
Conference Report

Asia gears up for space exploration

by Marsha Freeman

The leadership of every nation that is looking toward the future and planning for the economic and cultural development of its people, has considered space exploration and technology to play an important role in that development. Only a few nations, however, have so far had the resources—industrial, scientific, and technical—to become major contributors to, and users of, space technology.

Those nations which were first in the field, that is, the United States, the former Soviet Union, and western European nations, are all suffering cut-backs in funding for space projects, because they are laboring under the bizarre idea that their economies will do better if government funding is constrained, even in the new technology fields that actually *create* economic growth.

In China, there does not appear to be such a constraint on allocating resources for science and technology. On the contrary, there is an understanding that it is investment in the people and resources necessary for endeavors such as space exploration that will help push the Chinese economy and society into the 21st century.

On June 3, the American Astronautical Society held a one-day seminar on “Non-U.S. Space Agencies” in Washington, D.C., which gave an opportunity for spokesmen from China, Japan, Europe, Russia, Canada, and India to brief their American counterparts on the progress and plans of their space programs.

China attaches great importance to space

At the AAS symposium, the Washington representative of China Great Wall Industry described in detail how the Chinese space program is being called upon to support his country’s economic development programs. Baosheng Chen briefly reviewed the history of China’s space program, explaining that in the 1950s when development began, it “lacked strong economic power and advanced science and technology.”

But in the past two decades, China has focussed on three principal areas of development: launch vehicles, (the Long March series of rockets), indigenous satellite development and fabrication, and new applications technologies using sat-

ellites. China is one of the few countries that launches satellites that it designs and manufactures, rather than purchasing satellites from the United States or Russia. China Satellite Launch, which operates three launch centers and two research institutes, has a total workforce of over 20,000, including 5,000 engineers.

As an example of satellite applications, Chen reported that over 80% of the Chinese people now have access to television via satellite. While this might not seem that impressive to an American audience, where most households have at least two televisions, he remarked, it is quite impressive for a nation the size and level of development of China. Satellites have allowed more than 2 million people to receive university and technical education through courses transmitted via television in China, he said.

China’s weather satellite system is used for the forecasting of typhoons and storms, and remote sensing systems are surveying the land and aiding agriculture. China has started to conduct microgravity experiments in materials, life sciences, and fluid dynamics using the system of recovering small unmanned satellites with the experiments that have been sent into orbit, Chen reported, and has established international satellite communications business with over 150 countries.

Chen reported that in the Chinese plan for the years 2000-20, it is stated that we shall “keep strengthening the development and research of space power systems, propulsion, telecommunications, and manned space technologies.” Before the end of this century, he said, China is committed to develop increased-capacity communications and broadcasting satellites, and next-generation Earth resource and meteorological satellites. China plans to continue to provide launch services to international customers with the Long March family of rockets, and will work toward “making use of satellite applications by all walks of life.”

Periodically, there have been reports that China is planning to develop a manned space program in the next century. Soon after the AAS symposium, it was reported that China has sent a group of pilots to Russia to visit the Cosmonaut Training Center. They have not been formally chosen or announced as cosmonauts or astronauts, but are apparently getting a first-hand look at what such a program would entail.

While China has had failures recently in its Long March launches, the government is committed to improve the reliability of its launch systems, and has plans for upgrades and new technologies for the next century. Today, only Russia and the United States have man-rated launch systems that are used to carry people into space.

Japan aims for the Moon

Masazumi Miyake, deputy director of the Washington office of the National Space Development Agency of Japan (NASDA), outlined the ambitious manned and unmanned space projects Japan is planning, at the AAS symposium.

Japan's space program, at a level of about \$2.3 billion this year, is the third largest in the world in terms of resources, after the United States and Russia, and is at about the same funding level as that of the 14-nation European Space Agency. Japan has a multifaceted space exploration effort, which includes the development and use of applications satellites; the design, production, and launch of rockets; the development and launch of scientific satellites; and manned space activities, which it conducts with the United States.

