PROFILE Gilberto Camara

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Promoting Data Free for All

On a recent trip to Washington to meet with U.S. government officials to discuss possible cooperation with his country on Earth observation, the director of Brazil's National Institute for Space Research, Gilberto Camara, made a strong pitch in favor of keeping the venerable U.S. Landsat remote sensing program publicly owned and operated. He emphasized that among all of its other attributes, the Landsat program could be a very effective tool for U.S. diplomacy.

"Some U.S. officials don't realize how important Landsat has been to the world community and how much good will the U.S. could generate by having a free and open data policy," Camara said. "This is really grossly underestimated in many U.S. circles. The point I have been making here over and over is that there is so much for the U.S. to gain, both internally and externally, from an open data policy that it doesn't make any sense to adopt any other policy. This is the obvious way to go."

The United States intends to build at least one more government-owned and -operated Landsat spacecraft to replace the old and ailing pair of satellites currently on orbit, but what happens after that is still under discussion. Some parties favor privatizing the collection of moderate resolution land imagery, but Camara said that would be a mistake.

"With Landsat-type data, the only model that makes sense is data free for all," he said. "There is no commercial possibility for exploiting that data and still making a lot of impact on society."

Brazil knows something about using remote sensing data to serve the public. The vast South American nation has been using Landsat imagery for more than 30 years for agriculture and to manage its portion of the Amazon rain forest. More recently, Brazil has been operating its own small fleet of Earth-observing satellites built and launched in cooperation with China. Camara, who has to fight every year for his agency's $110 million budget, said delivering practical benefits is the only way to maintain support for space programs in a nation like Brazil that has no clear-cut military adversaries. "You have to really be concerned about societal benefits. That is your only way out," he said. "You can't just maintain that you are giving scientists their due. Scientists must be happy, but they are not the ones who can support a space program."

During his visit, Camara also made a push for the United States to start downloading and distributing data from the China-Brazil Earth Resources Satellite (CBERS).

Camara talked with *Space News* editor Lon Rains and staff writer Brian Berger.

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Could the United States use CBERS imagery to supplement Landsat imagery?

Yes. At the end of March, two of our engineers brought a personal computer and downlink system we have developed to the U.S. Geological Survey's EROS Data Center, hooked up to one of their antennas and demonstrated that we can receive and process the CBERS imagery there.

In addition, the CBERS data policies already in place are extremely open. They are the same as we have for Landsat. If the U.S. pays the annual fee, it is entitled to download the CBERS data and can do whatever it wants with it with no strings attached.

That is very different from the Indian Remote Sensing satellite data policies, which are commercial. Not only would the U.S. have to pay much more for the downlink, it would actually need to pay a fee for each image which is distributed. That is a very tough data policy.

We think this is nonsense. It's the reason we don't receive IRS data in Brazil. We told them unless they change their data policy there's no game. I would even be willing to discuss paying a hefty downlink fee as long as I have the right to do whatever I please with the data. The way they are setting this up is detrimental. It's not a satellite that serves the public good.

How much would Brazil charge the United States for direct CBERS downloads?

The same that we pay for the rights to directly download Landsat imagery — about $250,000 a year for unlimited use.

Given the sentiment in the United States that there is already a Landsat gap, why hasn't a check been written so that the CBERS data can flow?

Such decisions take time. We got a great reception in our discussions with the U.S. Geological Survey, the Department of Interior, the Department of State, NOAA [National Oceanic and Atmospheric Administration] and the White House Office of Science and Technology Policy's Future Land Imaging Working Group. There's certainly no resistance on the Brazilian side, however we prefer to have the deal start with CBERS-2B, which launches in May 2007, because CBERS-2 is nearing the end of its operational life.

Now if Landsat were to suddenly fail, we could envision putting a downlink into operation for the U.S. Geological Survey sooner.

What is Brazil's approach to technology sharing on the CBERS program?

There is no technology sharing. Each country develops its own subsystems, and these subsystems are tested independently and integrated through standard interfaces. There are two spacecraft integration sites for the CBERS program. One is in Brazil and one is in China and we use them alternately. CBERS-2 was integrated in China. CBERS-2B is now being integrated in Brazil.

Who has been launching your remote sensing satellites?

China. But we expect our equatorial launch base will be ready in time to launch CBERS-4 on a Ukranian Cyclone rocket.

Does China's involvement in the CBERS program complicate matters for the United States?

From the point of view of using the data, I don't get that sense. It certainly would complicate buying components from U.S. industry because there are laws in place restricting export of U.S. goods to China.

Why do you feel international cooperation is so important for land remote sensing?

If you are going to do agriculture and forest management in a rapidly changing world, you need frequent revisit capabilities. This is crucial and this is not generally understood outside the community who tend to focus on the spatial resolution differences between a high-resolution system like Ikonos and the moderate-resolution Landsat.

Revisit cycles of 16 or 17 days are not enough, especially when you factor in obscuring cloud cover on any given day. To do remote sensing operationally, you ideally want daily revisit. One Landsat-type spacecraft is not enough. You need five. We are far from that point but we have to get there step by step. Adding CBERS to the mix would be a good start.

Can you give an example where daily revisit is particularly important?

Combating Amazon de-forestation is one. Many areas of the Amazon are poached on a step-by-step basis. The poacher enters pristine forest, chops down the valuable wood, then clears out the rest to make way for agriculture. With Landsat we can do mainly after-the-fact assessments verifying that the trees have been cut down. But with more frequent revisits, like we get from Moderate Resolution Imaging Spectroradiometer (MODIS) instruments flying on the Aqua and Terra satellite, we can catch the poacher when he's just getting started.

MODIS' 250-meter resolution data is exploited by a system called Detection of Deforestation of the Amazon. Each new area that is being cut is captured by the satellite, the authorities are notified and they can then go there and imprison the guys who are doing it. But still, we are limited by the temporal resolution of the MODIS instrument, which is why we stress more frequent revisits. This is no science project. This is a 24-7 operation involving INPE, the Environmental Ministry and the federal police.

Is CBERS data similar enough to Landsat imagery to satisfy scientists?

Those of us running space programs should be very careful balancing scientific needs with operational needs. Many scientists try to push the boundaries and that's good. But what good is a satellite that only pushes boundaries, but does not preserve the nitty gritty — the operational capability to support 24/7 services?