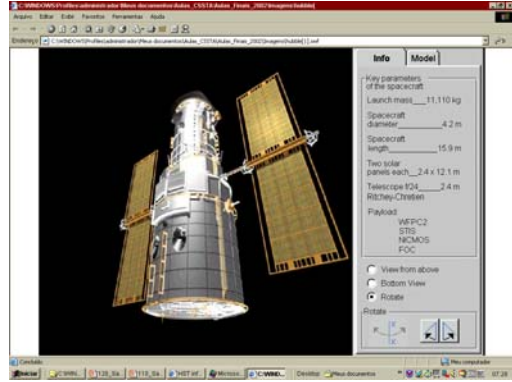
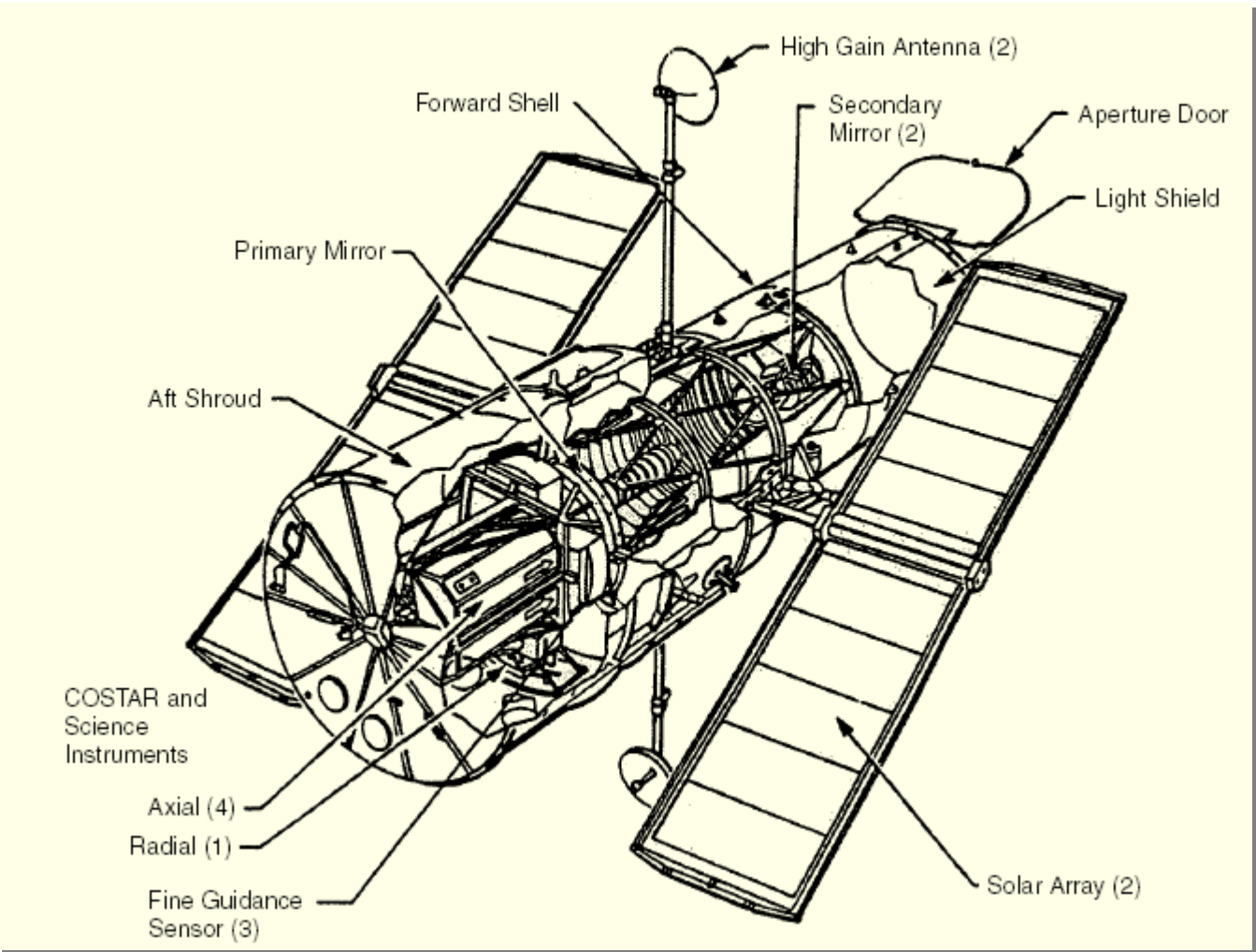
- Satélites e sondas são a parte mais visível de um conjunto de sistemas concebidos com o propósito de explorar o espaço exterior com uma finalidade específica.
- Satélites e sondas são concebidos tendo em mente exclusivamente sua função e o ambiente onde deverão operar (em seu projeto não são considerados aspectos de estilo ou moda). Desta forma, dependendo da finalidade, sua aparência mudará totalmente de uma missão para outra.
- Satélites e sondas são conceitualmente divididos em duas partes: a **carga útil** (“payload”) e o **corpo básico** (“bus”):
 - A carga útil não é necessariamente única. Ex: Um satélite de telecomunicações pode contar com vários transmissores. Um satélite científico pode contar com vários experimentos.
 - O corpo básico conta com as partes necessárias para suportar o lançamento e sustentar a operação da carga útil.

1.1 – Satélites artificiais e sondas interplanetárias: Exemplos

- Telescópios espaciais
 - Hubble Space Telescope
 - INTEGRAL
 - XMM-Newton
- Satélite de sensoriamento remoto
 - Topex/Poseidon
- Satélite de telecomunicações
 - A2100
- Sondas interplanetárias
 - SOHO
 - Rosetta
 - Ulysses
 - Cluster
 - SMART
 - Mars Express
 - Cassini/Huygens
 - Voyager 1 e 2
 - Magellan
 - Galileo Orbiter

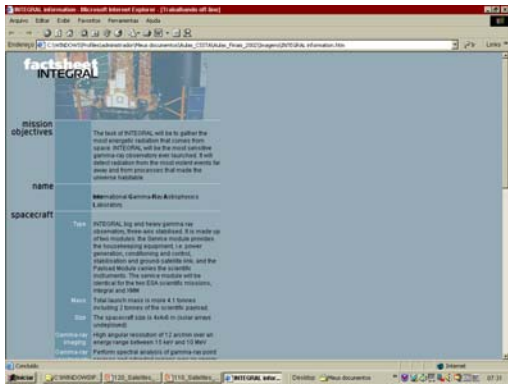


1.1 – Satélite artificial: Hubble Space Telescope, [31, 28]



