https://www.esa.int/Science_Exploration/Space_Science/Cheops/Liftoff_for_Cheops_ESA_s_exoplanet_mission

Liftoff for Cheops, ESA's exoplanet mission

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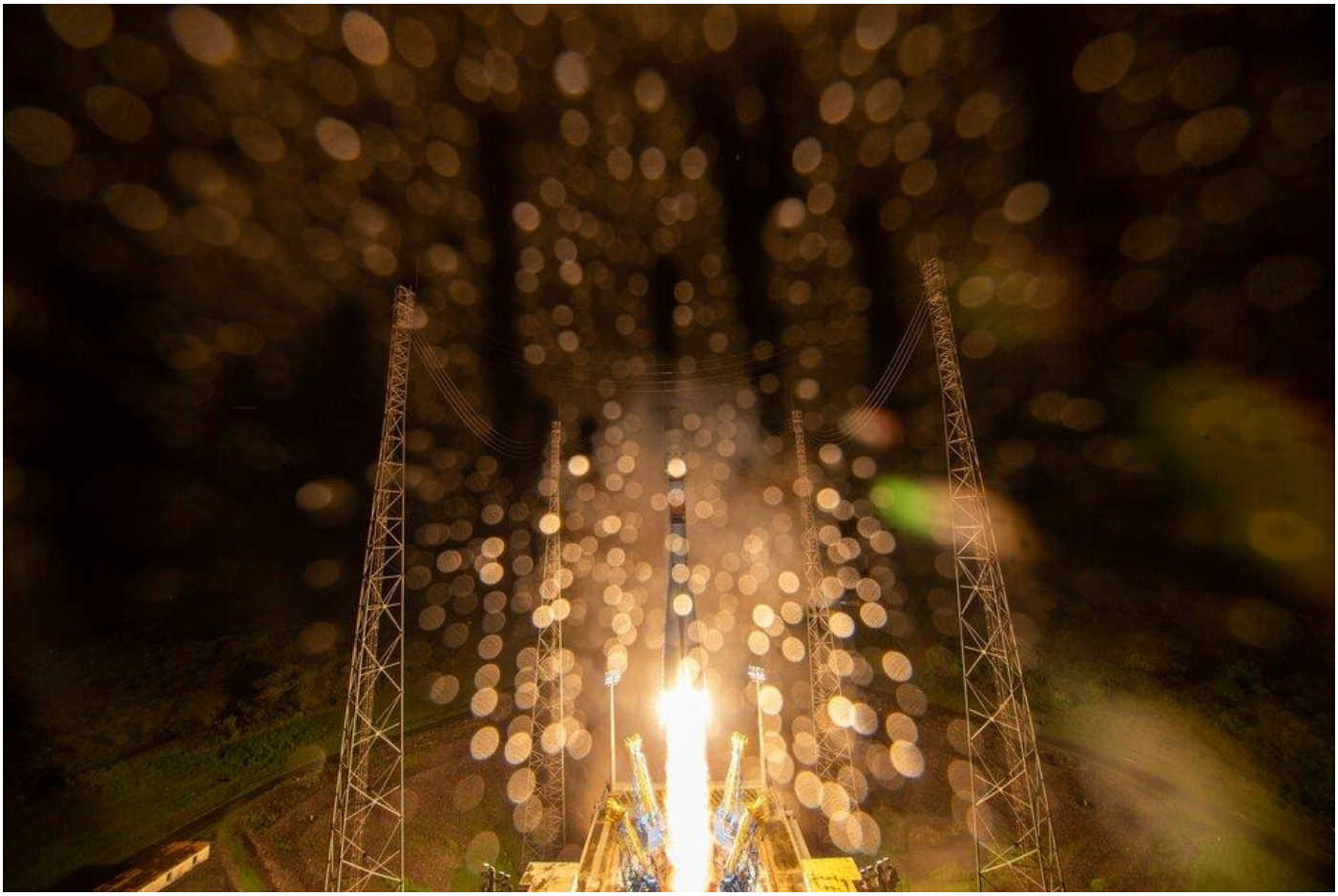
ESA / Science & Exploration / Space Science / Cheops

ESA's Cheops mission lifted off on a Soyuz-Fregat launcher from Europe's Spaceport in Kourou, French Guiana, at 09:54:20 CET on 18 December on its exciting mission to characterise planets orbiting stars other than the Sun.

