The Brazilian Space Agency

The bridge to the future

AEB
BRAZILIAN SPACE AGENCY
AGENCY LINKED TO THE MCTI

Content

The Brazilian Space Agency

The Brazilian Space Agency, the central body of the National System for the Development of Space Activities (SINDAE), is an autarchy linked to the Ministry of Science, Technology and Innovation (MCTI), responsible for coordinating and executing the Brazilian Space Policy.

Since its creation, on February 10, 1994, the Agency has worked for the efforts of the Brazilian State in promoting the well-being of society, through the employment of the space sector.

PNDAE
The National Policy for the Development of Space Activities

The National Policy for the Development of Space Activities (PNDAE) establishes objectives and guidelines for national programs and projects related to space and has the National Space Activities Program (PNAE) as its main planning instrument.

The organization and execution of activities are instituted by the National System for the Development of Space Activities (SINDAE), which defines the AEB as the central and general coordinator of activities.

SINDAE is composed by the National Institute for Space Research (INPE), of the Ministry of Science, Technology and Innovation (MCTI); the Department of Aerospace Science and Technology (DCTA), Air Force Command (Comaer), Ministry of Defense (MD); the aerospace industrial sector; universities and research institutes. These bodies are part of the set of executors of PNAE's projects and strategic activities.

Launch Centers

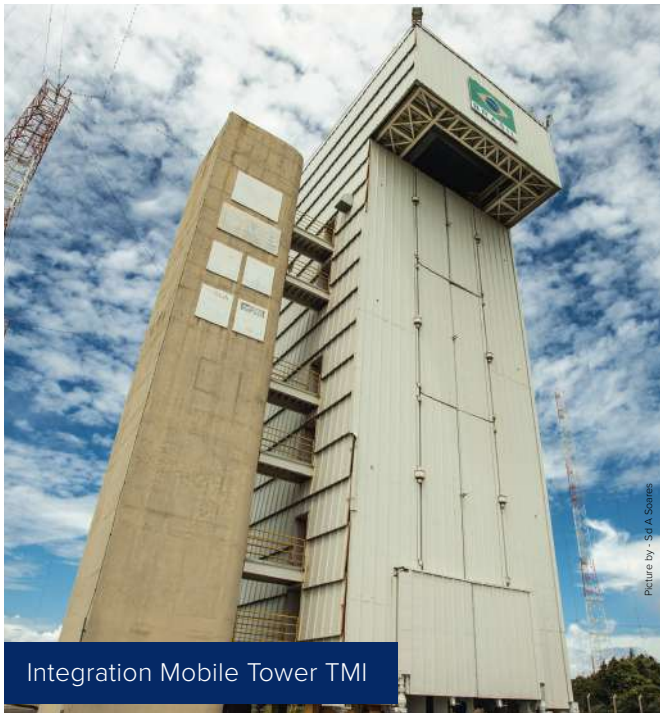
Brazil has two launch centers: the Alcântara Launch Center (CLA) and the Barreira do Inferno Launch Center (CLBI). The pioneer CLBI hosted a maiden flight in 1965. Since then, it supported hundreds of launch campaigns, including sounding rockets and other suborbital artifacts. One of its regular activities is performing telemetry services for orbital launches from Kourou, French Guiana.

The CLA is larger than the CLBI and it is from there that Brazil plans to concentrate the orbital and deep space launches. Concerning the national capabilities to perform orbital launches, the current project is the Microsatellite Launch Vehicle (VLM). The initial version comprises only solid rocket motors. They would be prepared in three stages in the Preparation Building and further vertically mounted in the Integration Mobile Tower (TMI). At the end of this integration, the turret moves back and the rocket is ready to be launched.

.Alcântara Launch Center (CLA)

Conceived in the early 1980s as one of the three segments of the Brazilian Complete Space Mission (MECB), the Alcântara Launch Center has the mission of carrying out the launching and tracking activities of aerospace devices and data collection and processing of its payloads, as well as the execution of tests and experiments of interest to the Air Force Command, related to the PNDAE.

CLA's current installations and operating systems has been providing support for scientific probe and investigation launches. It's geographical, strategic, and privileged position, 2°18′ south of the Equator, in addition to the conditions of safety, security, economy, and availability, make up a competitive differential ready for suborbital and orbital launches of small satellites. Thanks to the improvements planned for the spaceport, aiming also medium and heavy launchers, it should become one of the best space centers in the world.