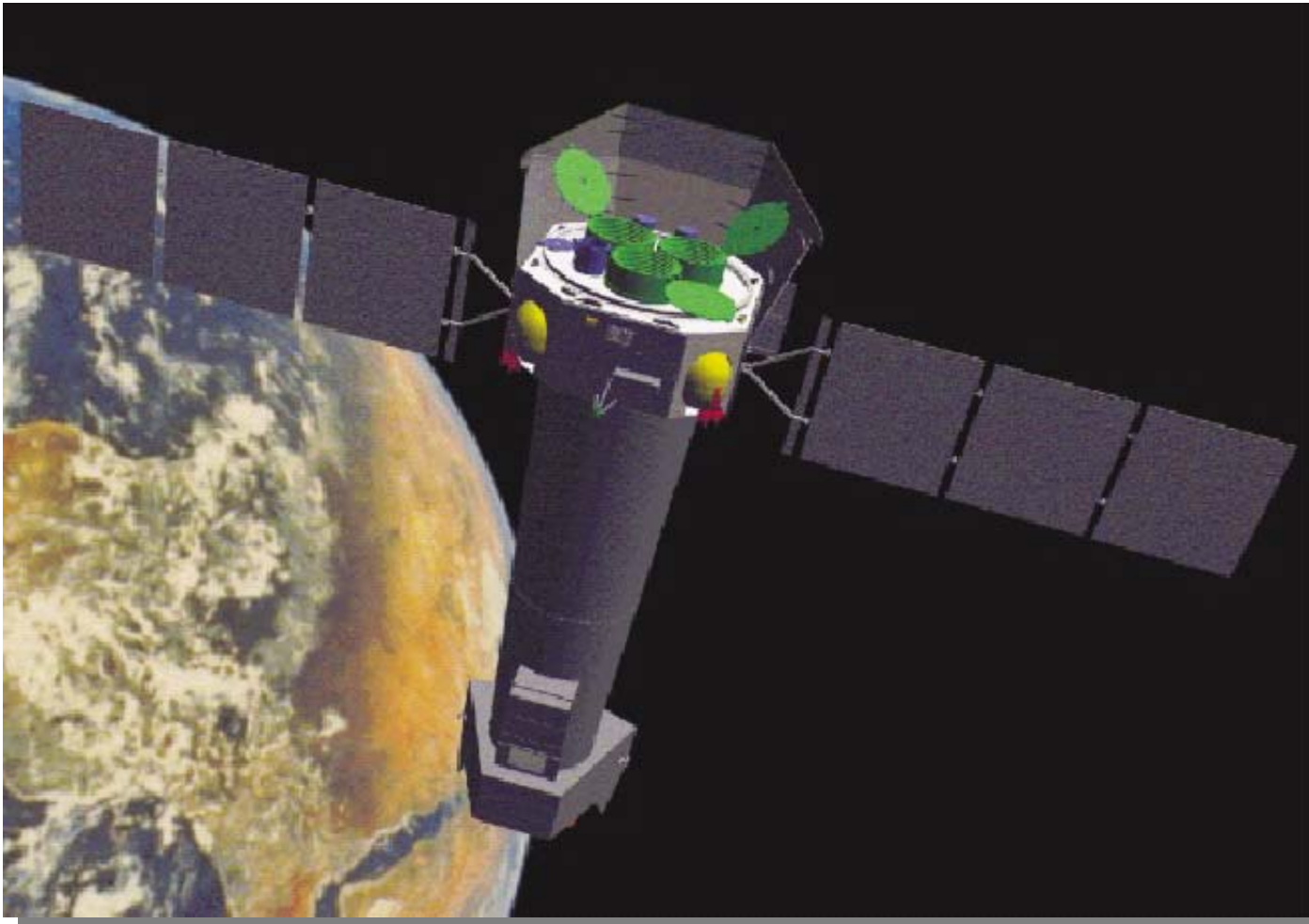


1.1 – Satélite artificial: INTEGRAL, [31]





1.1 – Satélite artificial: XMM-Newton, [31]



factbase
XMM-Newton

mission objectives
Earth's atmosphere blocks out all X-rays. Therefore, to observe X-ray sources and study celestial X-ray sources, the XMM-Newton mission will have to operate from a number of orbital positions, ranging from the equatorial plane to the region of the Galaxy itself.

name
The XMM-Newton mission derives its name from its very high energy design and honors Sir Isaac Newton, but was formally called high throughput X-ray observatory because of its great search to detect X-rays.

spacecraft
The XMM-Newton is a three-axis stabilized spacecraft with a pointing accuracy of one arcmin.
Total length is 13 meters, 10 meters span with solar array extended.
Three beam-shaped Mirror Modules, containing 48 "gold-plated" ultra-thin concentric mirrors, 2.2 meters in 2.2 meters in diameter and 0.5 meters in length.
Four length is 7.5 m Resolution is 3 arcmin. But with full equipment, 14 arcmin. Half energy width at 40 keV energy.
Spectral range of 0.1 - 120 keV energy (0.2-120 keV).

Info **Model**

Key parameters of the spacecraft

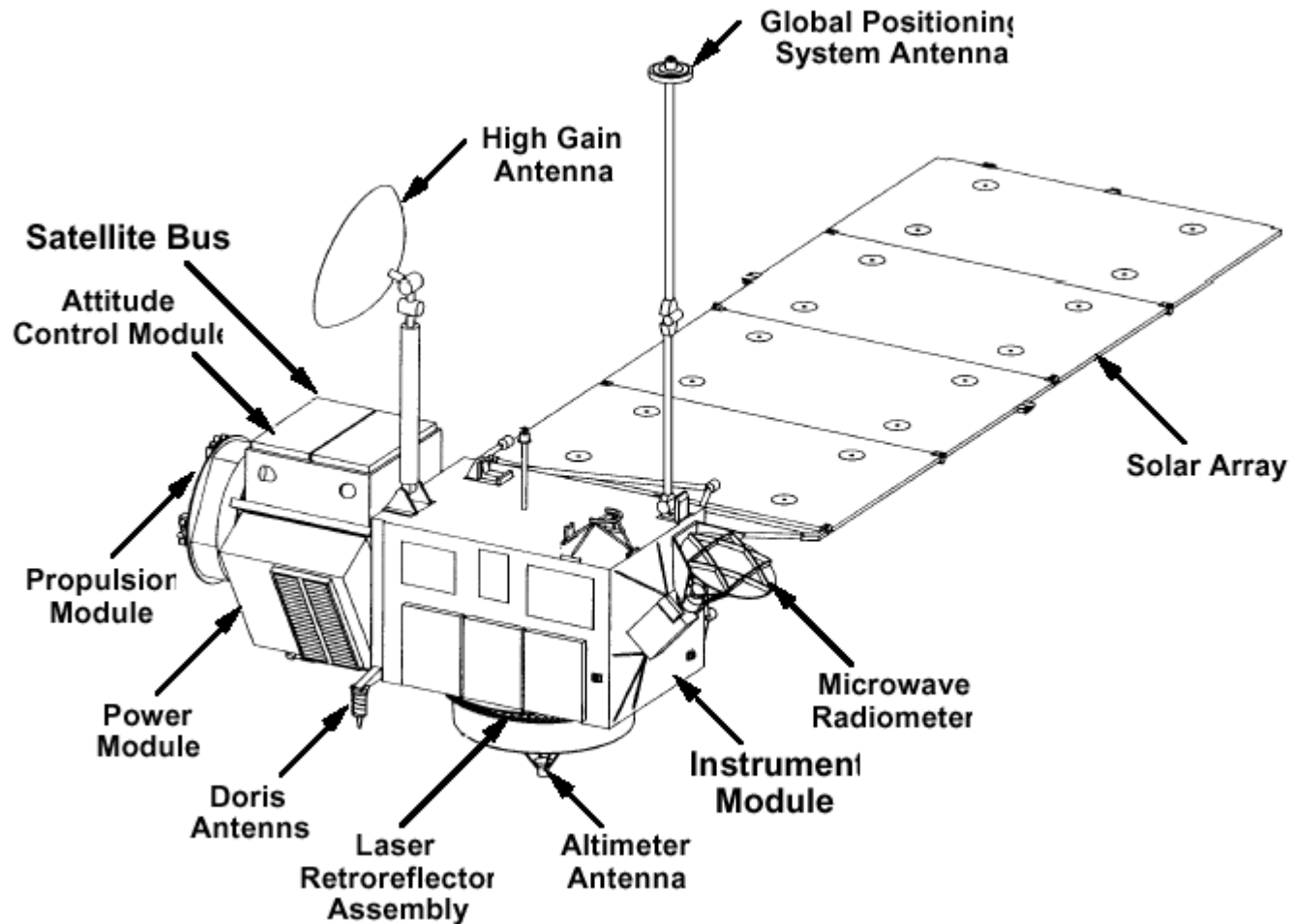
Launch mass: 10.5 tonnes

Three very advanced X-ray telescopes (they each contain 50 high-precision concentric mirrors)

Ritchey-Chretien telescope (Optical / UV monitor): 30 cm

View from above
 Bottom View
 Rotate

1.1 – Satélite artificial: Topex/Poseidon, [2]