Signals from the spacecraft, received at the mission control centre based at INTA in Torrejón de Ardoz near Madrid, Spain, via the Troll ground tracking station at 12:43 CET confirmed that the launch was successful.

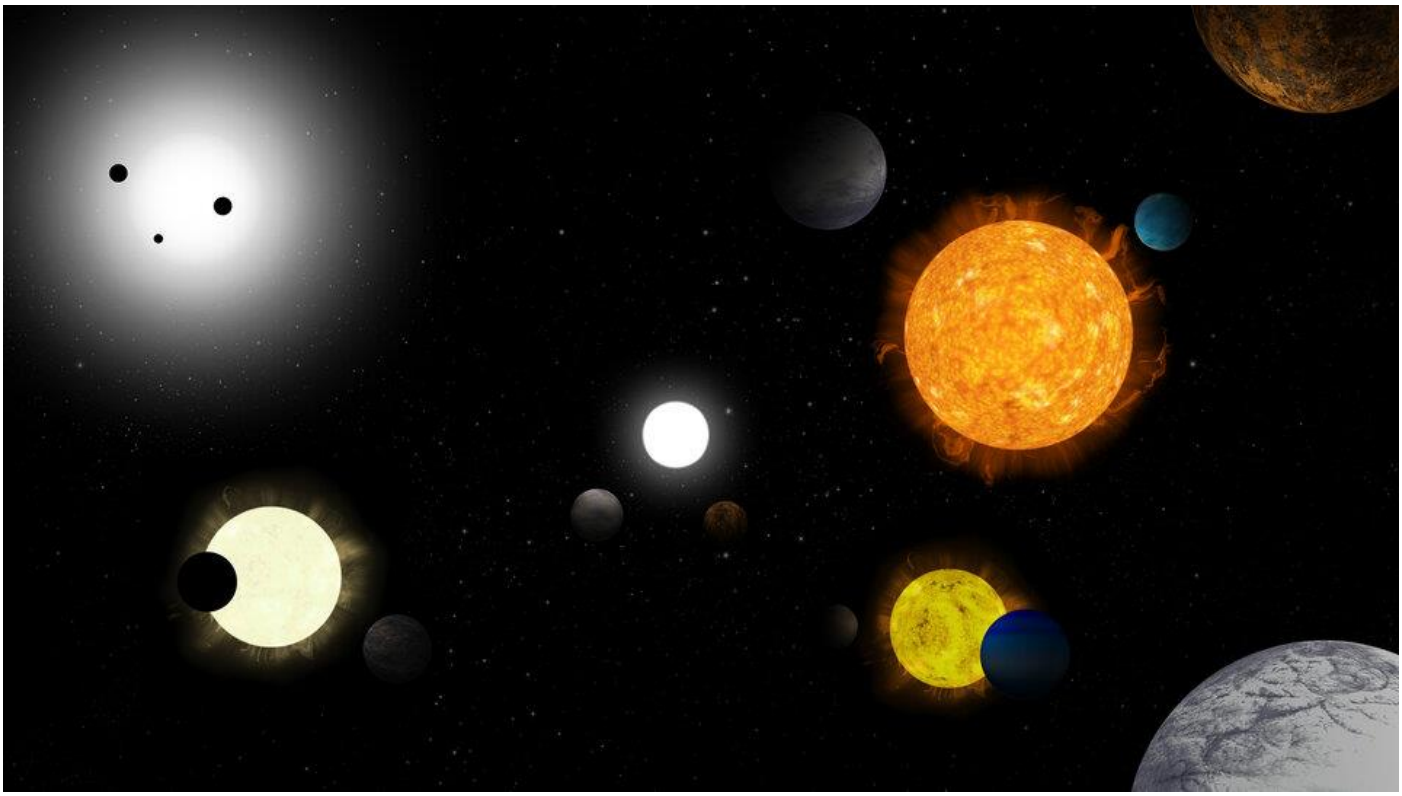


Liftoff for Cheops

Cheops, the Characterising Exoplanet Satellite, is a partnership between ESA and Switzerland, with important contribution from 10 other ESA Member States. ESA's first mission dedicated to extrasolar planets, or exoplanets, it will investigate known planets beyond our Solar System and provide key insight into the nature of these distant, alien worlds.

