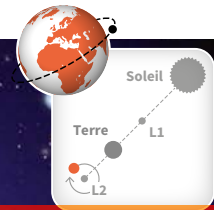
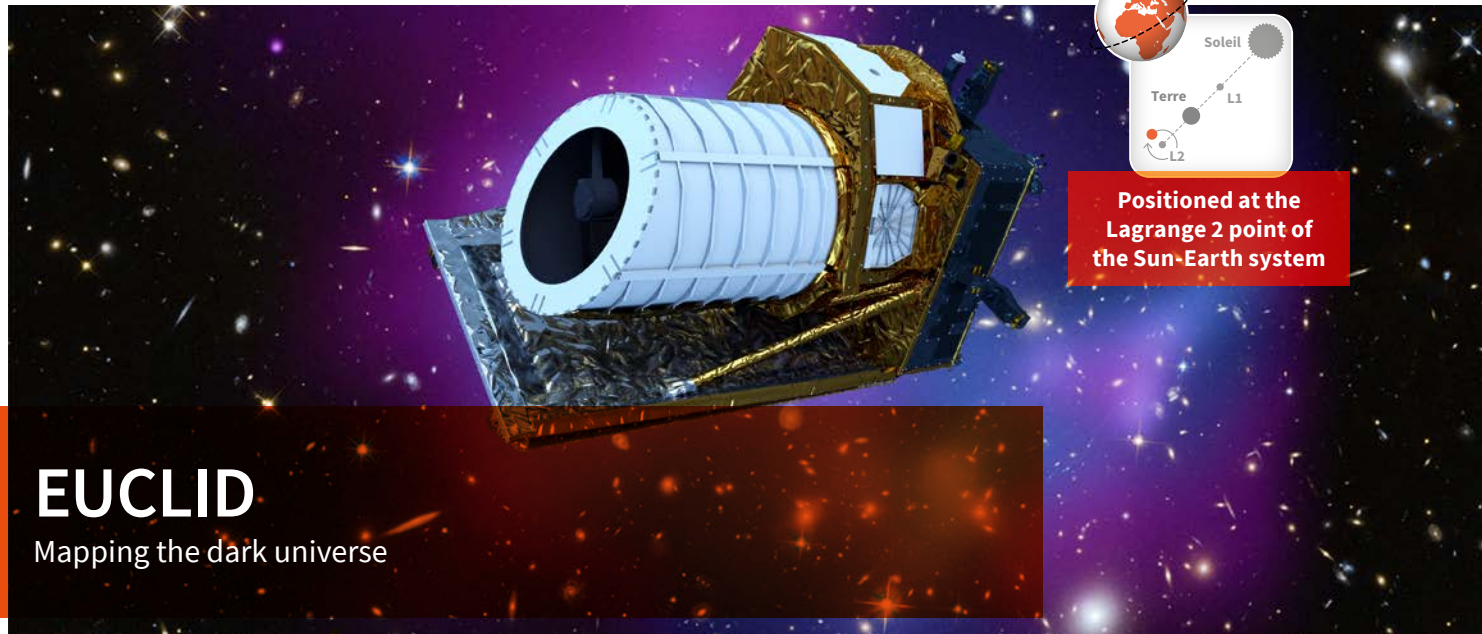


Dark matter and dark energy



Positioned at the Lagrange 2 point of the Sun-Earth system

EUCLID

Mapping the dark universe

© ESA/ATG medialab (spacecraft); NASA, ESA, CXC, C. Ma, H. Ebeling and E. Barrett (University of Hawaii/ifa), et al. and STScI (background)

- **Scientific leader:** Stéphanie Escoffier (CPPM) *
- **Laboratories involved:** APC (Paris), CC-IN2P3 (Lyon), CPPM (Marseille), IP2I (Lyon), LPSC (Grenoble)
- **Nature:** European Space Agency (ESA) M-class mission
- **Status:** project under construction, financed mainly by Europe
- **Website:** <https://www.euclid-ec.org/>, <https://euclid.cnes.fr/fr>

SCIENTIFIC OBJECTIVES

Euclid aims to understand dark matter and dark energy, which is 95% of the energy content of the Universe, by mapping it over the last 10 billion years. Dark energy and gravity imprints will be tracked by observing galaxy clustering in a spectroscopic survey of 50 million galaxies. Dark matter will be mapped through the effects of gravitational shear observed in images of over 2 billion objects. Euclid will also explore galaxy evolution, strong lensing, transient objects and exoplanets.

RESOURCES DEPLOYED

- Euclid uses a telescope which, together with the service module, forms a unit 4.5 m long with a diameter of 3.74 m and a mass of 2.1 tonnes.
- In 2023 Euclid is scheduled to be placed in a high-amplitude Lissajous orbit (about 1 million km) around the L2 Lagrange point of the Sun-Earth system.
- Euclid will have two instruments: VIS for visible light and NISP for infrared radiation. These instruments will analyse the light collected and make it possible to deduce the morphometric, photometric and spectroscopic properties of galaxies.
- A European consortium of 200 laboratories from 16 different countries will be responsible for the very large volume of data generated by Euclid and its scientific exploitation.

200 international laboratories

6 years of operation

16 participating countries, 14 of which are European

850 GBits of compressed data/day

2 000 consortium members

IN2P3 CONTRIBUTIONS

- Design and development of the Near infrared spectrophotometer (NISP) instrument by integrating the individual detectors on the infrared focal plane, the largest to fly with this technology.
- Simulation, data reduction and analysis pipeline.
- The scientific axes explored by the IN2P3 teams revolve around the cosmological constraints that will be provided by studies of the distribution of galaxies, clusters of galaxies or cosmic voids, as well as cross-correlations with other cosmological probes such as the CMB or the gravitational shear.

OTHER FRENCH LABORATORIES INVOLVED

Irfu (CEA Saclay), IAP (Paris), IAS (Orsay), IRAP (Toulouse), OCA (Nice), LAM (Marseille), LERMA (Paris)

- 2008** ESA defines a space mission to study dark energy
- 2011** Euclid is selected as part of ESA's Cosmic Vision programme
- 2012** ESA gives the Euclid Consortium responsibility for the mission
- 2015** Construction of the flight model begins
- 2020** Delivery of the NISP instrument by IN2P3
- 2023** Launch from the United States
- 2024** First delivery of Euclid data planned
- 2029** End of the nominal Euclid mission

* Since 2019