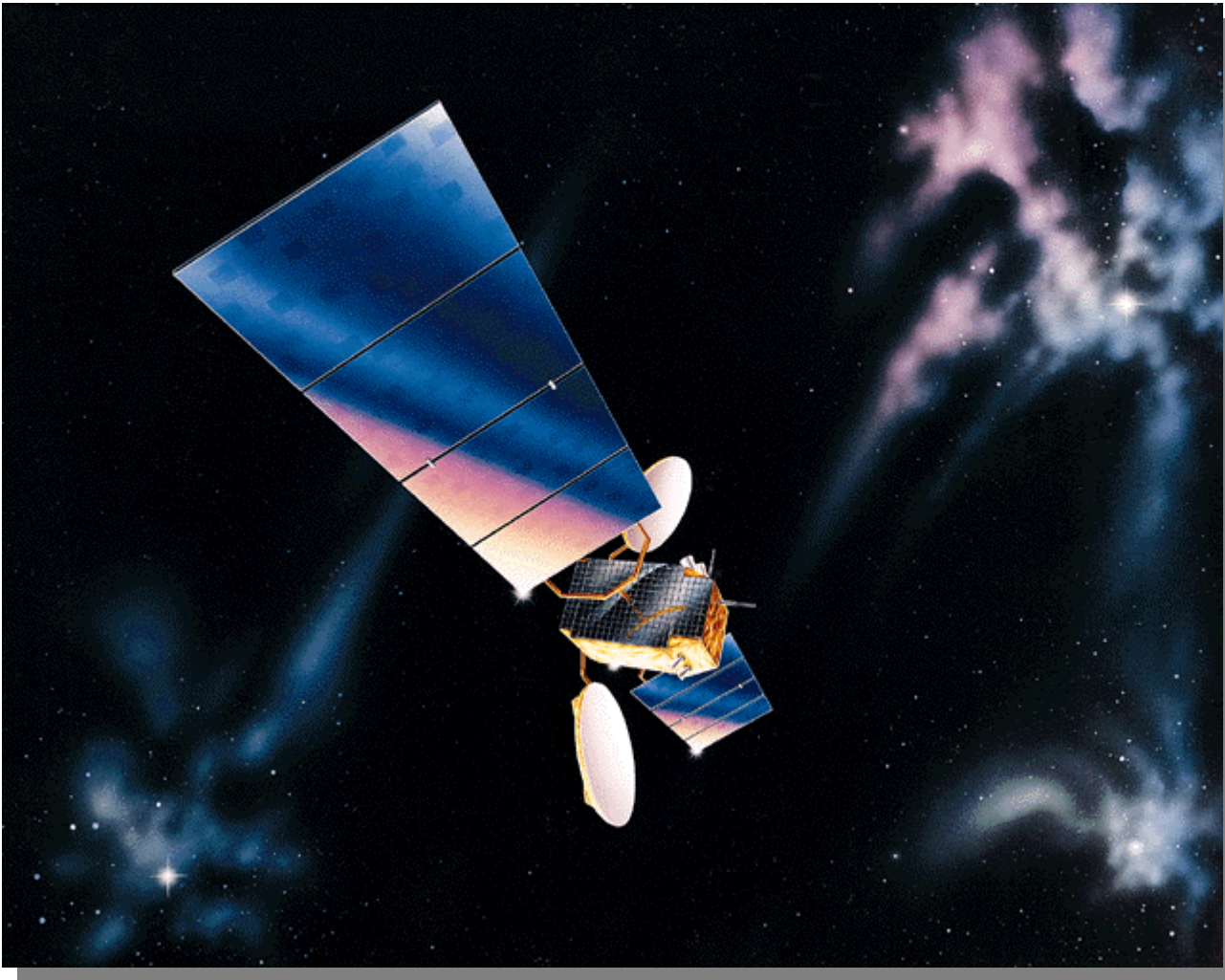


Classification: Orbiter spacecraft.

Mission: Global view of Earth's oceans.

Features: Topex/Poseidon is a joint project between NASA and Centre National d'Études Spatiales (CNES) launched in mid 1992 aboard an Ariane 4. The spacecraft occupies a 1336-km-high Earth orbit inclined 66°. Revealing minute differences in the oceans' heights, Topex/Poseidon's data should lead to improved understanding of oceanic circulation and forecasting of global environment.

Stabilization: Three-axis stabilized via reaction wheels and thrusters.

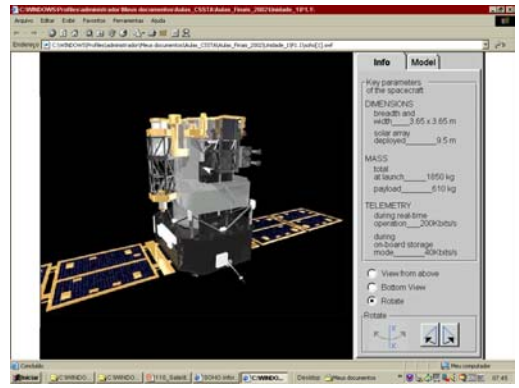
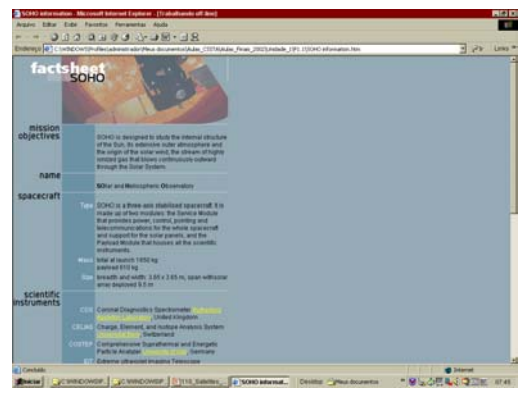
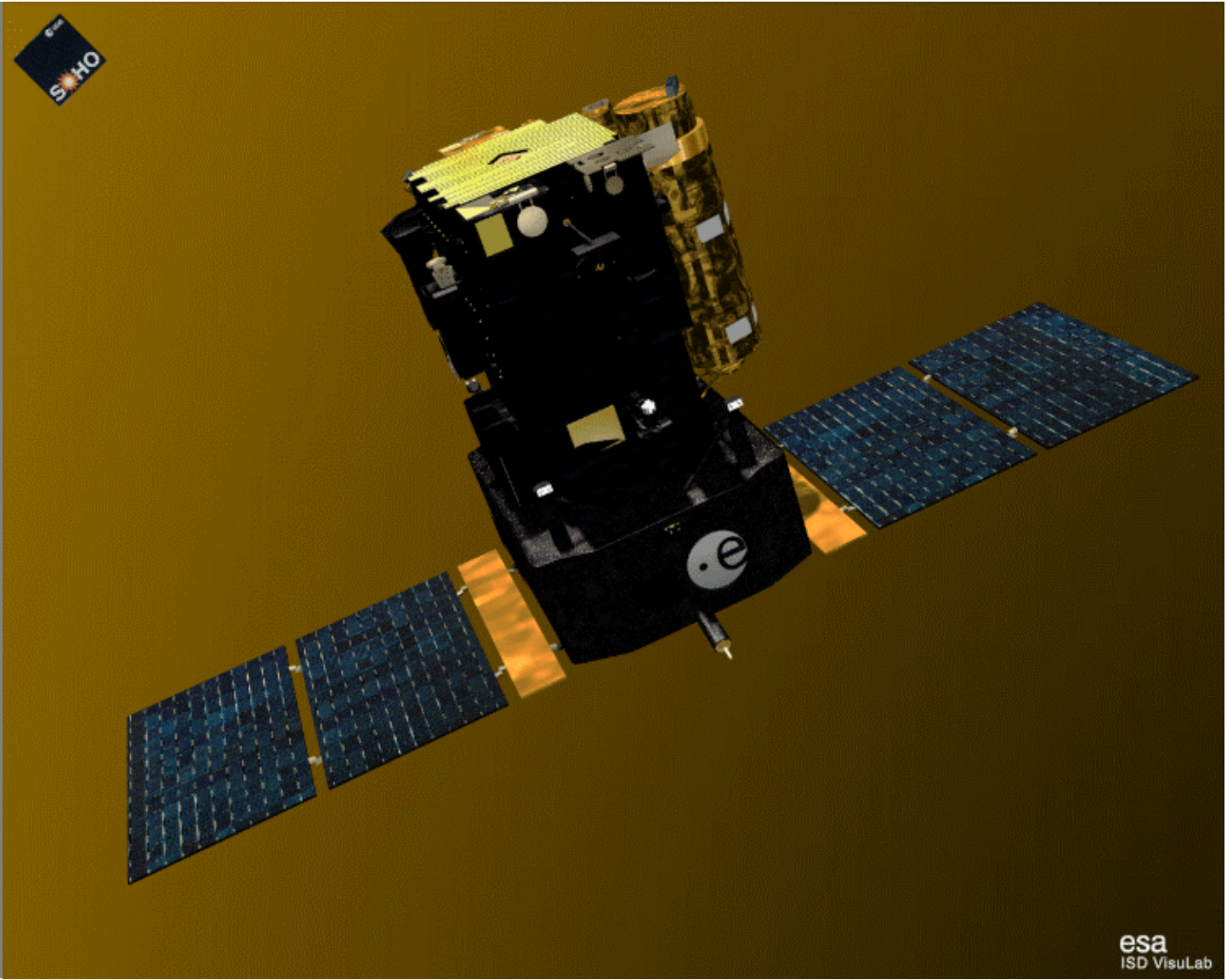