Scientists had long speculated about the existence of exoplanets until the discovery of 51 Pegasi b, the first planet found around a Sun-like star, which was announced in 1995. The discoverers, Didier Queloz and Michel Mayor, shared the 2019 Nobel Prize in Physics for their breakthrough finding, which marked the beginning of a new era of investigation and turned exoplanet research into one of the fastest growing areas of astronomy.

Over the past quarter of a century, astronomers using telescopes on Earth and in space have discovered more than 4000 exoplanets around stars near and far, most of which have no counterparts in our Solar System. This widely diverse assortment extends from gassy worlds larger than Jupiter to smaller, rocky planets covered in lava, with the most abundant exoplanet type found in the size range between Earth and Neptune.

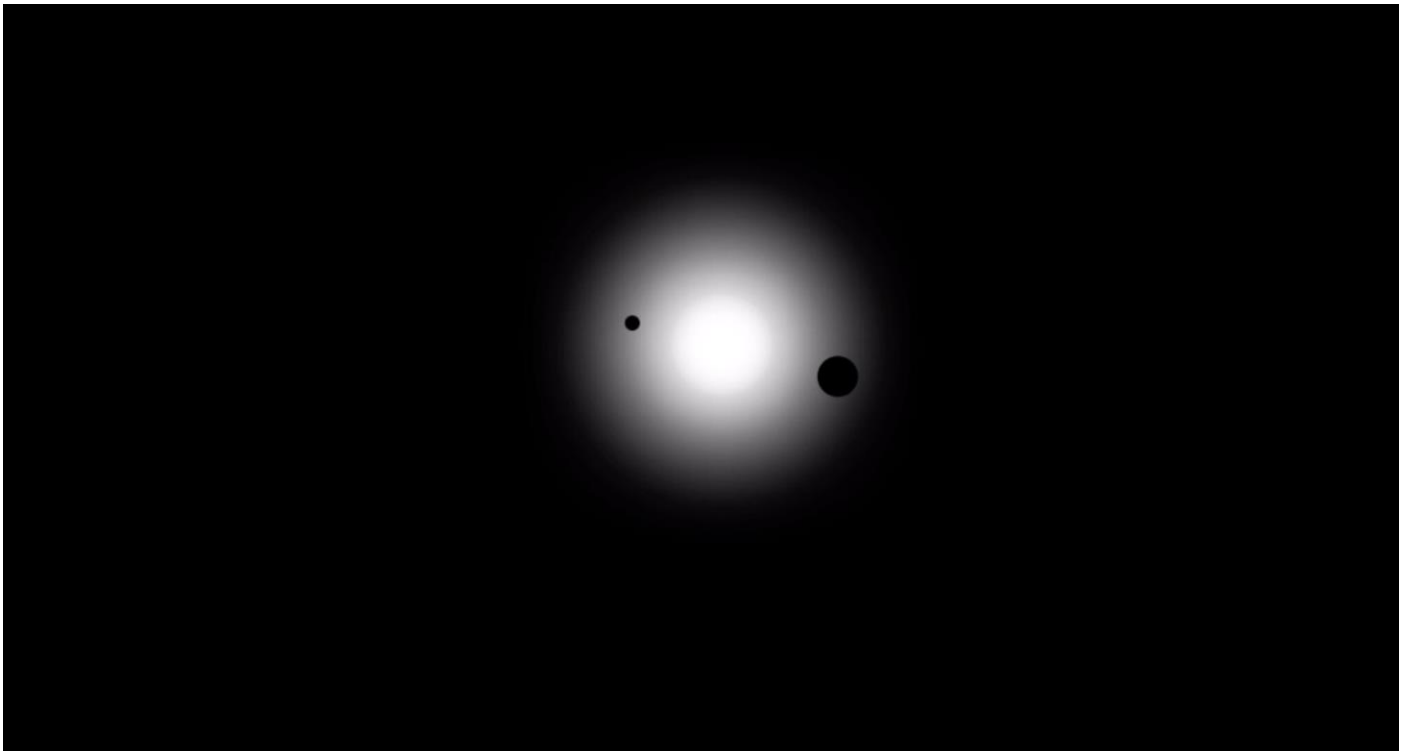


Exoplanet imaginarium

“Cheops will take exoplanet science to a whole new level,” says Günther Hasinger, ESA Director of Science.

