

29th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
23rd Workshop on Small Satellite Programmes at the Service of Developing Countries (1)

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## DEVELOPMENT OF THE COLOMBIAN SPACE PROGRAM

### Abstract

Officially, Colombia's space career began with the FACSAT program of the Colombian Air Force (COLAF). As the first and most significant milestone, the deployment in orbit of the 3U CubeSat FACSAT-1 was achieved, giving the first step as a satellite operator. However, this satellite was neither designed nor fully developed by COLAF. To give continuity to the program and increase the country's competitiveness in the industry, COLAF framed a strategy to achieve autonomy in mission design, starting with the definition, analysis, and implementation of an operational concept, followed by the preliminary and critical design of the satellite, and ending with the creation and execution of its integration and validation plan. All above, through a transfer of knowledge system provided by the technological ally GomSpace from Denmark and received by the Aerospace Technologies Research Center personnel (CITAE). In parallel with the transfer, COLAF sought to create the capacity to verify and validate the space products developed, leading to the design of the AIT facilities named "CUBO-2", carried out under the supervision of INPE from Brazil in compliance with the technical standards: ISO 8 for the satellite bus and ISO 7 for payloads.

Within the framework of the Research, Development, and Innovation (RDI) activities, COLAF co-designed and co-developed a 6U CubeSat called FACSAT-2 following ECCS standards. The primary payload is an electro-optical sensor with a resolution of 5 meters per pixel, and the secondary payload is a spectrometric sensor that collects data for greenhouse gases analysis.

As a result of the process, COLAF generated products such as space-grade electronic boards (designed at the research center) and payload encryption software along with mission control software for satellite planning and tracking. All of the above works as evidence of the capability acquired by the center due to the appropriation of knowledge of subsystem identification, space mission design, sensor integration procedures, COTS model evaluation, and engineering analysis for requirements validation.

In conclusion, the transfer of knowledge of satellite platforms and the future construction of specialized facilities promotes the research for the development of new highly-functional space products. The discussion should now focus on promoting the development of new strategies that emphasize more practical elements to generate new missions and raise the capacity of the research center and, at the same time, the Colombian space program.