Product: A2100

Company: Lockheed Martin
Telecommunications

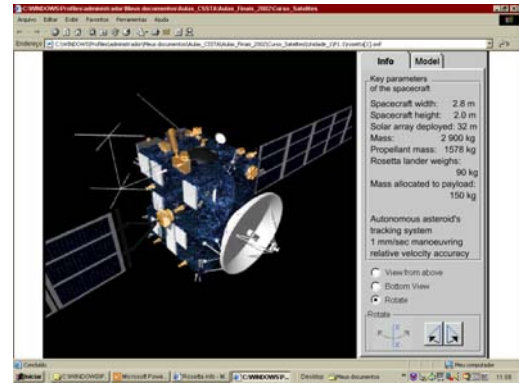
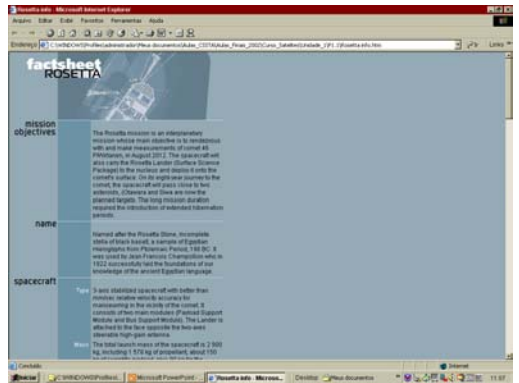
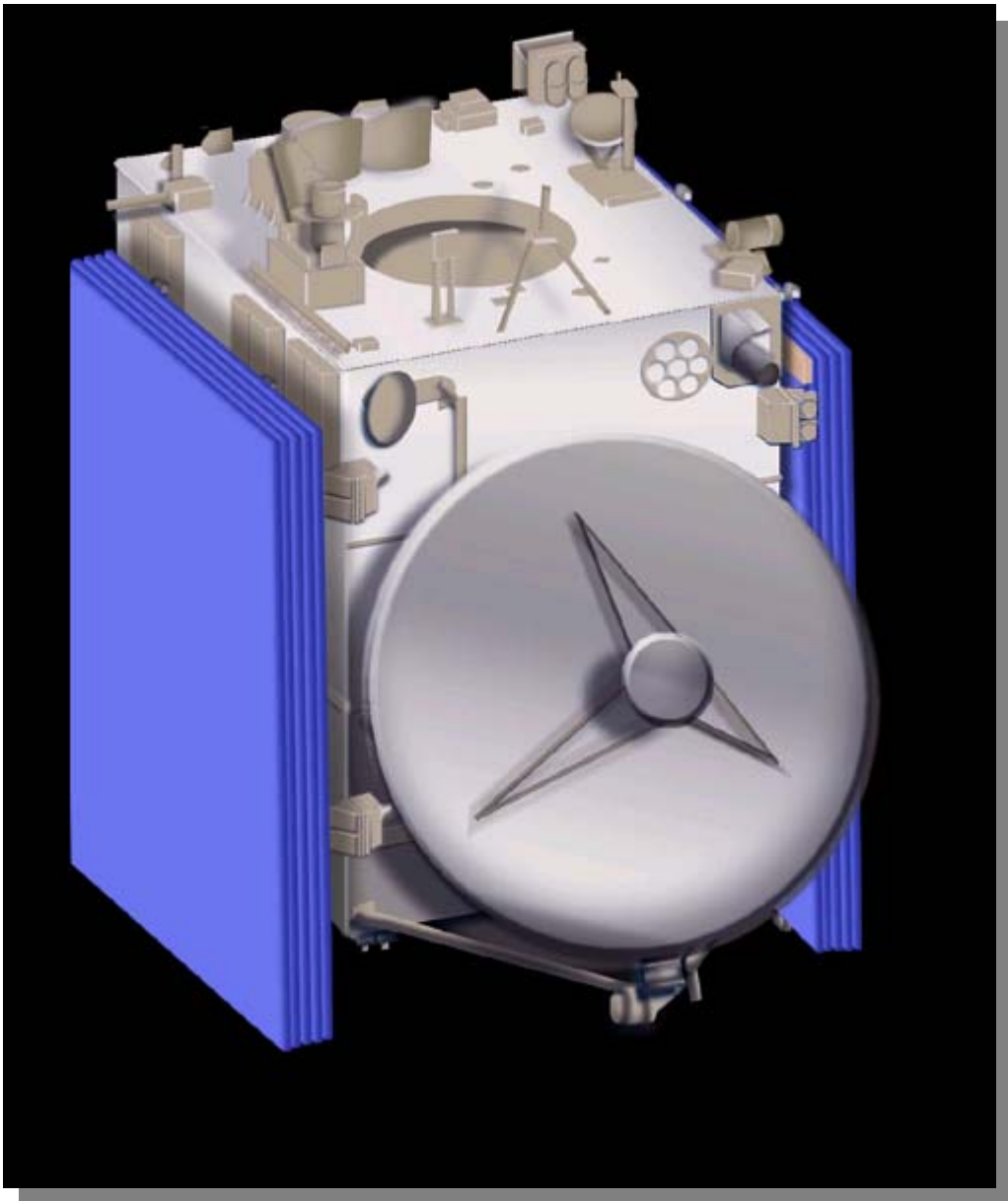


1.1 – Sonda interplanetária: SOHO, [31]



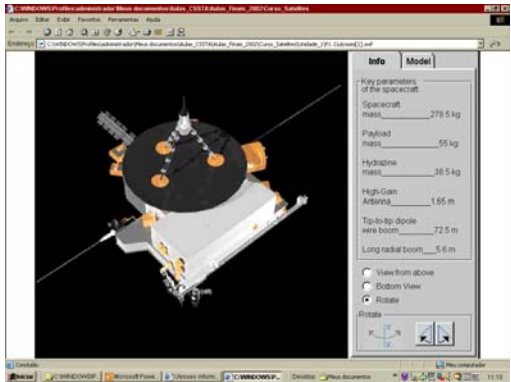


1.1 – Sonda interplanetária: Rosetta, [31]



