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## Brazil's first homemade satellite will put an extra eye on dwindling Amazon forests

By **Sofia Moutinho** | Feb. 26, 2021 , 1:45 PM

The fate of Brazil's satellite program—and the country's capacity to monitor disappearing Amazon forest—will be decided in 17 minutes and 30 seconds on Sunday. That's the time it will take to launch Amazonia-1, the first satellite entirely developed by the country. If the mission goes well, Brazil will join about 20 countries that have managed the whole chain of design, production, and operation of a satellite. Amazonia-1 will give researchers more frequent updates on deforestation and agricultural activity in the world's largest tropical rainforest. But other challenges await, as Brazilian scientists deal with increasing cuts in research funding and a political split on the country's space program.

The satellite represents "a milestone for Brazil," says Adenilson Silva, an engineer at Brazil's National Institute for Space Research (INPE) who leads the mission and will oversee the launch at the Indian space center on the island of Sriharikota. The satellite's development, which began in 2008, has

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involved more than a dozen Brazilian companies and an investment of 360 million real (\$60 million)—about one-sixth what it would cost to import ready-to-use equipment, Silva says. Amazonia-1 is the first of three Amazon-monitoring satellites INPE aims to build with the same manufacturing platform.

The new satellite is a 2.5-meter-long metallic cuboid weighing 640 kilograms. It's loaded with 6 kilometers of cables and three wide-angle cameras capable of detecting any area of deforestation bigger than four soccer fields. A planned launch in 2018 was postponed because of a lack of funding and delays in the supply of key components from collaborating companies.

Amazonia-1 also carries the extra weight of Brazil's disastrous history with satellite launches. In 2003, a satellite exploded during launch from the Brazilian base in Alcântara, killing 21 people. The base hasn't launched a satellite since; although it's now operational, it's not equipped for satellites as big as Amazonia-1. At the Indian base, INPE scientists indulged their superstitions ahead of the new launch: Silva participated in a traditional Hindu ceremony, cracking a coconut in front of the equipment as a blessing for a safe journey before it was transported to the launch pad.

If it survives the launch, the new satellite will orbit 752 kilometers above Earth to monitor a rainforest now undergoing record-breaking clear cutting and burning, mostly for agriculture and cattle farming. INPE reports that 20% of areas officially designated as protected are already destroyed.

Right now, Brazil's Amazon monitoring program relies on flyovers from the U.S. satellite Landsat, which provides high-definition image data every 16 days. More timely alerts about deforestation come from two satellites codeveloped by Brazil and China, CBERS-4 and CBERS-4A, which together provide images every 3 to 4 days.

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Amazonia-1's cameras, which cover an area of 850 kilometers at 65-meter resolution, will be no sharper than those on the existing satellites. But the new addition to the satellite fleet would shorten the gap between flyovers to generate new images every day or two. That frequency increases the chances of getting clear pictures without cloud cover—a common problem in the rainforest—and gives authorities faster alerts about deforestation.

“A day can make all the difference,” says Cláudio Almeida, who coordinates INPE's Amazonian monitoring program and oversees its official deforestation reports. With near-real-time monitoring, “enforcement teams can go to the right place at the right time,” he says.

Using homemade equipment gives Brazil the technological autonomy it has long desired, Almeida adds. He recalls a “data blackout” in 2012 when a problem with Landsat threatened to leave a gap in the deforestation reports. INPE had to buy expensive satellite data with poorer image quality from the U.K. government.

Amazonia-1 and its two planned companions will be a powerful research tool, says environmental modeling expert Britaldo Soares Filho at the Federal University of Minas Gerais, whose team relies on satellite data to model the spread of fire and its environmental consequences in the Amazon and neighboring biomes.

But Filho worries an unsupportive government will limit INPE's ability to process the enormous volumes of data Amazonia-1 will produce. “It is not enough to invest in technology without investing in research and people,” he says. INPE's budget and staff have been cut repeatedly since 2019, when Brazilian President Jair Bolsonaro declared the agency's alarming data on deforestation to be false **and ousted its director**, physicist Ricardo Galvão.

The government's proposed 2021 budget includes a 15% cut to INPE that has already prompted the

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cancellation of 100 fellowships, which support nearly one-quarter of the agency's technical staff. Amazonia-1's launch was nearly postponed after seven researchers on the project lost their grants. They've been reinstated until March with funds from the Brazilian Space Agency to make the launch possible.

Even with the new satellite, Brazil's remote sensing capacity is far from ideal, Galvão says. The country would need "at least 30 other satellites like Amazonia-1 to meet its needs," he says. And he's skeptical that the current government will act on new evidence of deforestation. "I am sure INPE's scientists will provide the data without bowing to any pressure, but I have doubts that the current government will value this data," he says.

The Brazilian government has been sending mixed signals about its interest in remote sensing programs. In June 2020, the military at the Brazilian Ministry of Defense allocated 145 million real to buy an undisclosed satellite imaging system for Amazon monitoring, both for civilian and military use. That parallel strategy threatens INPE's efforts to create and launch its own satellites, Galvão says. "The government should value our own technology."

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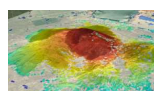
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