“After the discovery of thousands of planets, the quest can now turn to characterisation, investigating the physical and chemical properties of many exoplanets and really getting to know what they are made of and how they formed. Cheops will also pave the way for our future exoplanet missions, from the international James Webb Telescope to ESA’s very own Plato and Ariel satellites, keeping European science at the forefront of exoplanet research.”

Cheops will not focus on the search for new planets. Instead, it will follow-up on hundreds of known planets that have been discovered through other methods. The mission will observe these planets exactly as they transit in front of their parent star and block a fraction of its light, to measure their sizes with unprecedented precision and accuracy.



Determining exoplanet sizes with Cheops
Access the video

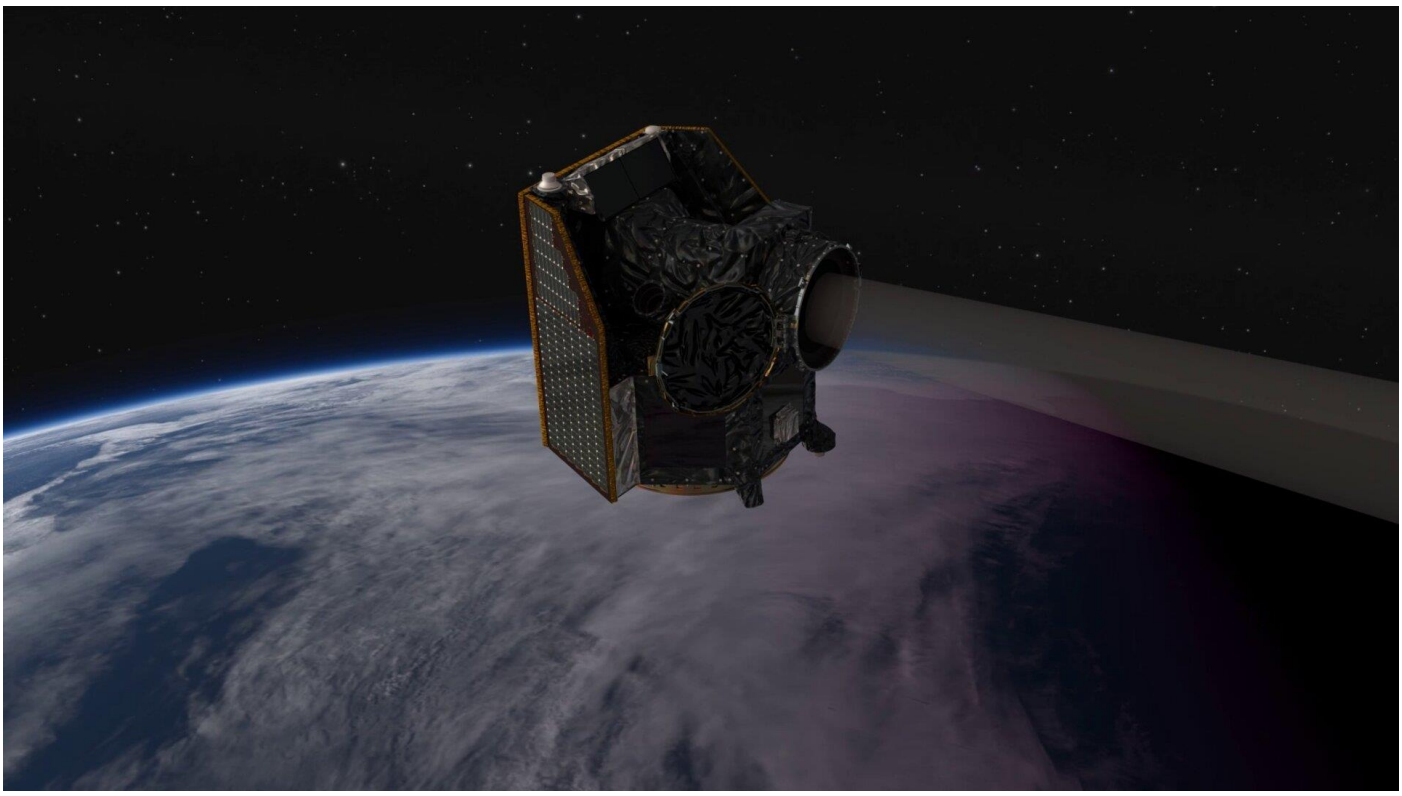
Cheops measurements of exoplanet sizes will be combined with existing information on their masses to derive the planet density. This is a key quantity to study the internal structure and composition of planets and determine whether they are gaseous like Jupiter or rocky like Earth, whether they are enshrouded in an atmosphere or covered in oceans.

