# Biomass satellite to weigh Earth’s forests through cloud and canopy cover



A pioneering satellite with the capability to see through dense cloud cover and forest canopies is set for launch on Tuesday from the European Space Agency’s (ESA) Kourou spaceport in French Guiana. Known as the Biomass satellite, this mission aims to "weigh" the Earth’s forests by accurately assessing the amount of carbon stored within their wood, branches, and trunks. By doing so, it intends to provide a clearer picture of how these vast ecosystems contribute to regulating the planet’s climate by sequestering carbon dioxide.

The Biomass satellite, weighing 1.2 tonnes, will be launched at 10:15 BST and is operated by ESA in collaboration with operators CNES and Arianespace. British aerospace company Airbus has led the development of the project, which has been in progress for over two decades. A distinctive feature of the satellite is its enormous 12-metre diameter antenna, which unfolds after deployment and has earned it the nickname "space brolly." This umbrella-like antenna emits radar waves of an unusually long wavelength, which enable the satellite to penetrate through leafy canopies and clouds, reaching as far down as the forest trunks and branches.

Dr Ralph Cordey, head of geosciences at Airbus, explained to the BBC that existing radar systems in orbit are limited to imaging only the forest tops, including twigs and leaves. The longer wavelength radar used by Biomass, however, can scan deeply inside forests, akin to how CT scans generate layers through a body to reveal its inner structure. "Most radars that we have in space today take wonderful images of icebergs, but when they look at forests they see the tops of the forest, the little twigs, the little leaves, they don't penetrate down into the forests," Dr Cordey said. "But what we found was that by using a much longer radar wavelength, we could see down into the depths of trees and forests."

This capability will allow the satellite to estimate the volume of woody material in forests, which acts as a proxy for the amount of carbon dioxide stored. Current methods rely on ground measurements and extrapolations, which are challenging given the incredible scale of the world's tropical forests, home to an estimated 1.5 trillion trees. Professor Mat Disney, a remote sensing expert from University College London, highlighted the difficulty of this task, saying, “Our current understanding is really patchy, because it's really, really difficult to measure... Essentially, what we're talking about is trying to weigh the amount of carbon that's stored in one and a half trillion trees across the tropics. Satellites are really the only way you can do that consistently.”

In preparation for launch, Airbus collaborated with American firm L3Harris Technologies, specialists in large deployable antenna systems, to ensure the successful construction of the satellite’s reflector. Dr Cordey noted the complexity of unfolding the 12-metre antenna in space, comparing the process to deploying a very large umbrella. The launch itself remains a critical moment, given the technical challenges involved.

Once operational, the Biomass satellite is expected to deliver its first maps within six months, followed by an ongoing five-year mission gathering annual data. These maps will not only quantify the carbon stored but also track carbon losses resulting from deforestation, providing vital information on the health and changes in global forests. Professor Disney emphasised the importance of the satellite’s ability to see through clouds, a significant limitation faced by previous Earth observation satellites such as Landsat. “The kind of observations that we've had for 50 years from [other] satellites like Landsat are affected very heavily by clouds. And in tropical regions, we have clouds a lot of the time, so you may not see a chunk of tropical forest,” he said. The Biomass satellite’s radar, unaffected by cloud cover, will offer consistent year-to-year comparisons.

Reflecting on the significance of the mission, Dr Cordey said, “It's exciting, because it's going to tell us about how something that we perhaps take for granted, our forests, our trees, how they are contributing to the processes which govern our planet, and in particular, the processes behind climate change which are so important to us today and for the future.” The ESA and partners anticipate that this new perspective on forests will greatly enhance scientific understanding and modelling of climate change impacts worldwide.

Source: [Noah Wire Services](https://www.noahwire.com)

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