Integration Mobile Tower TMI

Barreira do Inferno Launch Center (CLBI)

The purpose of the Barreira do Inferno Launch Center is to carry out and support the launching and tracking activities of aerospace devices and the collection and processing of data from their payloads, CLBI carries out tests, experiments, basic research, or applied and other technological development activities of interest to the Aeronautics, related to the Aeronautics Policy for Research and Development and the PNDAE.

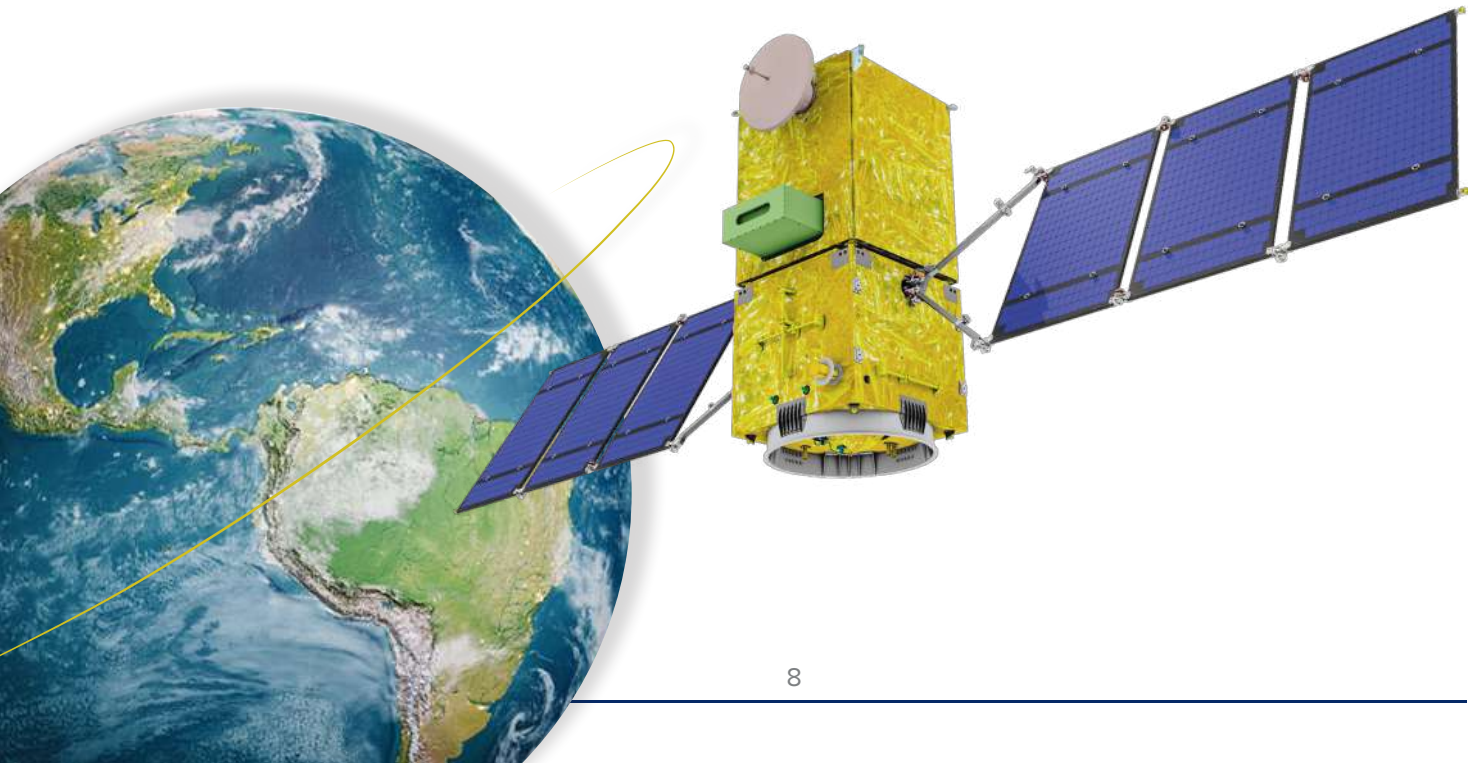
Tracking antenna - CLBI

CLBI launch pads

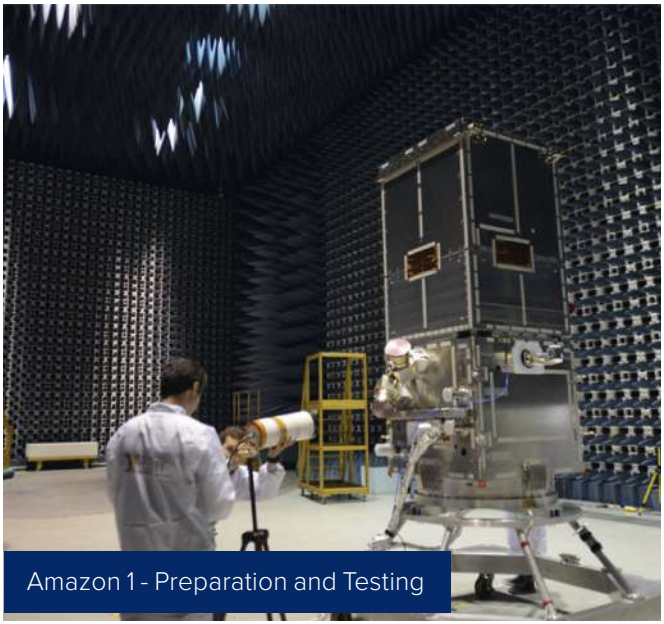
Amazonia 1
Satellite

Amazonia 1 is the first Earth observation satellite completely designed, integrated, tested, and operated by Brazil. On January 28, 2021, it was launched from India's Sriharikota Range (SHAR) on mission PSLV-C51, in a commercial agreement with the country's space agency, the Indian Space Research Organization (ISRO).