“We are very excited to see the satellite blast off into space,” says Kate Isaak, ESA Cheops project scientist.

“There are so many interesting exoplanets and we will be following up on several hundreds of them, focusing in particular on the smaller planets in the size range between Earth and Neptune. They seem to be the commonly found planets in our Milky Way galaxy, yet we do not know much about them. Cheops will help us reveal the mysteries of these fascinating worlds, and take us one step closer to answering one of the most profound questions we humans ponder: are we alone in the Universe?”

For some planets, Cheops will be able to reveal details about their atmosphere including the presence of clouds and possibly even hints of the cloud composition. The mission also has the capability to discover previously unknown planets by measuring tiny variations in the timing of the transit of a known planet, and can also be used to search for moons or rings around some planets.

Cheops is the first ‘Small’-class mission implemented in the Cosmic Vision 2015–25 programme, the current planning cycle for ESA's space science missions, and the first mission in the programme overall to be launched. As a Small-class mission with a relatively short time – only five years – from project start to launch, it entailed several challenges, making it necessary to use technologies that have already been tried and tested in space, and driving several aspects of the satellite design.



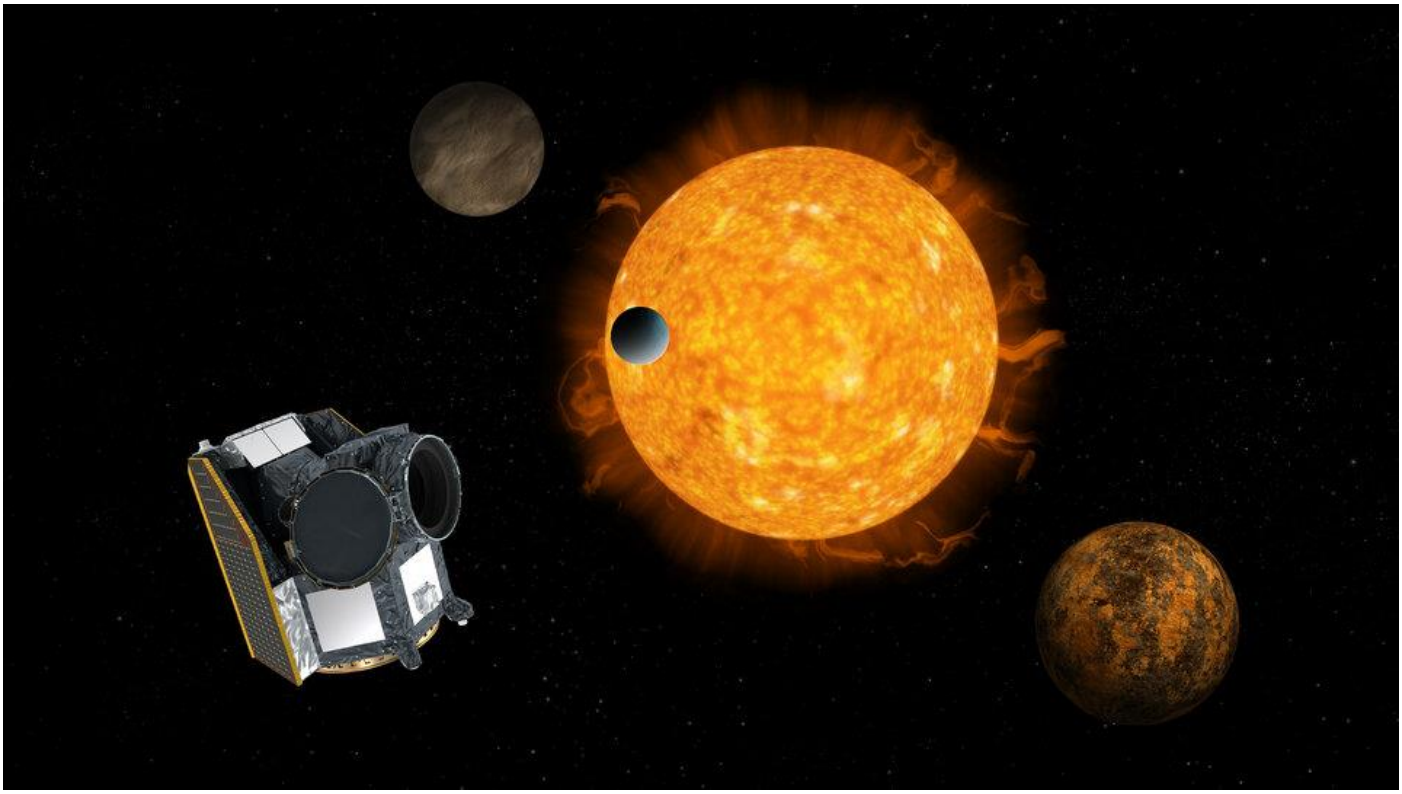
Cheops observing in space
Access the video

