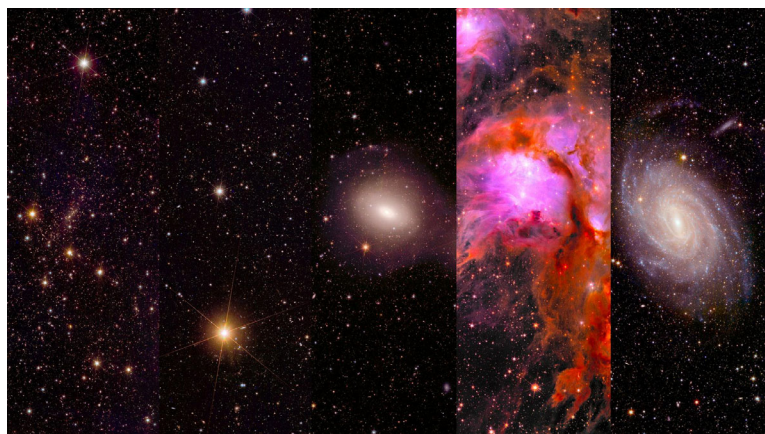


# Press Releases

## GALAXIES, STARS AND CLUSTERS: THE SPECTACULAR NEW IMAGES OF EUCLID



The European Euclid space telescope enriches our 'album' of the universe with five breathtaking new portraits. The European Space Agency (ESA) mission, in which NASA is also involved, thus continues to send amazing images to Earth that contain unprecedented detail of information. There is also great satisfaction for the Italian researchers from ASI, INAF and INFN who are participating in the mission's international consortium of more than 2,000 scientists from 300 institutes in 13

European countries, in addition to the United States, Canada and Japan.

The entire series of first observations made by Euclid, which pointed its telescope at 17 astronomical objects, from nearby clouds of gas and dust to distant galaxy clusters, was made in anticipation of the main programme of observations that Euclid will conduct to unlock the secrets of the dark cosmos and reveal how and why the universe appears as it does today. The new images, which took just 24 hours of observations, less than 0.1% of the total time spent on the mission's main objective, are accompanied by the publication of ten articles on the first scientific data produced by the mission and five articles describing the mission, instruments, and performance based on the first in-flight data.

The images obtained by Euclid cover vast portions of the sky and allow us to observe the distant universe with much better resolution than terrestrial telescopes, using both visible and infrared light. And although they are extraordinary even only visually, these images are more than just beautiful 'snapshots': thanks to Euclid's new and unique observational capabilities, they also reveal a great deal of information about the cosmos. For example, it has been possible to study the mechanisms of star and galaxy formation and evolution, as well as to identify objects hitherto never seen, such as wandering newborn planets in our galaxy and dwarf galaxies on the periphery of a galaxy cluster. Two INAF-led studies have revealed previously unknown details of a star cluster in the Milky Way and a number of galaxies close to our own. In addition, the infrared light-sensitive NISP instrument aboard Euclid has made it possible to reveal new galaxies that formed in the primordial stages of the universe some 13 billion years ago, proving that it is possible to observe and study this category of astrophysical objects, discovered only a few decades ago and still so mysterious.

Euclid is one of the most ambitious programmes at the international level in which Italy, through the Italian Space Agency (ASI), the National Institute of Astrophysics (INAF) and the National Institute for Nuclear Physics (INFN), plays a leading role, involving more than two hundred Italian scientists, also belonging to numerous universities: University of Bologna, University of Ferrara, University of Genoa, State University of Milan, Sapienza University of Rome, University of Trieste, SISSA, University of Ferrara, and CISAS of the University of Padua.

Thanks to this fundamental Italian role, the Euclid satellite houses a 1.2-metre-diameter mirror telescope and two scientific instruments, the VIS (VISible Instrument) and the NISP (Near Infrared Spectrometer Photometer), which have the main objective of observing the extragalactic sky with the aim of obtaining images with very high resolution and measuring the spectra of millions of galaxies. Italy had the key role of designing the mission's observational strategy and now has the role of coordinating all ground data reduction activities.

In addition, ASI, again in collaboration with INAF and INFN, led the industrial team that designed and built the instrument contributions, which consisted of a Temporary Association of Enterprises with OHB Italia as lead company and SAB Aerospace and Temis as member companies, while the leadership for the platform implementation was entrusted by ESA to Thales Alenia Space Italia belonging to the Leonardo Group. ASI also funded the industrial activities for the design and implementation of the mission's Italian Science Data Centre, which were entrusted to ALTEC of Turin.

"Euclid is currently the most complex mission in ESA's Science Programme in terms of scientific objectives and is destined to open an important chapter in the knowledge of our Universe" says Barbara Negri, Head of Human Flight and Scientific Experimentation at ASI. "These new images obtained by Euclid confirm the excellent performance of the scientific instruments on board, to which ASI contributed with the implementation of important parts, and the great work of the Science Ground Segment, under Italian responsibility, in processing the scientific data."

"These new images, along with those released last November, provide insight into the enormous potential of the mission, in terms of both the number of objects Euclid will be able to observe and the quality of the measurements themselves," says Anna Di Giorgio of INAF, who coordinates Italian activities for the ASI-funded Euclid mission. "The first scientific results published today, which see a significant contribution from INAF researchers, also provide an idea of which and how much 'legacy science' it will be possible to do using Euclid data: for example, the study of extragalactic star clusters, the discovery of new small-mass dwarf galaxies or of very distant bright galaxies, or the exploration of objects whose light was emitted more than 10 billion years ago, at the very beginning of the Universe."

"The goal of the Euclid mission is to study how dark energy and dark matter governed the evolution of the universe," explains Stefano Dusini, who coordinates INFN's participation in Euclid. "95% of the universe seems to consist of these two mysterious forms of energy and matter about which we still know little or nothing. The excellent quality of these first images makes us confident that Euclid will achieve its scientific goal. The excellent performance of the NISP instrument, to which INFN contributed with responsibility for integrating the hot electronics and, together with INAF, monitoring and in-flight management of the instrument and of the performance and good quality of the data, make us proud of the work done by INFN scientists and researchers," concludes Dusini.

The Euclid satellite was launched from Cape Canaveral in Florida on 1 July 2023 aboard a Falcon 9 launch vehicle of the private U.S. company SpaceX.