With six kilometers of wires and 14 thousand electrical connections, Amazonia 1 is the third Brazilian remote sensing satellite in operation with CBERS-4 and CBERS-4A. Amazonia 1 is a Sun-synchronous (polar) orbiting satellite that generates images of the planet every 5 days. For this, it has a wide-sight optical imager (camera with 3 frequency bands in the visible spectrum VIS and 1 band near-infrared or NIR) capable of observing a range of approximately 850 km with 64 meters of resolution.



Amazonia 1



Amazon 1 - Preparation and Testing

Launch of Amazonia 1
Satish Dhawan Space Centre - India

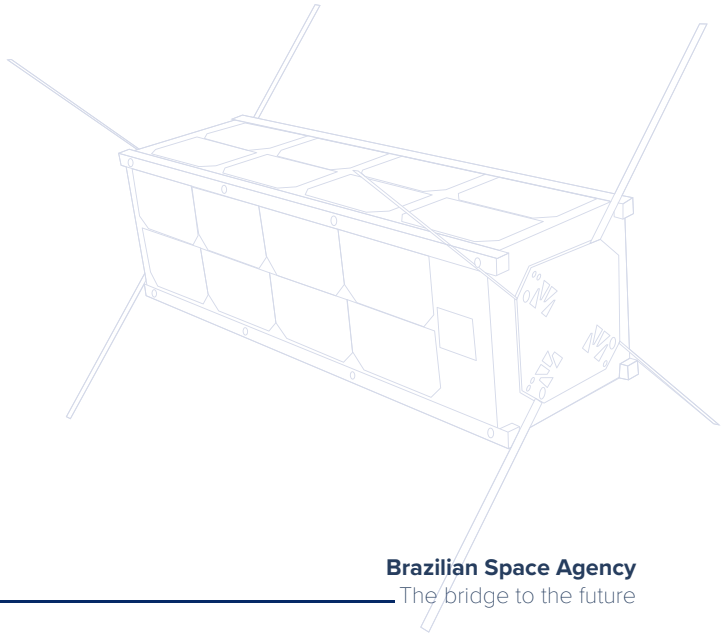
First images of Amazonia 1


BRASIL
AEB
CLA

Technological Safeguards Agreement (TSA)

The Technological Safeguards Agreement (TSA) between the governments of Brazil and the United States was signed in 2019. Its terms involve the exploration of the Alcântara space base, in Maranhão, for space activities by US companies and the protections that these agents will have in the development of local actions, such as launching rockets and satellites.