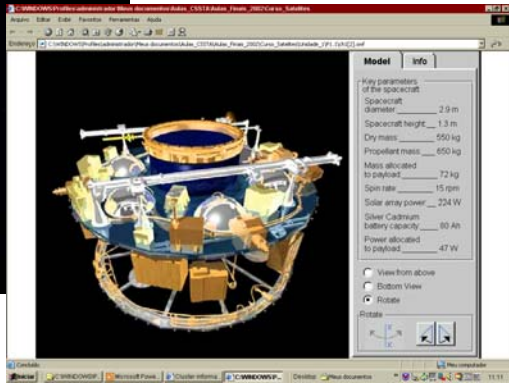
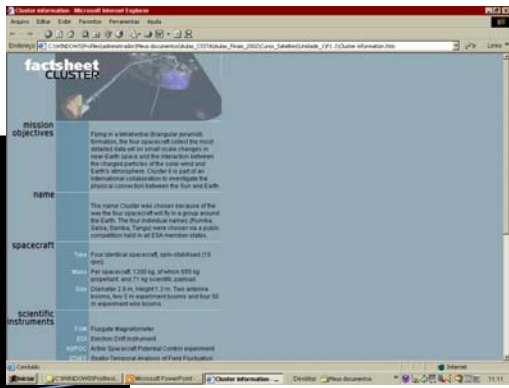
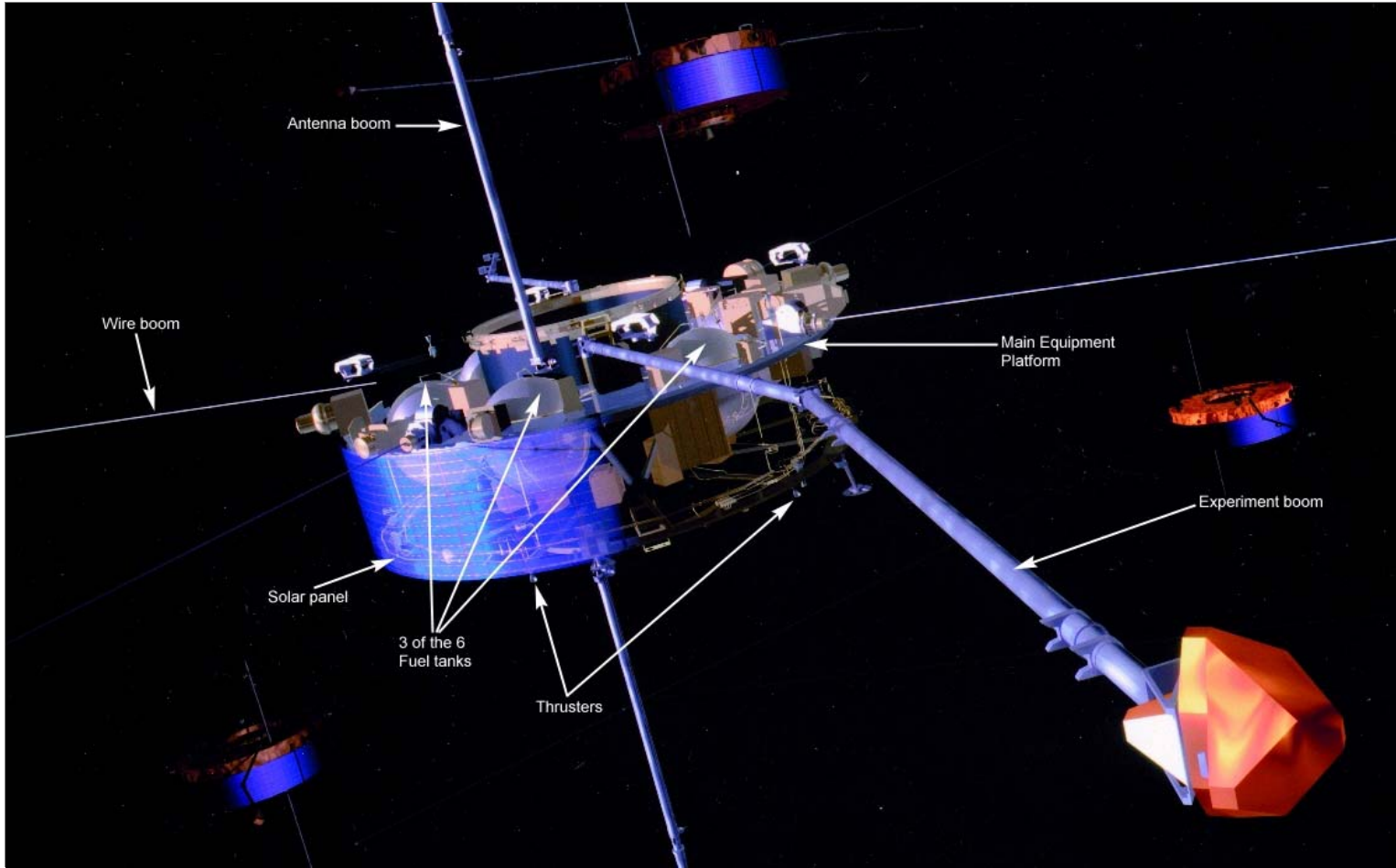


1.1 – Sonda interplanetária: Ulysses, [31]



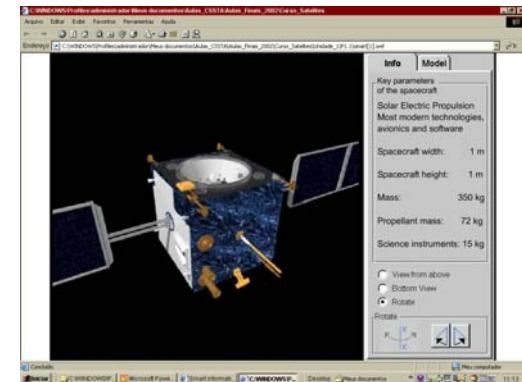
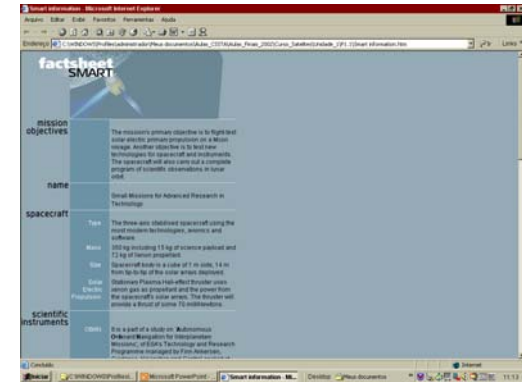
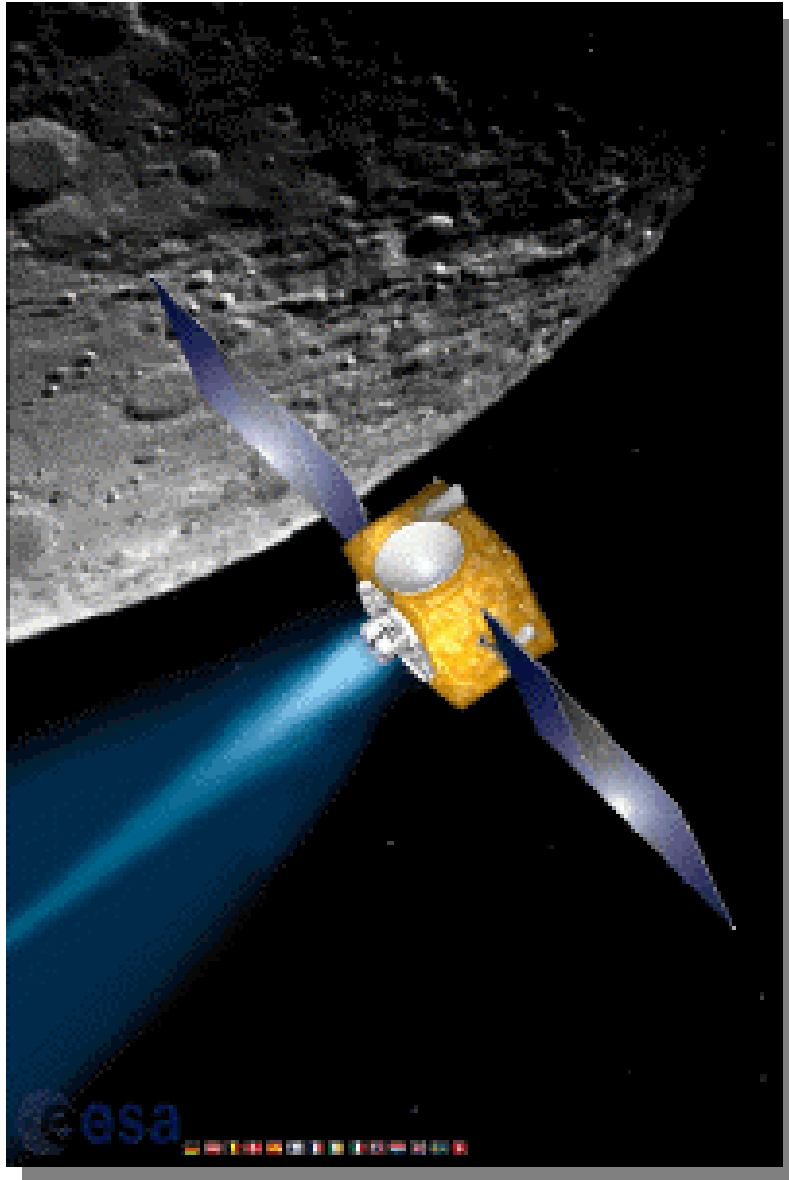


