

ESA’s EarthCARE satellite roars into space on an exciting mission to study Earth’s climate



The EarthCARE satellite has been successfully launched into space! Credit: ESA - S. Corvaja.

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Understanding Earth's climate is very important, and now scientists have a special new tool to help them: ESA's EarthCARE satellite! It began its journey into space on 29 May 2024 onboard a Falcon 9 rocket from the Vandenberg Space Force Base in California. Just 10 minutes after launch the satellite separated from the rocket, and before long a signal was received saying that it was safely orbiting almost 400km above Earth's surface.

EarthCARE deploys solar wing and cloud profiling radar

EarthCARE's solar panels have unfolded! Credit: ESA/ATG medialab.

EarthCARE stands for Earth Cloud Aerosol and Radiation Explorer. Its vital mission is to observe our planet from space, collecting information about how clouds, aerosols (tiny particles such as dust and pollutants floating in Earth's atmosphere) and radiation all interact.

We see clouds in the sky above us all the time, but did you know that they play an important part in how Earth's atmosphere heats up and cools down? They reflect energy from the Sun back into space, which has a cooling effect on our planet; but they also trap infrared energy from the ground, which makes it warmer! Whether clouds do more cooling or heating overall depends on many factors, such as their size, location, and how much water they contain.

Earth's atmosphere also contains lots of aerosols, and human activities such as transportation and farming can add more. Aerosols allow clouds to form, but they also reflect and trap heat themselves, in a similar way to clouds.

How the effects of clouds, aerosols, and radiation combine to impact our climate is very complicated, which is why EarthCARE is needed to improve our understanding. The satellite has four high-tech instruments that will all work together:

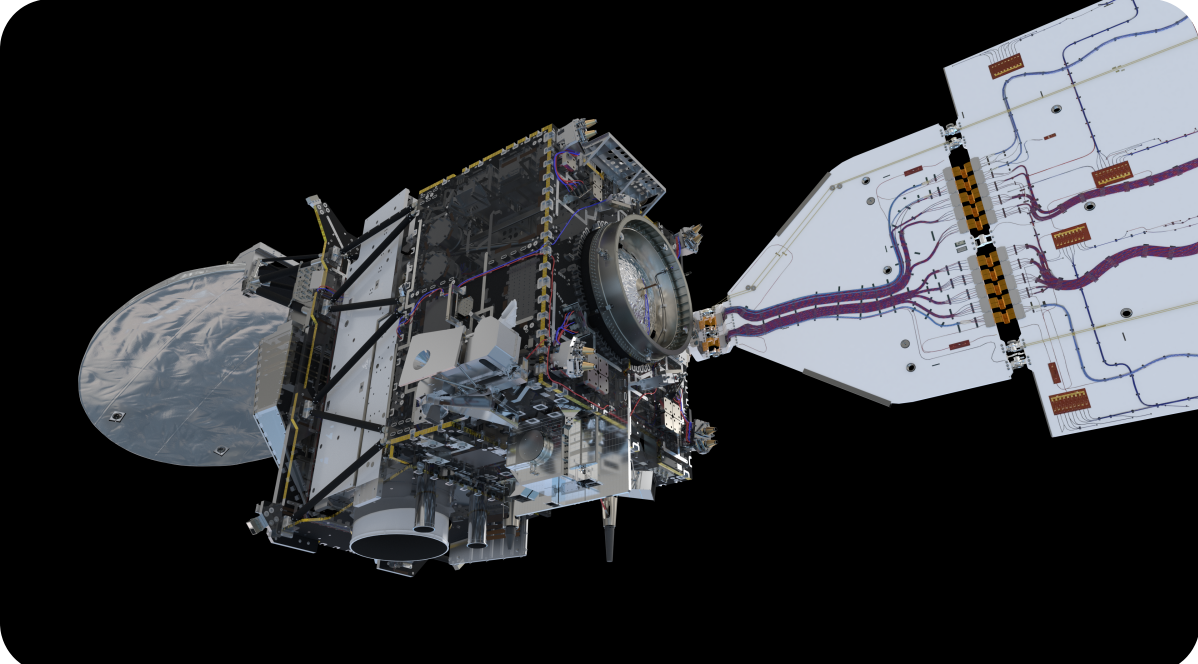
- Atmospheric Lidar, which measures clouds and aerosols in Earth’s atmosphere.
- Cloud Profiling Radar, which allows EarthCARE to see what clouds are like on the inside.
- Multispectral Imager, which takes very detailed pictures in different wavelengths of light.
- Broadband Radiometer, which measures radiation from the Sun that is reflected into space, and infrared radiation coming from Earth.

Measuring clouds and aerosols

Discover more about EarthCARE's four special instruments. Credit: ESA/ATG medialab.

EarthCARE is now being controlled from ESA's European Space Operations Centre in Darmstadt, Germany. The next few months will be spent carefully checking that the satellite is working as expected. Scientists are excited to start examining the information EarthCARE will collect!

Cool fact: EarthCARE is a joint project between ESA and JAXA, the Japan Aerospace Exploration Agency!



See EarthCARE close up. Credit: ESA/ATG medialab.

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