The agreement aims to protect export controlled technology developed by the countries against unauthorized use or copying. With that agreement, satellites with US technology could now be launched from the Alcântara base, since it is assured the guarantee of protection of technologies subject to export controls.



Public Call for Commercial use of Alcântara

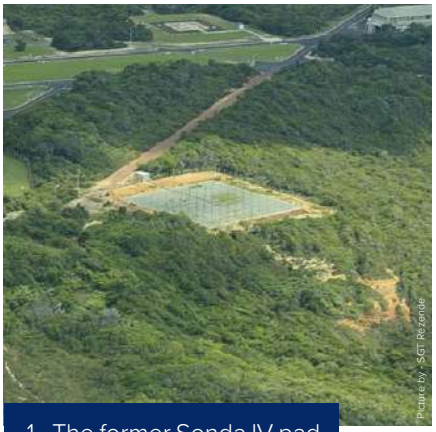
The Brazilian Space Agency and the Brazilian Air Force, with the purpose of promoting the development of space activities of national interest, launched two public calls for Brazilian and foreign companies interested in launching from Alcântara.

Four companies selected in the first public call to operate the launch of non-military orbital and suborbital space vehicles from the Alcântara Space Center (CEA), in Maranhão, have already been announced.

Three American companies, Hyperion, Orion AST, and Virgin Orbit, and a Canadian company, C6 Launch, were the winners of the tender, and they are now moving on to the contractual negotiation phase.

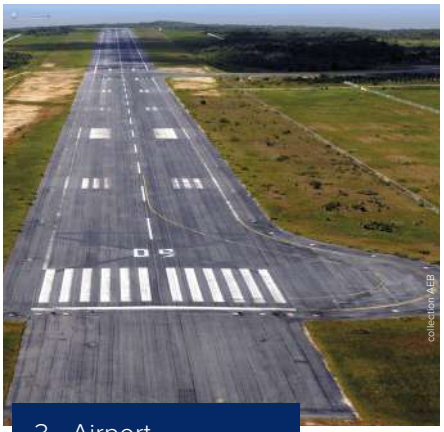
The Second Public Call were attended by some companies and is in progress.