“Both Cheops instrument and spacecraft are built to be extremely stable, so as to measure the incredibly small variations in the light of distant stars as their planets transit in front of them,” says Nicola Rando, ESA Cheops project manager.

“For a planet like Earth, this amounts to the equivalent of watching the Sun from a distant star and measuring its light dim by a tiny fraction of a percent.

“Now we are looking forward to the first part of the operational activities, making sure that the satellite and instrument perform as expected, ready for scientists to perform their world-class science.”

Cheops shared the ride into space with the Italian space agency ASI’s Cosmo-SkyMed Second Generation satellite, which separated 23 minutes after liftoff.



Cheops, ESA’s first exoplanet mission

More information about Cheops

Cheops is an ESA mission implemented in partnership with Switzerland, with important contributions from Austria, Belgium, France, Germany, Hungary, Italy, Portugal, Spain, Sweden, and the United Kingdom.

ESA is the Cheops mission architect, responsible for procurement and testing of the satellite, launch, the launch and early operations phase, in-orbit commissioning, as well as the Guest Observers’ Programme. The prime contractor for the design and construction of the spacecraft is Airbus Defence and Space in Spain. The consortium of 11 ESA Member States led by Switzerland provided essential elements of the mission.

Cheops is a Small, or S-class, mission in ESA’s science programme. S-class missions have a much smaller budget than Large- and Medium-class missions, and a much shorter time from project start to launch. These conditions have made it necessary to use technologies that have already been tried and tested in space, and a number of tasks traditionally undertaken by ESA,

such as operations, will be done by the Consortium. The Cheops mission consortium runs the Mission Operations Centre located at INTA, in Torrejón de Ardoz, Spain, and the Science Operations Centre, located at the University of Geneva, Switzerland.

Eighty percent of the science observing time on Cheops is dedicated to the Guaranteed Time Observing programme, defined by the Cheops Science Team. The remaining 20% is made available to the astronomical community in the form of an ESA-run Guest Observers' programme, with proposals selected via a competitive peer-review selection process.

A media kit about the launch of Cheops and the science of the mission is also available.

More information about the launcher

The Soyuz launch vehicle that is operated by Arianespace at Europe’s Spaceport is the Soyuz-2 version. It is a medium-class launcher able to carry up to three tonnes into geostationary transfer orbit.

Its performance perfectly complements that of Europe’s launch vehicles Ariane 5 and Vega.

Images:

Images of Cheops

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Videos:

Videos about Cheops

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About ESA

ESA works on all aspects of space missions – from development, to launch, to exploitation and preservation of data. Activities include human spaceflight, Earth observation, navigation, telecommunications, and astronomy, as well as the application of space technology in everyday life.

ESA is an intergovernmental organisation, created in 1975, and has 22 Member States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom. Slovenia is an Associate Member.
ESA has established formal cooperation with six Member States of the EU. Canada takes part in some ESA programmes under a Cooperation Agreement.

ESA works with the EU on implementing the Galileo and Copernicus programmes as well as with Eumetsat for the development of meteorological missions.

Learn more about ESA at www.esa.int

For further information:

ESA Media Relations

Email: media@esa.int