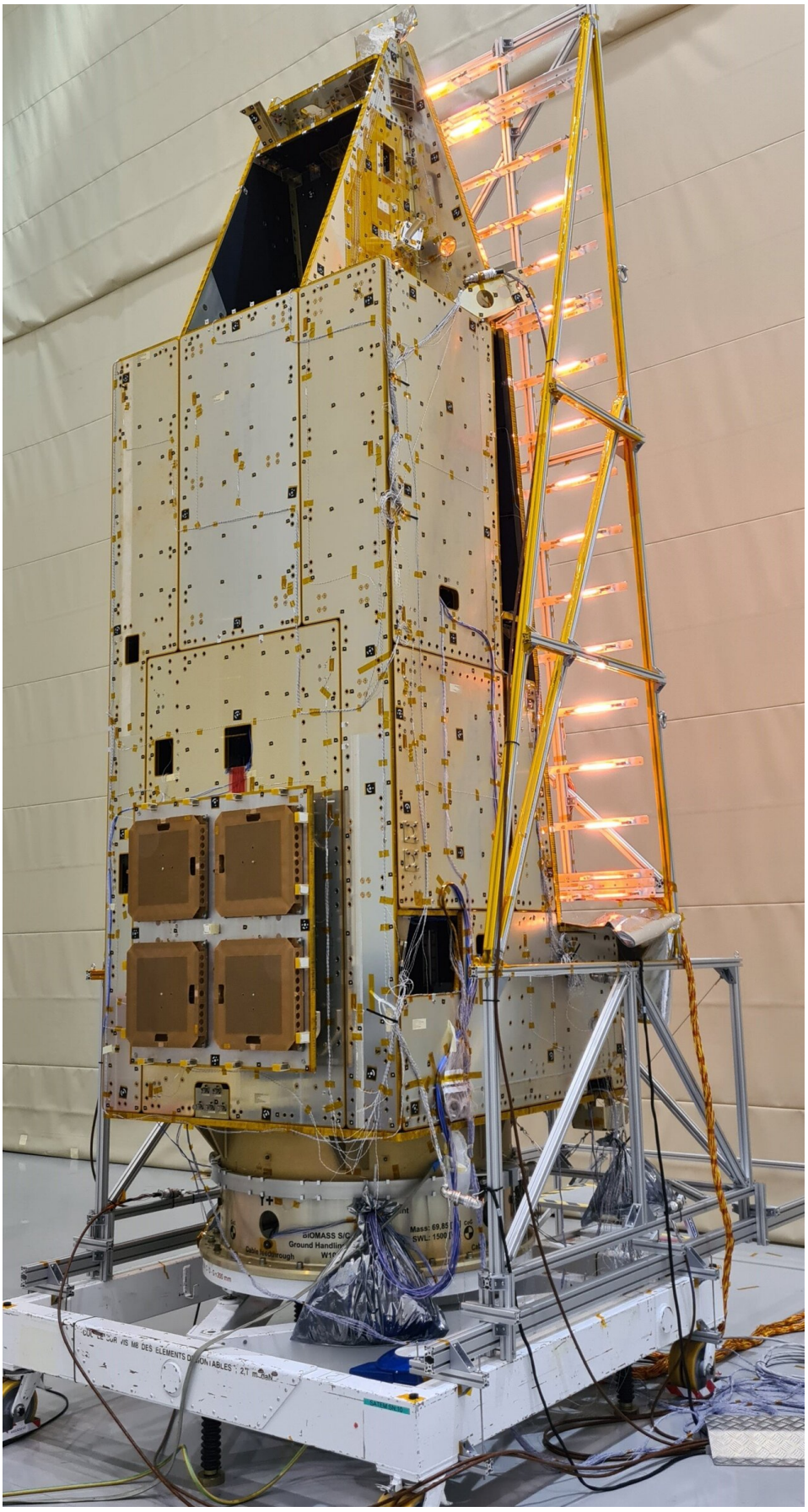
Forest measuring satellite passes tests with flying colors

