
Conference Report

Space research is still a major priority in Asia Pacific nations

by Marsha Freeman

The 49th annual Congress of the International Astronautical Federation (IAF), on Sept. 28-Oct. 2 in Melbourne, Australia, included participation from many nations in Asia, and afforded a first-hand look at the progress being made by the less-well-known space powers. This was only the second time in its history that the congress was held in the Southern Hemisphere. The approximately 1,000 participants included large delegations from Japan and China, which have well-established and broad space programs. And, papers were presented describing the efforts in space research and applications of smaller countries which are just becoming involved in space technology.

As Sir William Deane, Governor General of Australia, pointed out in his opening remarks, the Asia Pacific comprises 60% of the world's population, and the region has seen substantial recent growth in space activity. Dr. Karl Doetsch, outgoing president of the IAF, remarked on Sept. 28, that the theme for this conference on the Pacific Rim was set two years ago, "before the economic, downturn in Asia." "Should space continue as a priority" in Asia? Doetsch asked. His emphatic answer was, "Yes." Overall, the Asian delegates agreed with him, that although a financial crisis exists and budgets are constrained at this moment, space development requires long-term planning and commitments, which should not be interrupted.

The developing nations of Asia have populations spread over hundreds and thousands of islands, with large areas of sparse population, and a great lack of communications and transportation infrastructure. To leap-frog the earlier technologies, such as coaxial cable telephone communications, which launched the development of modern communications in industrialized nations, most Asian nations have taken advantage of the commercial satellite communications technology increasingly available over the past three decades. Over the past few years, many countries have expanded their interest to include Earth remote-sensing satellite and other space technology applications. While the past year's financial and economic upheavals have put some of the more ambitious national space initiatives on hold, the Asia Pacific nations are pooling their resources collaboratively, to extend their reach

into space.

Indonesia has been a space pioneer among developing nations, and began using advanced communications satellites in 1976, to link its 17,000 islands. In 1984, the Indonesian Ministry of Education and Culture and the U.S. Agency for International Development put into operation a teleconferencing facility and satellite communications Earth station to provide links between Jakarta and the island of Sulawesi. The system also connects Sulawesi to 11 main campuses of the Eastern Island University Association, making the professors, research findings, and library resources widely available to students all over the country.

One year ago, then-Minister of Research and Technology, and currently President, Dr. B.J. Habibie, renewed advocacy for Indonesia to establish its own satellite-launching facilities. Previously, the islands of Biak and Waigeo, both near the Equator in the province of Irian Jaya, had been discussed as attractive sites for satellite launch pads. While this ambitious project is now stalled, Indonesia plays an active role in the region-wide space initiatives now under way.

In 1991, a commercial telecommunications company in Malaysia signed the first agreements for the construction and launch of two communications satellites. In an interview with *Aviation Week & Space Technology* in April 1995, Prime Minister Dr. Mahathir bin Mohamad explained that he sees aerospace as a technology-driver for his nation. Mahathir, who is a pilot, promoted the development of composite materials technology in Malaysia, as a future material in the aircraft industry. In the space sector, the Prime Minister told *Aviation Week* that Malaysia had started a long-term program with the French to develop the capabilities to build mini-satellites, to give Malaysian engineers experience, as a forerunner to a more ambitious space program.

In April 1997, Kuala Lumpur awarded a contract to Surrey Satellite Technology Ltd. of England, which specializes in small satellites, to manufacture a 100-pound remote-sensing and communications satellite and to share the technology with Malaysia. Eight months later, the government launched its "Blueprint for the Development of the Aerospace Industry," which set up a committee led by the Prime Minister to

strengthen its aerospace industry.

Thailand joined the space age at the end of 1991, when France's Arianespace announced that it had been selected to orbit Thailand's first telecommunications satellite, Thailand-sat 1. In 1993, Thailand proposed that the Asia Pacific nations form a space association to foster cooperation, which was part of a broader push to expand Thailand's own space capabilities. The Thai Transport and Communications Ministry began a cooperative program with China at that time, and opened discussions with the United States on space cooperation. A few months before the assault on its currency, in February 1997, Thailand was discussing with the U.S. Department of Defense a program to jointly construct and operate a defense communications satellite ground station. In October 1997, the program was cancelled after Bangkok had to announce emergency budget cuts. As recently as April 1997, Thailand was planning: a \$116 million program to build an 880-pound remote-sensing satellite; a \$20 million multinational program with China, South Korea, and Pakistan to build a small communications and Earth observation satellite; and \$500 million space defense program.

