

Space, Colombia's New Frontier



A group of CITAE engineers test the FACSAT-2 camera at the GomSpace laboratory in Denmark, September 14, 2022. (Photo: Colombian Air Force's CITAE)

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The Colombian Air Force (FAC) is preparing to launch its second satellite, FACSAT-2 Chiribiquete, in February 2023, with a greater payload capacity. It will be used to detect environmental risks and threats; combat illegal mining; and monitor energy, port, and road infrastructure, and for airspace surveillance operations.

The satellite will reach space on the FALCON 9 rocket of the Transporter 7 mission to an orbit at an altitude of 500 kilometers. In the process, a team of FAC engineers served co-designers and co-developers of the technology with GomSpace of Denmark as a technology partner.



The graphic shows part of the FACSAT-2 engineering team from the FAC's Aerospace Technologies Research Center at the GomSpace facilities in Denmark on June 15, 2022. (Photo: Colombian Air Force's CITAE)

"We acquired capabilities such as the development of encryption software homologous to other types of technologies and an interface card to integrate the payload of the spectrometer [instrument used to measure wavelengths]," FAC Major Juan Manuel Cárdenas García, a software engineer at the Center for Research in Aerospace Technologies (CITAE), told *Diálogo* on September 23. "[We are also working] on developing the emission control software to operate, control, and receive telemetry data from the satellite."

FACSAT-2 Chiribiquete refers to the national park's highlands, which is a nature reserve. Thanks to an agreement with Colombian oil company **ECOPETROL**, the satellite, whose main mission will be to take images of Colombian territory, will carry a spectrometer to monitor greenhouse gases to analyze the decrease in emissions that contribute to global warming.

Colombia and Antarctica

The experience acquired in the Command and Control Station of FACSAT-1 at the Marco Fidel Suarez Military Aviation School in Cali led to the January 2020 participation in the VI Scientific Expedition of Colombia and in the IV Antarctic Campaign of the FAC, where a temporary ground station was tested for monitoring and communication with the nanosatellite.

"With the objective of activating the FAC's space capabilities and with the support of the Colombian Ocean Commission a temporary ground station was proposed at the Chilean Army's General Bernardo O'Higgins Base, where we were able to evaluate the technical and logistics requirements for the future construction of a permanent ground station in that territory," FAC First Lieutenant Lorena Cárdena Espinosa, a CITAE engineer who was part of the first expedition in 2020, told *Diálogo*.

"With the launch of FACSAT-2 into orbit, the Antarctic project will be divided into two phases. The first one was accomplished in 2020," Maj. Cárdenas said. "The second phase, application of FAC satellite capabilities for greenhouse gas analysis, is currently under development."

During the second phase, a fixed antenna will be brought to Antarctica with better capabilities. "A portable satellite communication antenna is in the process of being acquired [...] for the Antarctic campaigns of summer 2023 and winter 2024, to command FACSAT-2," FAC Lieutenant Colonel Sonia Rincón Urbina, engineer and head of CITAE, told *Diálogo*. "It is expected to carry out pre-Antarctic campaign tests in air units in Colombia and in academic-scientific cooperation with the GAIA Antarctic Research Center of the University of Magallanes in Punta Arenas, Chile.

"By taking measurements of greenhouse gases in Antarctica, we will be able to motivate the national scientific front and the community that studies Antarctica, considering that this phenomenon is the greatest threat in this territory [...]" Lt. Col. Rincón added. "We are just starting in the space field race, and to already be able to talk at those levels is really incredible [...]. What happens with Antarctica impacts our country; it is a scientific field, a community of international cooperation, there are no borders there."

Satellite Command and Control

FACSAT-2 will be operated from the FAC's Space Operations Center, based in Cali, to preprocess satellite images and carry out projects in national security and defense, agriculture, forestry, land use, maritime space use, mining activities, and infrastructure.

In addition, the satellite is expected to take part in international exercises such as PANAMAX and Resolute Sentinel with space interoperability capabilities, information processing, and disaster response and prevention.

"Due to its doctrine generation, specialized organization in space operations, material capacity, and the equipment acquired, it has been a success," Lieutenant Colonel Guillermo Poveda, head of the FAC's Space Operations Headquarters, told *Diálogo*. "It is what has allowed us to quickly enter the networks of Global Sentinel [U.S. Space Command's premier security cooperation effort] and the Combined Space Operations Center of the United States."



The photo shows a portable satellite antenna during a test at the FACSAT-1 temporary ground station at the Chilean Army's General Bernardo O'Higgins Base on January 19, 2020. (Photo: Colombian Air Force's CITAE)

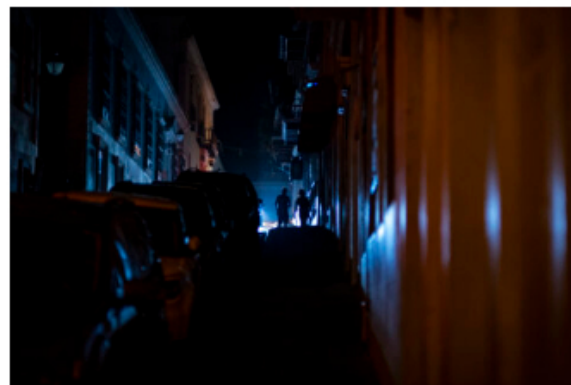
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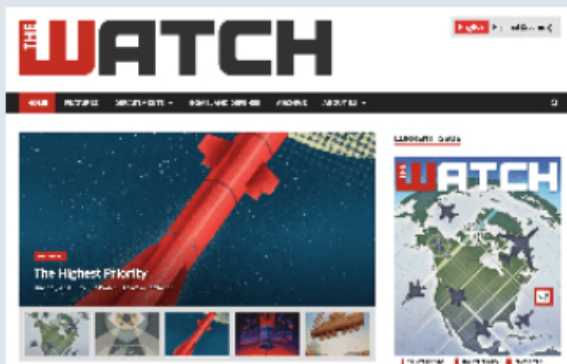
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