The following figures show the four areas open for use in CEA

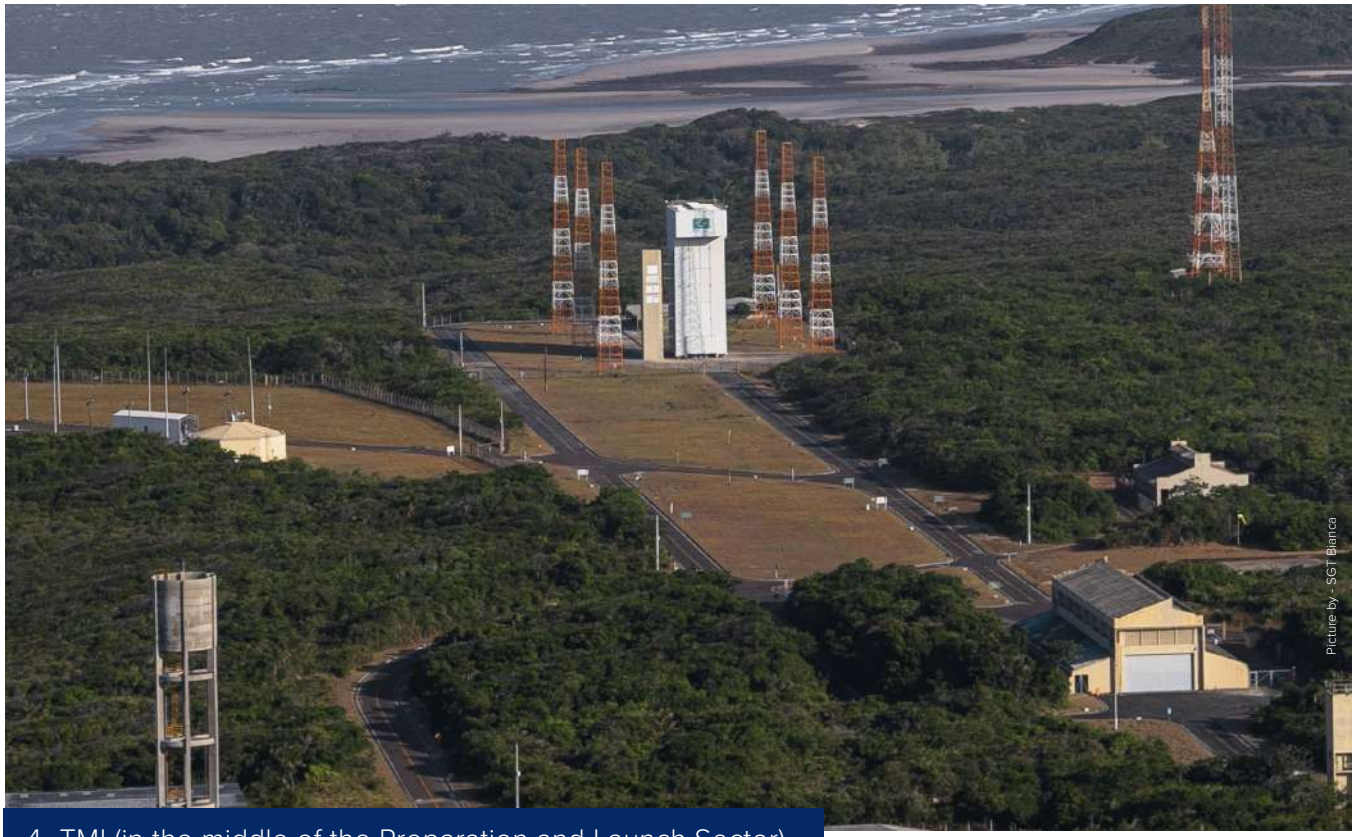


1 - The former Sonda IV pad

2 - The Suborbital Launchpad (Universal Launcher)



3 - Airport



4- TMI (in the middle of the Preparation and Launch Sector)

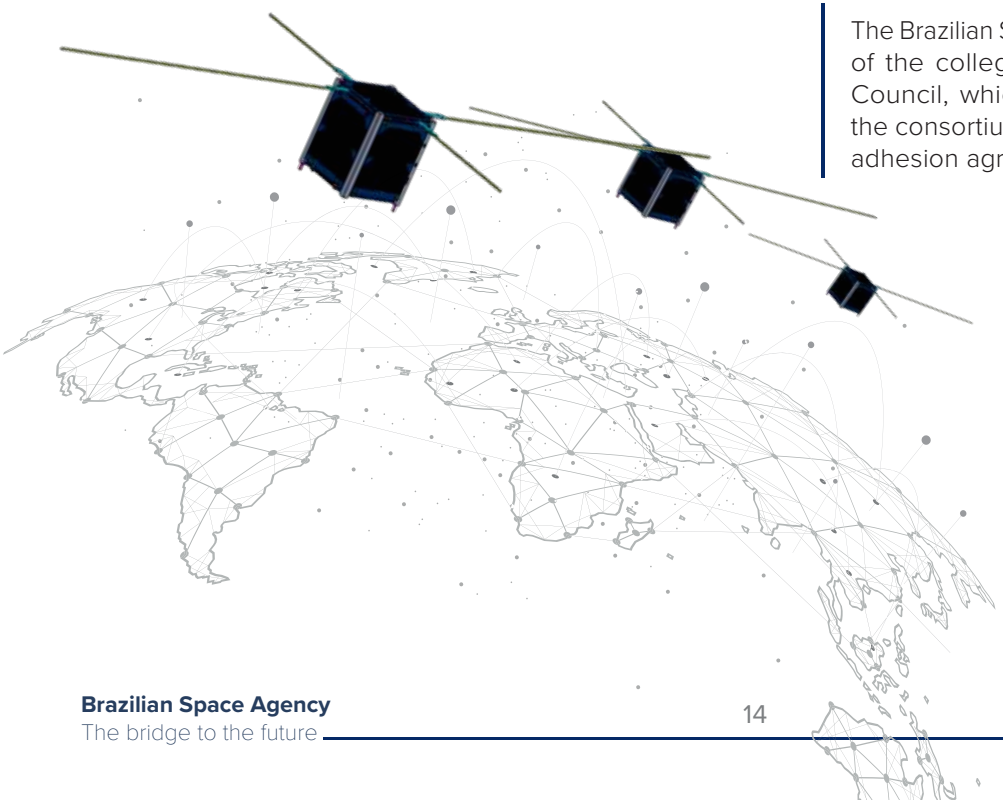
Catarina Satellite Constellation

Catarina Constellation

Catarina Satellite Constellation is a set of space systems, based on the use of nanosatellites, which will primarily serve the national agricultural and civil defense sectors, in order to contribute to the country's sustainable socio-economic development agenda.

