BIOMASS

ESA's forest mission

SCIENTIFIC AND TECHNICAL EXCELLENCE

ESA's Earth Explorers are recognised as some of the world's leading research missions, delivering groundbreaking scientific insights crucial to understanding Earth's complex systems. They address questions that have a direct bearing on climate change and societal issues such as the availability of food, water, energy and resources. Additionally, many Earth Explorer missions lay the foundation for operational missions that provide systematic data for environment services.

EARTH'S GREEN LUNGS

Forests, often called 'Earth's green lungs', absorb around 8 billion tonnes of carbon dioxide from the atmosphere each year. Deforestation and degradation, particularly in tropical regions, are causing stored carbon in forests to be released back into the atmosphere. Quantifying the global carbon cycle is essential to understanding how forests are changing and the subsequent implications for our climate.

ESA's Biomass mission is designed to measure woody biomass in forests and how this is changing. Since carbon makes up roughly half the weight of wood, the mission is extremely important in the quest to reduce uncertainties about the role forests play in the global carbon cycle and their impact on climate change.

FIRST OF ITS KIND

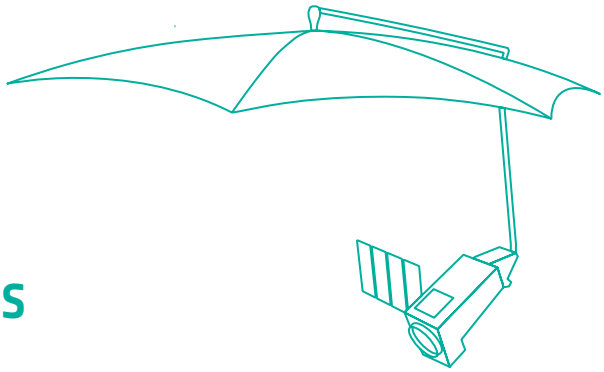
The Biomass satellite carries the first P-band synthetic aperture radar to observe Earth from space. Thanks to its long wavelength, around 70 cm, the radar signal can penetrate all the way through the forest canopy. This feature allows it to collect information on the height and structure of different forest types, and ultimately be used to measure the amount of carbon they store and how this is changing over time.

PHASE MATTERS

Over its 5.5 year planned life in orbit, the mission is operated in two phases, namely, the tomographic phase at the beginning followed by the interferometric phase. Novel to Earth observation, the first phase yields 3D maps of forests. The second phase allows forest height and above-ground biomass to be estimated. During this phase, around five global maps are acquired.

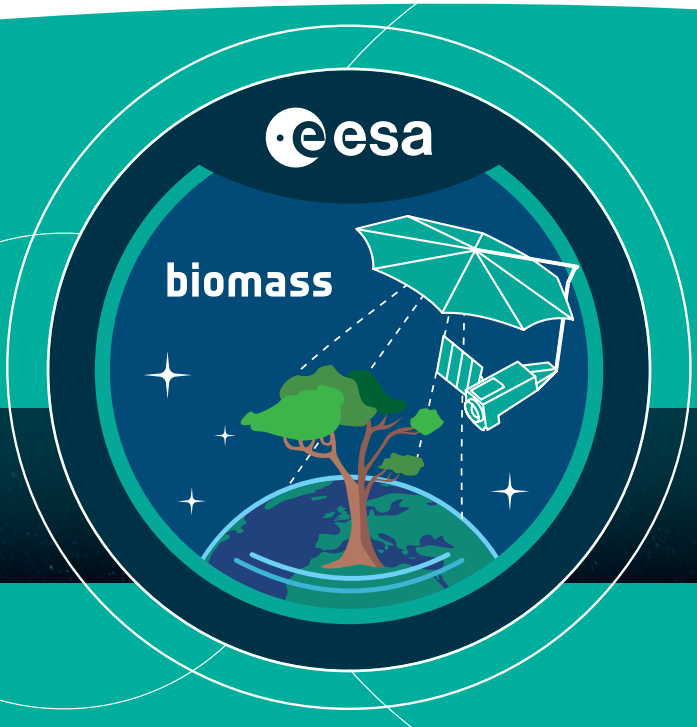
BEYOND FORESTS

The mission's novel P-band radar also offers opportunities to gather information on other aspects of Earth such as ice velocity and subsurface ice structure, underground geology in deserts to study the remains of ancient riverbeds and lakes, and the topography beneath dense vegetation.



FACTS AND FIGURES

Scientific goals	To deliver the first global, repeat systematic estimates of forest biomass and height to reduce major uncertainties in the knowledge of carbon stocks and fluxes on land, including carbon fluxes associated with land-use change, forest degradation and forest regrowth.
Launch	2025 on a Vega-C rocket from Europe's Spaceport in French Guiana
Life	5.5 years
Satellite	Three-axes stabilised platform 5.8 m high, 2 m wide and 2 m long
Instruments	Fully polarimetric P-band synthetic aperture radar with a 12 m diameter passive reflector
Mass	1250 kg (including 132 kg fuel)
Power	1.5 kW deployable solar array with 7 m2 triple junction GaAs cells; 156 Ah Li-ion battery
Orbit	Polar, dawn-dusk, Sun-synchronous, at an altitude of 666 km, inclined at 98 degrees, three-day repeat cycle for interferometric acquisitions
Communication	Science data transmitted to Kiruna (SE) via X-band downlink, and via S-band for uplink, tracking, telemetry and command
Project	Managed at ESA's European Space Research and Technology Centre in Noordwijk (NL)
Mission control	ESA's European Space Operations Centre in Darmstadt (DE)
Data processing	ESA's Centre for Earth Observation in Frascati (IT)
Prime contractor	Airbus (UK)



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