1.1 – Sonda interplanetária: Cluster, [31]



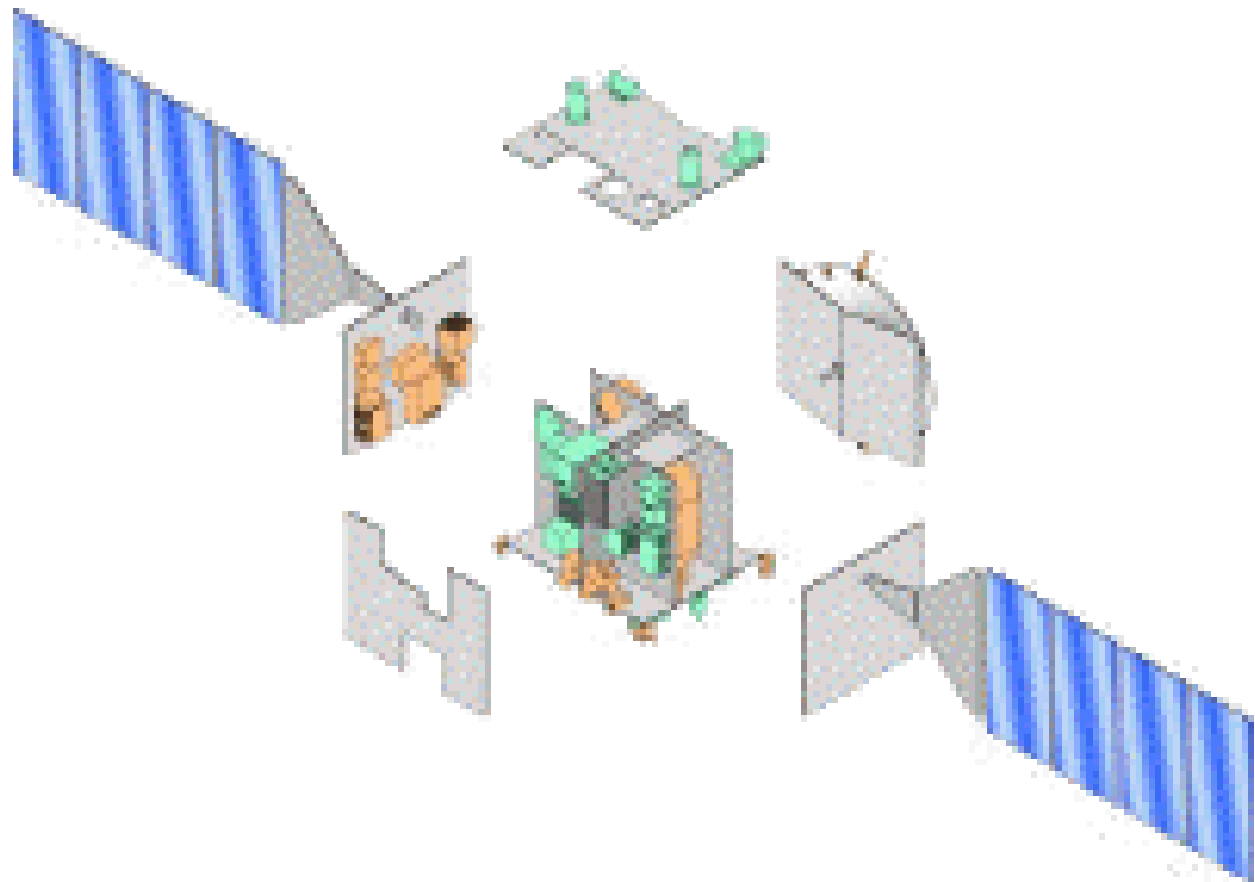


1.1 – Satélite experimental: SMART, [31]





1.1 – Sonda interplanetária: Mars Express, [31]



factsheet
MARS EXPRESS

mission objectives
The main objective is to search for subsurface water from orbit and along a lander on the Martian surface. The scientific payload will consist of the probe and perform a series of remote sensing experiments designed to detect water on the Martian atmosphere, the planetary structure and geology. After landing to orbit on the surface, thelander Beagle 2 will perform geology and geochemistry research.

name
Mars Express operated named after the Mars planet, the only one in the solar system on which there is a strong possibility of finding life, past, or perhaps present.
lander called Beagle 2 named after the ship in which Charles Darwin set sail to explore uncharted areas of Earth in 1831.

spacecraft
Type
Mars Express is a three axis stabilized spacecraft with pointing performance 0.1°, carrying the scientific payload mounted on the spacecraft bus which is a hexapod aluminium one. The lander Beagle 2 is attached to one side of the Mars Express spacecraft underneath the umbra of the four reaction wheels.
Mass
The launch mass of the spacecraft is 1 042 kg including 427 kg of propellant, 116 kg of