Constellation Catarina provides, through cooperation instruments, the collaborative sharing of infrastructure, knowledge, data, services, and applications, fostering the space industry in the state of Santa Catarina.

Also established in the ordinance, Consórcio Catarina is a group of entities, called participants, which coordinately work in cooperation and activities of the Constelação Catarina program. To become a participant, the interested entities will sign an Adhesion Agreement to the Catarina Consortium.

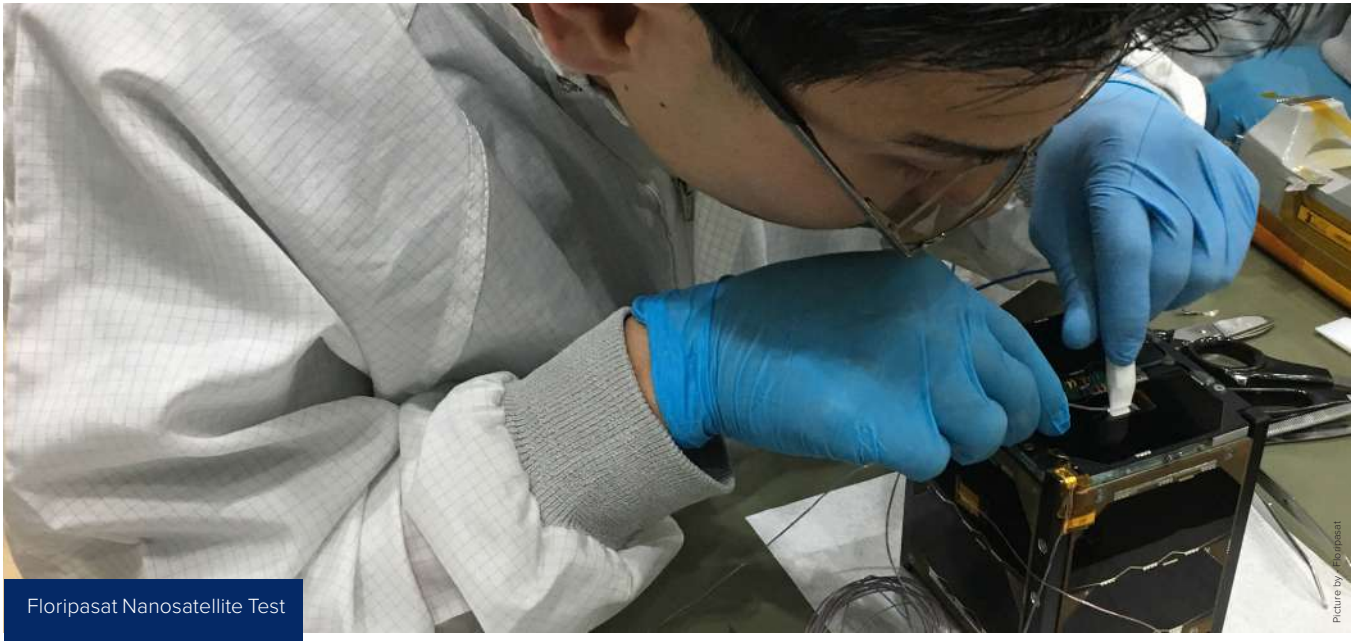


The Brazilian Space Agency is a permanent member of the collegiate and will preside the Catarina Council, which is the decision-making body of the consortium and responsible for approving the adhesion agreements.

Nanosatellites

The agency has cooperated with various institutions for the development and launch of nanosatellites. FloripaSat-1 (UFSC) and NanoSatC-Br2 (INPE/UFSM) were recently launched, for example.

Nanosatellites in preparation with AEB support: SPORT (ITA), Aldebaran-1 (UFMA), PdQSAT (UFMG), NanoMIRAX (INPE), ITASAT-2 (ITA), Alfa Crux (UnB), Nanosatellite data collection (UFSC and INPE), Constellation Catarina (UFSC and SENAI). Also, AEB institutionally supports the VCUB-1 (Visiona).