Miyake said that the January 1996 report, "Fundamental Policy of Japan's Space Activities," states that Japan will conduct a "lunar exploration project, including a lunar orbiting satellite and landing vehicle, to find out scientific knowledge and possible availability of the Moon." This mission, Lunar-A, is scheduled for launch early next year, and its two small penetrators will be the first spacecraft to land on the Moon in two decades.

The plan also states the objective of "scientific observation and exploration *from* the Moon," and proposes that Japan consider "international cooperation in the future," while NASDA continues to develop "observation technology and lunar infrastructure technology." NASDA itself has only about 1,000 employees, with most of the space activity carried out by Japanese industry. Japanese corporations have been conducting experiments on using lunar materials for construction, and exploring the possibility of building hotels in Earth orbit for tourists.

However, the world financial crisis has affected Japan's plans. Miyake reported that the Japanese Finance Ministry has not yet approved the more ambitious Selene project, which would put a scientific lander on the Moon after the turn of the century. The ministry has also asked NASDA to reduce the development cost of its current lunar exploration effort, he said, and a working group under the prime minister has asked NASDA not to start any new projects until the year 2000. Miyake said that over the last ten years the Japanese space budget doubled, and that an increase of 20% per year is needed in the future to cover all of their planned programs—which does not seem likely to happen at the current time.

Because Japan, unlike China, has not been isolated internationally, and has had access to American space technology and expertise, it is not planning to develop an independent manned space capability. Japanese astronauts have flown on the Space Shuttle, and Japan is an active player in the international space station, contributing the Japan Experiment Module (JEM) laboratory.

On June 2, NASA Administrator Dan Goldin announced from Tokyo that a Japanese astronaut will fly on the third station assembly mission, scheduled for January 1999. There are currently five Japanese astronauts in training at the Johnson Space Center in Houston, and, as a major contributor to the space station, Japan will be entitled to have its own astronauts on board the station to carry out experiments

Will the first be last?

The direction the space programs are headed toward in the oldest space powers, may bring about a situation in the next century in which the younger space nations take the lead in increasing areas of space exploration.

At the AAS symposium, Graham Gibbs from the Canadian Space Agency reported that in 1994 the Canadian government had to renegotiate its agreement with NASA on the international space station, because it could not meet its obligations. Canada is contributing a large robotic arm for the international space station, which is powerful enough to lift a Space Shuttle orbiter, fully loaded. It can reach anywhere on the station and is critical for the assembly of the modules.

But Canada has had to curtail its financial participation, with NASA having to pick up the tab. This will mean that Canada will have reduced utilization of the station, to offset a reduction of 2% in payments for the station's operating costs.

Louis Laurent, the attaché for space from the Embassy of France, stated that the state-funded part of the French space agency's budget peaked in 1994. "Our new partners in space are China, Brazil, and Israel," he said. In the future, Laurent said, we see "strong political support and a flat budget."

Enzo Letica, representing the Italian Space Agency, presented a similar outlook. He said that the main priority in Italy now is to "reduce the deficit to balance the budget"; something with which the Americans in the audience are well familiar.

Dietmar Wurzel, the head of the Washington Office of the German Space Agency, DARA, also remarked that the peak funding year for space in Germany was 1993. Recently, the German government has decided to merge DARA with the German Aerospace Research Establishment, DLR, in order to "reduce the management workforce by 25%, and by 1999, by an additional 10%." By the year 2000, Wurzel said, the new agency will be called the German Aerospace Center, and will be a private, nonprofit association, and some of its funds will come from services that can be sold commercially.

There was little said about the current state of funding for the U.S. space program. Last year, when President Clinton agreed to go along with the Conservative Revolutionary agenda of balancing the budget by the year 2002, the out-year projections for NASA were for the budget to fall from nearly \$15 billion in fiscal 1996, to a little over \$11 billion by the turn of the century.

An outcry from the saner members of Congress, the space community, and even the scientific community, during meetings with Vice President Al Gore, led the Clinton administration to increase the projected funding levels for the space agency. This marginal increase in funding, however, is no substitute for an economic policy based on investments in science, technology, infrastructure, and education.