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INPE: FOCUS ON SOCIAL BENEFITS OF SPACE



CBERS-2B satellite being tested

The National Institute for Space Research (INPE) was established in 1961 as a research and development centre to bring the benefits of space technology to the Brazilian society. INPE strives for a balance between academic research and space applications. In the 1960s and 1970s, it established research groups on remote sensing, satellite-based meteorology and space science. These groups set up masters and PhD programmes. In the early 1980s, INPE started building satellites. Our satellite programme is focussed on earth observation and space science. One of the main programmes is CBERS - the China-Brazil Earth Resources Satellite programme, a long term project developed with China. Three satellites have already been launched and two more are being built for launch by 2011 and two more by 2020.

Changes in spatial technologies

From the 1970s to 1990s, remote sensing, GPS and GIS developed as separate technologies. From the 1990s onwards, technological advances enabled the

convergence of the two technologies. We now refer to geoinformatics as an area which encompasses all types of spatial technologies. The combination of high-resolution imagery with GPS devices has changed the mapping industry. Mapping is no longer the exclusive domain of the federal governments.

Geographic data helps Brazil in efficiently managing our resources. As an example, consider that Brazil has a large agricultural production that is technology-based. National laws require that all land users adhered to environmentally sound practices. Thus, there are a lot of companies providing services for private land management. Also, public organisations use geotechnologies to check that farmers are complying with the law.

INPE considers that we need a strong private sector in the geoinformatics area; we also want that public institutions, researchers and students have the fullest possible access to remote sensing images. Satellite imagery can be used in many fields including agriculture, energy, ecosystem monitoring, climate change, urban and land management.

Thus, all satellite images received by INPE are freely available on the Web. Free spatial data enabled larger outreach and encouraged development of geoinformatics applications. From 2004 to 2009, more than one million images were distributed by INPE. This had a spin-off effect in creating an estimated 15,000 jobs in Brazil. INPE has supported open source software since the 1990s. INPE's SPRING is a state-of-the-art open source GIS and remote sensing image processing system with an object-oriented data model providing the integration of raster and vector data representations in a single environ-



São Paulo Guarulhos airport taken by the CBERS-2B satellite

ment. SPRING has registered 175,000 downloads and private companies are building solutions around this open source software. It is being used by several Brazilian ministries including health, defence and science and technology. The Brazilian army uses INPE's software to develop customised military applications.

The most important challenge is the proper utilisation of space technology to understand the environment. Understanding the nuances of satellite imagery and interpreting them requires specialised training. To fully extract the potential of data from remote sensing, one needs good quality professionals trained in physics and maths.

On international partnerships

INPE's vision is to have international network and partnerships to make full use of space technology to understand earth resources. INPE has good relationships with Europe and United States and plans to develop two satellites with United States before 2015 and increasing ties with Argentina. We look forward to partner with ISRO. INPE also has ties with multi-lateral agreements with the Committee of Earth Observation Satellites (CEOS) and the Group on Earth Observations (GEO).

Satellite data - a public good

Organisations which produce data should make it available to the public without restriction. A time will come when organisations will have to open their data to the public - it is not the question of if, but it is the question of when. Brazil, US and the European Union already make publicly-funded remote sensing data available to the public freely. We hope other nations will soon follow this policy. There will come a day when all imagery with resolution more than 2.5 m be made open. While there is no intelligence in such data, they have a large value in civilian applications. That is the lesson we have learnt in Brazil, that is the lesson LandSat has learnt and now implementing, and that is the lesson we all should learn. ■

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