Floripasat Nanosatellite Test

VLM

The Microsatellite Launch Vehicle – 1 (VLM-1) Project's objective is to deliver payloads of at least 30 kg in Low Earth Orbit (LEO) orbit at 300km. The VLM consists of 3 stages. The first and second stages each contain an S50 motor and the third stage a S44 motor.

The VS-50 Suborbital Vehicle project emerged to demonstrate the required capabilities of the S50 thruster, in addition to testing various systems and technologies to be used in the VLM-1, as a way to mitigate development risks. In this way, the VS-50 seeks to assess the behavior of all systems in flight environment and also enables the performance of suborbital missions.

In the first half of 2021, the Santa Maria 1/2021 operation was carried out at the Alcântara Launch Center (CLA) and was divided into two phases: Phase 1, carried out in March 2021, which had as main objective the preparation work of the ground support for the launch of the VS-50, in particular the adjustments to the Mobile Integration Tower (TMI) platforms; Phase 2, held in May and June 2021, aimed to carry out operational exercises with road and industrial trollers and other mechanical support.

The upcoming of Operation Acre aims, whose objective is to carry out the engine test bench firing of the S50 motor, the main motor of the VS-50 and VLM.

Implementation of the microgravity experiments service

Operation Santa Branca is the launch of the VSB-30 suborbital vehicle for the Suborbital Microgravity Platform (PSM) qualification. PSM is responsible for storing and collecting data from experiments and was developed by the IAE in partnership with the national industry. Operation Santa Branca will qualify PSM in flight, as well as train companies to be launch service providers. The PSM is a national development that makes possible to accommodate the experiments without foreign dependence.

S50 rocket motor

Education

The Brazilian Space Agency has a series of joint actions with universities, research institutes, nonprofit organizations, third sector and private companies with outreach projects, courses, and research projects aimed at elementary education and beyond involving STEAM (Science, Technology, Engineering, the Arts and Mathematics) training, as well as in the fields of Astronautics, Space Applications, and Astronomy and Astrophysics.

Some activities

GLOBE is an International Science and Education Program developed by the American Space Agency (NASA). The acronym means The Global Learning and Observation to Benefit the Environment. GLOBE encourages the participation of students, faculty, scientists, and citizens around the world in environmental data collection and scientific studies, contributing to the understanding of the environment at local, regional and global scales.

Brazil joined the GLOBE program in 2015 through a cooperation agreement between NASA and the AEB and, since then, more than 170 schools spread across the five regions of Brazil have been reached. The country already has 6 Mentor Trainers, 50 Trainers, around 668 GLOBE trained teachers and 3109 volunteer scientists registered in the GLOBE Observer app.


Picture by - Valdivino Junior

GLOBE program activities


Picture by - Valdivino Junior

GLOBE program activities

AEB Escola
Program

The AEB Escola Program has a collaborative network for the continuous dissemination and updating of basic knowledge in the space area. This network is made up of public and private institutions, researchers, university teacher, students, and technicians interested in popularizing space science in the school environment and in Brazilian society. The Program starts from the premise that the spatial theme gather all areas of knowledge and that its applications are present in the daily lives of students, facilitating the contextualization of the knowledge to be built.

LIT, the INPE's AIT facility

The Augusto Severo Space Technological Vocation Center
CVT-Espacial

The CVT-Espacial Augusto Severo was inaugurated on November 13, 2017, in partnership between AEB and the Barreira do Inferno Launch Center (CLBI) in Parnamirim (RN). In addition to hands-on activities for children and adolescents, the Center has a structure to train technical staff, facilitate social inclusion and qualify teachers, university students, and other professionals in topics related to space activities.

Northeast Aerospace Network

This is a cooperation network involving teaching and research institutions (UFRN, UFPE, UFMA, UEMA) and our two rocket launching centers (CLBI, CLA). The partnership aims to develop studies in aerospace sciences and engineering, applied atmospheric sciences, strategic geopolitics, and regulation of the use of space.


Hands-on class at CVT-E


Hands-on class at CVT-E

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BRAZILIAN SPACE PROGRAM

AEB BRAZILIAN SPACE AGENCY

MINISTRY OF SCIENCE, TECHNOLOGY AND INOVATION

PÁTRIA AMADA BRASIL
BRAZILIAN GOVERNMENT