Info Model

Key parameters of the spacecraft

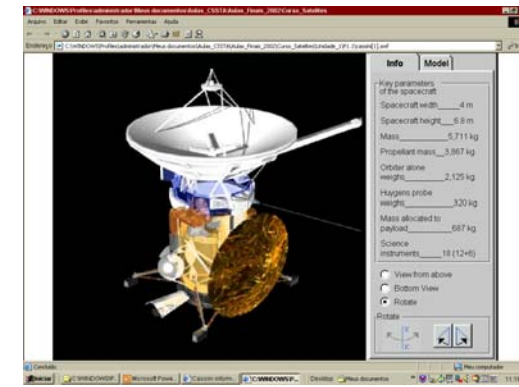
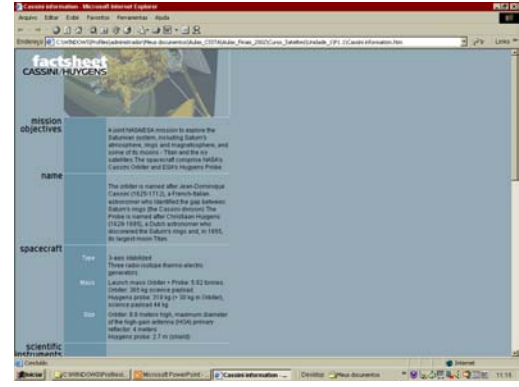
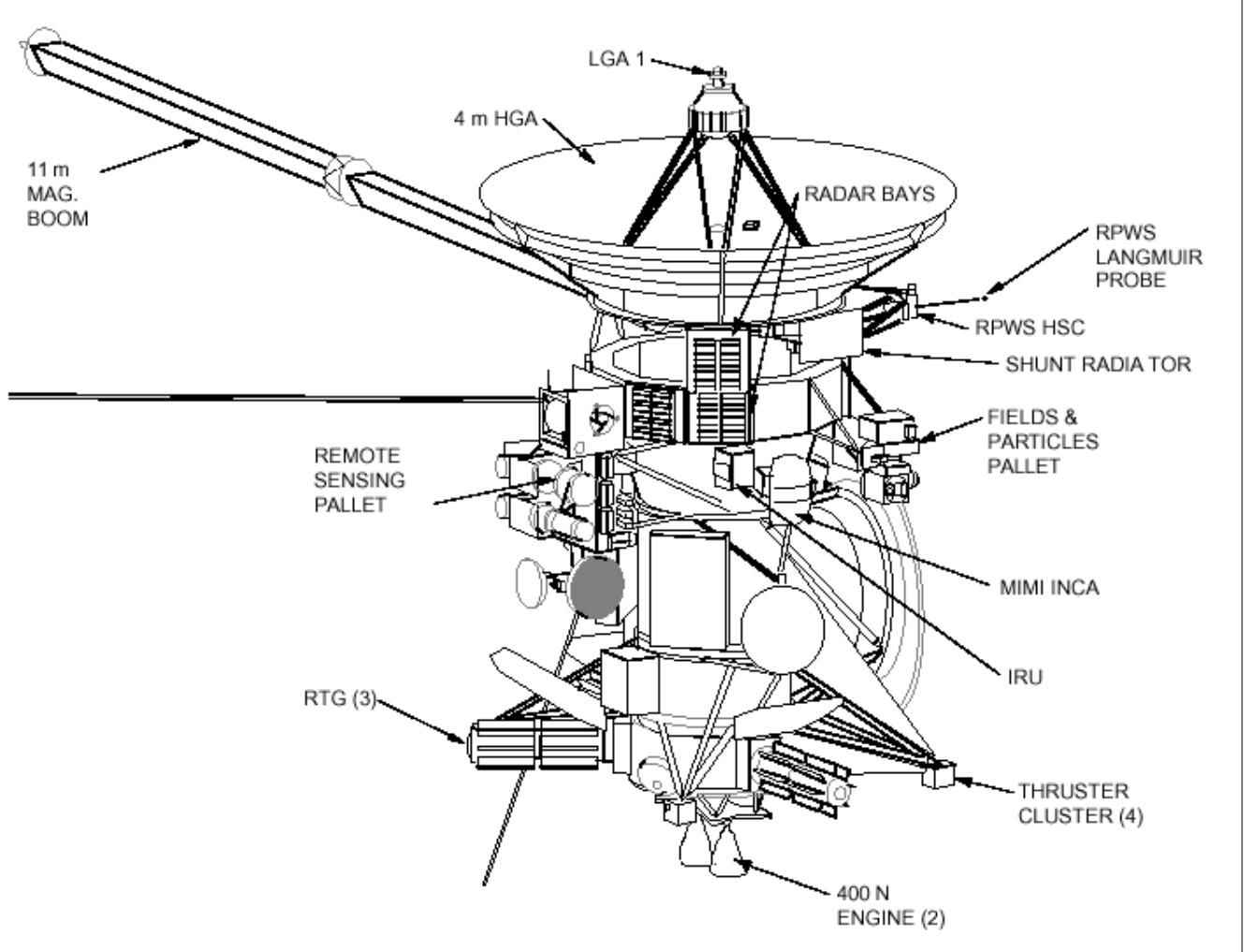
- Spacecraft width_ 1,8 m
- Spacecraft height_ 1,4 m
- Mass_ 1 042 kg
- Propellant mass_ 427 kg
- Beagle 2 probe weighs_ 60 kg
- Mass allocated to payload_ 116 kg

View from above
 Bottom View
 Rotate

Rotate

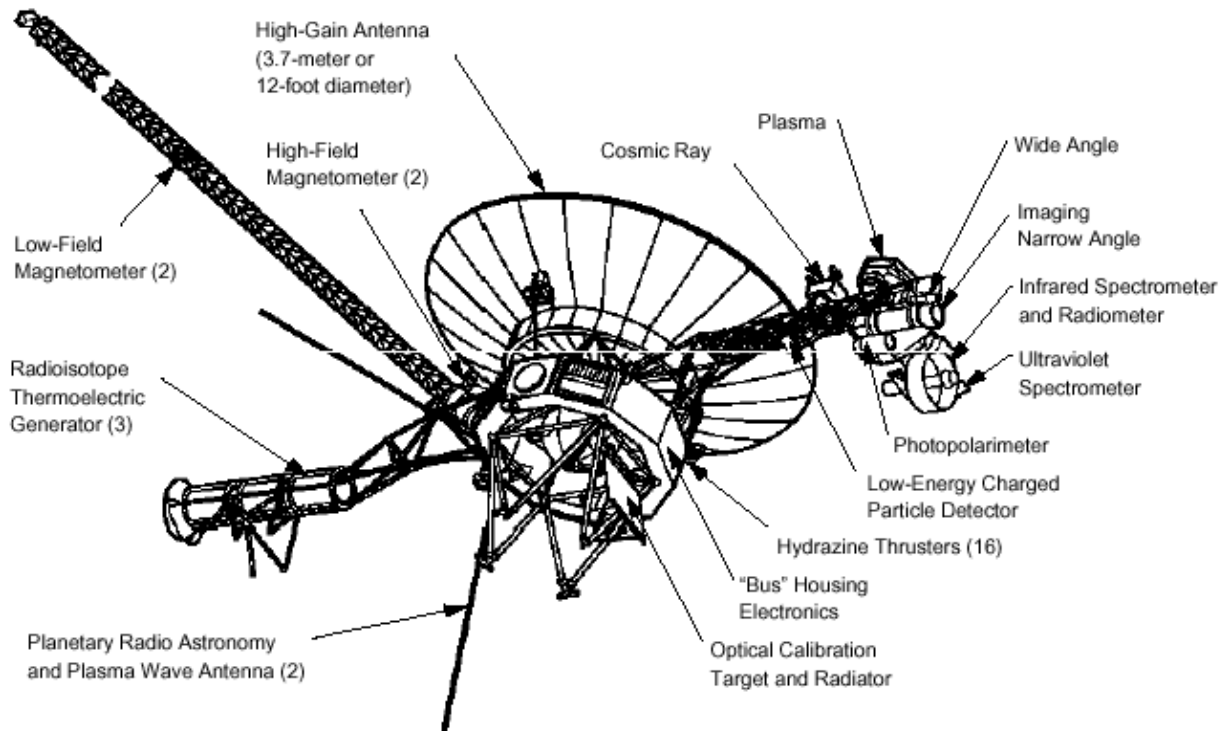


1.1 – Sonda interplanetária: Cassini/Huygens, [2, 31]





1.1 – Sonda interplanetária: Voyager 1 e 2, [2]



Classification: Flyby spacecraft.