April 28 2021



ESA’s Biomass satellite undergoing a ‘thermal elastic distortion’ test, the aim of which is to show that the temperature variations that the satellite will encounter in space will not affect its strict pointing requirements. First indications are that these swings of temperature will not introduce any distortions that could impair the way it takes its measurements. Carrying a novel P-band synthetic aperture radar, the Biomass mission is designed to deliver crucial information about the state of our forests and how they are changing, and to further our knowledge of the role forests play in the carbon cycle. Credit: Airbus/D. Marques

With challenges imposed by the COVID pandemic, engineers building and testing ESA's Biomass satellite have had to come up with some clever working methods to keep on track whilst adhering to safety rules. The result is that the satellite structure is not only complete, but has also undergone a series of demanding tests to ensure it will withstand the rigors of liftoff—all bringing the launch of this extraordinary forest carbon mapping mission one step closer.

Forests play a crucial role in Earth's carbon cycle by absorbing and storing large amounts of carbon from atmosphere—therefore helping to keep our planet cool. However, as swathes of forest continue to be cleared, carbon is being released back into the atmosphere.

As we seek to slow the progress of climate change and prevent the loss of biodiversity, the health of the world's forests is key. Knowing exactly how much carbon is stored in forests will help understand the state of our forests, how they are changing, and will advance our knowledge of the carbon cycle.

This is where the Biomass mission comes in.

Biomass—an Earth Explorer mission—takes forest counting to a new level by using a type of instrument that has never before been flown in space: a 'P-band' synthetic aperture radar. P-band is the longest radar wavelength available to Earth observation.

From over 650 km above, the Biomass instrument will be able to 'see' through the leafy forest canopy and measure the height of the trees. This information will be used to work out how much biomass—a proxy for carbon—is being stored in forests.

Biomass is due to be launched in 2023, but the COVID pandemic has meant that normal working procedures have had to be modified as the different ESA and industrial teams building and testing the satellite could not travel.

ESA's Biomass systems engineering and satellite manager, Janice Patterson, explained, "The Biomass structure was designed by OHB in Italy and manufactured by APCO Technologies in Switzerland. The original plan was for OHB to also integrate and build the structure. However, due to COVID restrictions, the consortium of engineers could not travel as normal so had to come up with novel approaches to complete the activities.

"To overcome this issue, the task of constructing the satellite was re-assigned to Airbus in the UK, the prime contractor, with the remote support from OHB. This was skilfully carried out, which meant that the structure had been finalized by the end of 2020 and then shipped to the testing facility in Toulouse in early 2021.

"We are now very happy to report that under the lead of Airbus and with the support of OHB, Arianespace and the Airbus test facility in France, the complete suite of mechanical tests have been successful, this included, sine vibration, acoustic, shock and clamp-band release tests."

Stefan Kiryenko, ESA's lead mechanical engineer for Biomass, said, "Passing this testing campaign is a major milestone, and to see everyone steering towards a common goal is powerful and inspiring. The efficiency and superb teamwork that I witnessed was impressive. We have built a beautiful and flight worthy satellite."

As well as the tests that simulated the vibrations and shocks of liftoff and the release of the clamp band that secures the satellite to the rocket's launch adapter, OHB also carried out a specific 'thermal elastic distortion' test. The aim here is to show that the temperature variations the satellite will encounter in space will not affect its strict pointing requirements. First indications are that these swings of temperature will not introduce any distortions that could impair the way it takes its measurements.

Janice Patterson added, "These remarkable achievements are a credit to all the teams involved and special thanks goes to everyone who has spent months away from their families allowing us to pass this milestone."

The Biomass satellite will now return to the UK for further instrument integration.

Provided by European Space Agency

Citation: Forest measuring satellite passes tests with flying colors (2021, April 28) retrieved 3 May 2024 from https://phys.org/news/2021-04-forest-satellite.html