

Brazil's ambitious program points toward continent-wide space agency

by Lorenzo Carrasco Bazúa

In November 1979, the Brazilian Commission on Aerospace Activities drew up a plan, the Comprehensive Brazilian Space Mission (MECB), which, by the end of the present decade, projects the construction of a launch base in Alcantara, in northern equatorial Brazil, the construction of a satellite launch vehicle (SLV), and the launching of four scientific satellites.

The program is ambitious for a "Third World" country, but its greatest importance lies in the hope that it could be the starting point for a long-dreamed-of Ibero-American Space Agency. Only the combined efforts of the nations of the continent, would make possible their meaningful participation in the great projects of space colonization that should occur during the first decades of the next century.

Brazil's program is a joint effort of the Institute of Space Activities (IAE), the Aerospace Technical Center (CTA), and the National Institute for Space Research (INPE), part of the Ministry of Science and Technology. The INPE is responsible for the design and construction of satellites, related facilities on Earth, and the testing and operation of satellites in orbit. The CTA is responsible for developing the launch vehicles and building launch facilities.

The CTA has, to date, launched four sub-orbital test rockets and will launch three more to complete the preliminary phases for placing the first Brazilian satellite in orbit at the end of this decade.

The most recent test launch was in November 1985, from the launching pad at Barreira do Inferno in the north. One meter in diameter and 12 meters in length, with 4 meters of cargo space, the two-stage Sonda IV rocket traveled at 11 times the speed of sound during its 20-minute flight, reaching an altitude of 700 kilometers. It carried 7.3 metric tons, including 500 kilograms of experimental equipment developed jointly by the CTA and the U.S. Air Force.

The Integrated Test Laboratory

The National Institute for Space Research's timetable lists February 1989 as the date for launching BRASA, the first of the four satellites, designed for collecting meteorological, climatological, and hydrological information for transmission back to Earth. It will weigh 115 kilograms, will take

two years to assemble, and will orbit 700 kilometers above the Earth. Its lifetime will be six months, after which it will be replaced by a more sophisticated model, to be launched at that time.

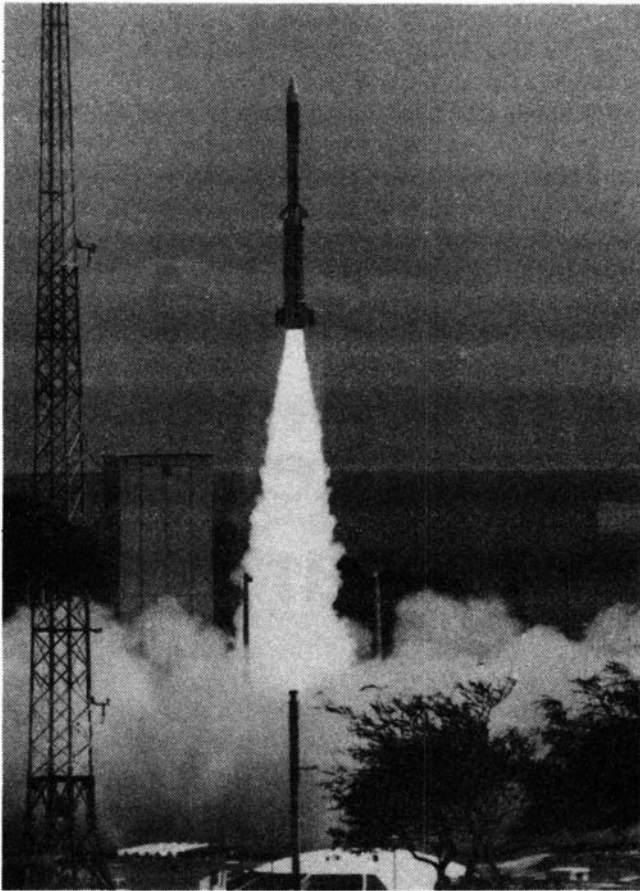
The second series of satellites will be designed to provide information on natural resources through visual observation of Brazilian territory. By picking up infrared images from the subsoil, these remote-sensing satellites will be an important tool for research on mineral, agricultural, forestry, and oceanographic resources. It will weigh 150 kilograms and will orbit the Earth at 642 kilometers.

In satellite building, the INPE is about to make its most important technological leap, by putting on line this September an Integrated Test Laboratory (LIP). It is the first of its kind to be built in the Southern Hemisphere and will be capable of simulating launch, orbit, and reentry of spacecraft.

This lab is really a battery of laboratories spread over 10,000 square meters. It is equipped with several Hewlett-Packard HP-1000 mini-computers. In one section, thousands of satellite components will be subjected to space-environment simulations, such as extreme temperatures, from 169° Celsius below zero to 150° above zero. They will also be subjected to electromagnetic interference, and other tests. Shielded echo-free chambers will be built by INPE for these tests.

In another section of LIP, the satellite will be put on vibration machines which simulate the acceleration and shock effects of the launch process. These tests will be performed in cylindrical chambers approximately three meters in diameter, which will have to be recalibrated constantly. A support section will take charge of calibrating the chambers.

But, beyond building a test lab for the development of the four satellites, which could be used in collaboration with other countries, the new installations will permit the development of scientific equipment and technological capacities, pushing Brazil's space sector toward an internationally competitive position. Then, in the opinion of the director general of INPE, Marco Antonio Raupp, "Brazil will have definitively reached its maturity in space activities."



A test-firing of Brazil's Sonda IV rocket.

Since the entire project will stimulate a broad variety of scientific areas and technological applications, the building and testing of satellites will also be of vital importance to the development of national industry, especially the high technology and capital-goods sectors. The Foundation for Space Science, Applications, and Technology is precisely the link which connects INPE with commerce and industry. Its function is to promote the creation of space-sector industries.

Looking toward the future

In addition to launch-vehicle and satellite development, the building of a giant launch complex is the pillar of the Comprehensive Brazilian Space Mission. Its siting in Alcantara, in the state of Maranhão, is due to its proximity to the Equator. Launchings near the Equator save fuel by taking advantage of the Earth's rotation, which is fastest along the equatorial line. That, of course, is why the French sited their launch base at Kouru in nearby French Guyana.

Fuel savings of as much as 27% in equatorial launches lead one to believe that many space launches, including those of NASA in the next century, could take place at Alcantara.

To this end, the facility is being built large enough to launch Space Shuttles, even though no such launches of that magnitude are planned in the near future. But it is extremely

important that Brazil is developing the infrastructure which will enable it to participate in future projects of man's colonization of space.

An Ibero-American Space Agency?

The only guarantee that Ibero-American countries, including Brazil, will meaningfully participate in, for example, the colonization of Mars, is the integration of their space programs in an Ibero-American Space Agency. This idea has repeatedly circulated on the continent, and was discussed, once again, during the Latin-American Symposium on Remote Sensing, which took place in Brazil at the end of last year.

INPE director general Marco Antonio Raupp advanced the idea there of putting together a joint space program, like the European Space Agency. "This is the hour to think of an agency, because its effects are long-term," he stated. Raupp stated that space programs are characterized by large capital investments and touch upon areas beyond the capabilities of any single country. To share costs and benefits, he asserted, there is nothing like a uniting of efforts.

Communications from Brazilian satellite to Earth stations