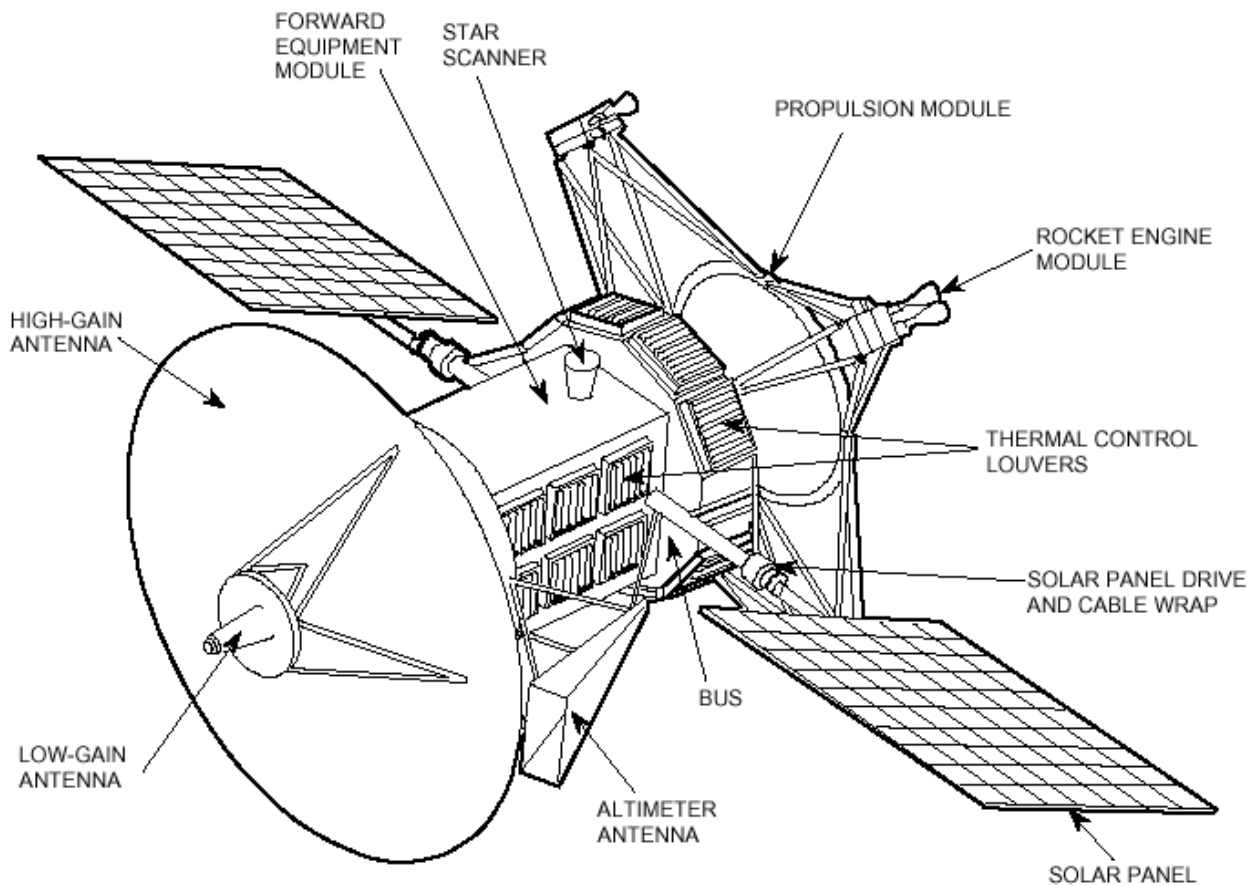
Mission: Jovian planets and interstellar space.

Features: The Voyager 1 and Voyager 2 spacecraft were launched in late 1977 aboard Titan III launch vehicles with Centaur upper stages. They completed highly successful prime mission flybys of Jupiter in 1979 and Saturn in 1980 and 1981. Voyager 2's extended mission succeeded with flybys of Uranus in 1986 and Neptune in 1989. Both spacecraft were still healthy in 1995, and were conducting studies of interplanetary space enroute to interstellar space. Voyager 1 and Voyager 2 recently identified low frequency radio emissions from the heliopause, estimated to be about 50 AU away from the spacecraft. Science data return is expected to continue well into the XXI century.

Stabilization: Three-axis stabilized via thrusters.



1.1 – Sonda interplanetária: Magellan, [2]



Classification: Orbiter spacecraft.

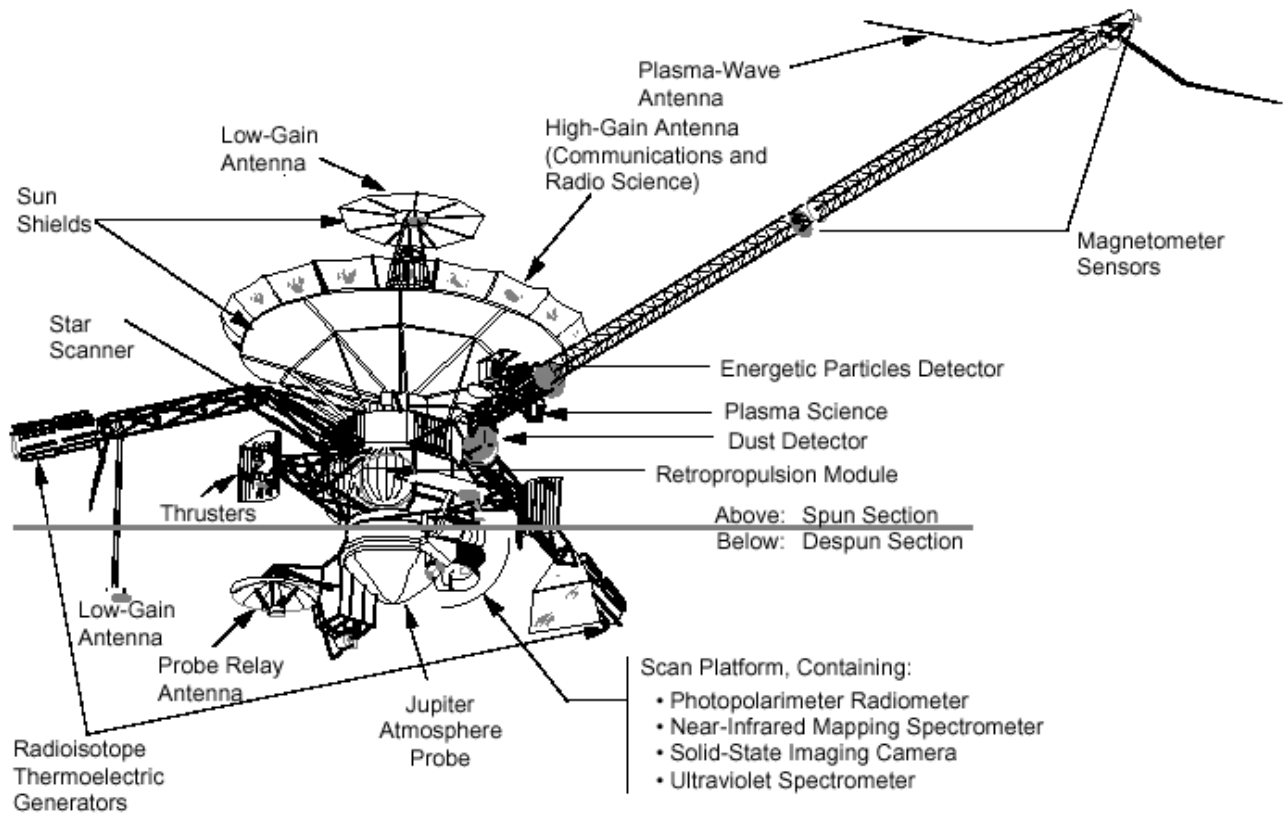
Mission: Venus mapping.

Features: The Magellan spacecraft was launched in early 1989 via the Space Shuttle Atlantis and an IUS upper stage. By the end of its fourth Venus-rotation cycle (243 days each) four years after launch, Magellan had mapped 98% the surface of Venus with imaging, altimetry, and radiometry, performed several radio science experiments, and had surveyed the gravity field at low latitudes all the way around the planet. The imaging resolution was about 100 m, close enough to discern the various geologic processes for the first time. Magellan's periapsis was lowered into Venus's atmosphere for a thousand orbits, aerobraking into a nearly circular orbit. Magellan's periapsis was then raised out of the atmosphere, and it completed high-resolution mapping of the planet's gravity field from low circular orbit. Magellan was then intentionally flown to its destruction in Venus's atmosphere in October 1994, all the while carrying out additional experiments.

Stabilization: Three-axis stabilized via reaction wheels and thrusters.



1.1 – Sonda interplanetária: Galileo Orbiter, [2]



Classification: Orbiter spacecraft.

Mission: Investigate Jupiter's atmosphere, magnetosphere, and satellites.

Features: Galileo was launched aboard the Space Shuttle in October 1989. It executed science observations during gravity-assist flybys of Venus and Earth, as well as during two asteroid flybys. It observed Comet Shoemaker-Levy 9's impact with Jupiter in July 1994. Galileo entered Jovian orbit December 1995 shortly after receiving the data from its atmospheric probe, which entered Jupiter's atmosphere.

Stabilization: Spin stabilized.