Technology transfer through small satellites

The Asia Pacific nations hope to advance their space technology skills and capabilities—under the constraints of the current financial crisis—by working cooperatively with established space institutions in programs that transfer know-how and technology. In 1979, the University of Surrey in England began a student project to design and build small satellites, which has produced 14 microsattellites (about 100 pounds) since 1981. In a paper presented at the IAF Congress, three current microsattellite programs were outlined, involving China, Thailand, and Malaysia. Prime Minister Mahathir visited the Surrey center in March 1997, and personally initiated the TiungSAT-1 microsattellite program. The satellite is named after a beautiful small bird in Malaysia, the paper's authors report. TiungSAT-1, which will be an Earth observation and communications satellite, has been completed and is now waiting for launch. It will be used mainly for educational programs, and the ground stations to receive its signals will be installed at high schools and universities.

The Surrey center also has a program, called MERLION, with Nanyang Technological University in Singapore. The university's specialists are contributing an experimental communications payload to one of Surrey's microsattellites, which is intended to lead to designs of satellite communications systems for equatorial regions.

A third Surrey microsattellite program trained 12 Thai graduate engineers and scientists from Mekanakorn University of Technology, near Bangkok, through participation in the design, construction, and launch of Thailand's first microsattellite. The TMSAT was successfully launched this past July, and it was reported at the IAF Congress that TMSAT is sending back its first multispectral images of the Earth. The

long-term goal of the program is to create the trained personnel who will establish a national capability to build small satellites for commercial and scientific research applications.

The view from space

At the IAF Congress, Anthony Milne, of the University of New South Wales, presented a paper outlining the application of remote-sensing technologies for the development of the region. Because there are many geologic, oceanographic, and other features of the Earth that cross national boundaries, a great deal can be gained from the joint study of both natural features and man-altered nature from satellite data.

The Association of Southeast Asian Nations has an ASEAN Experts Group for Remote Sensing (AEGRS), which operates under the Sub-Committee of Infrastructure and Resource Development of the Committee of Science and Technology. The last AEGRS meeting, held in Singapore in July, decided to publish a book, *ASEAN From Space*; to begin a pilot Earth observation program to study forest fire management, following the drought-driven ravaging of the region by fires earlier this year; and an ASEAN-Australia project on "Technology for Updating Maps Using Remote Sensing." Milne summarized the region's national resources that exist to make use of remote-sensing data. These include programs for analyzing U.S. Landsat, French SPOT, and other satellite data to map natural resources, to inventory forests, to monitor fires and other disasters, and to map oceans and coastal regions. He reported that the Malaysian Centre for Remote Sensing, for example, plans to expand its staff to 160 professional, technical, and support staff in early 1999, when its new buildings and facilities become available.

Four days after the IAF Congress, Dr. Cheick Diarra, UN Economic and Social Council (UNESCO) ambassador for Science and Technology Education, who is an interplanetary navigation expert at the U.S. NASA Jet Propulsion Laboratory, spoke in Kuala Lumpur. According to the Oct. 7 issue of Malaysia's *New Straits Times*, Diarra spoke on Mars exploration, before answering questions from the press. He stated that bringing developing countries into participation in space exploration was foremost on his agenda as UNESCO ambassador. "Malaysia can also participate, as I am sure it can contribute at least in data-gathering and analysis efforts, or even creating machinery needed for space exploration," he said. Malaysia's Deputy Science, Technology, and Environment Minister Datuk Abu Bakar Daud responded that the ministry would make a proposal to NASA regarding areas in which it could contribute to future space programs.

Prof. Datuk Mazlan Othman, the Ministry's Outer Space Research Division's director general, added, "We have successfully made our own micro-satellite, although initially the scientists and engineers involved were not specialists in the field. I am sure we can retrain them for a bigger challenge. "Who knows. We can even contribute ideas that the developed nations have not thought of," she said.