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## Space Exploration

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# The Momentum Shifts to Asia

by Marsha Freeman

Each Fall, more than one thousand managers and planners, scientists, and engineers, come together to report on the past year's accomplishments in space, and to discuss their plans for the future. For decades, participants at the annual International Astronautics Congress (IAC), looked forward to presentations by the world's most well-funded, broad-ranging, and forward-looking space agencies—those of the United States and Russia.

A striking feature of this year's IAC, held Sept. 29-Oct. 3 in Glasgow, Scotland, was the shift in attention and anticipation to the emerging space powers in Asia. While there is still no other nation, or combination of nations, that can match what the U.S. or Russia can do in space, it was clear that the momentum, enthusiasm, and optimism about the future, has moved East.

The opening of the Congress, coming just two days after the successful completion of a stunning 14-minute spacewalk carried out during the three-man Shenzhou VII mission, began with congratulations to China on its accomplishment.

During the conference sessions, China and Japan presented results from their ongoing Chang'e and Selene lunar missions. Indian presentations on their first deep-space mission, Chandrayaan-1 to the Moon, were made just days before the exciting lift-off of that spacecraft.<sup>1</sup>

South Korea, which is becoming a world-class power in both space and civilian nuclear energy, will, for the first time, host an IAC meeting, in 2009. This provided an opportunity for Korean officials to showcase the impressive projects they have underway.

Russia, which saw its civilian space program nearly destroyed during the pre-Putin "IMF years," is now re-



EIRNS/Marsha Freeman

*Dr. Yi So-yeon, seen here in native dress during "Korea night," at the Glasgow Congress, became the first South Korean astronaut last April, when she flew on a Russian Soyuz rocket to the International Space Station.*

building its space design, engineering, and manufacturing infrastructure, and accelerating this effort by embarking on new projects with international partners, including in Asia.

The greatest disappointment, which has been reflected in the frustration expressed by NASA Administrator Mike Griffin, is the situation in the United States. With no excuse except failed economic policies, and a lack of optimism, the U.S. is on the verge of taking down the space infrastructure it has spent decades creating. Lack of support—both political and budgetary—from the Bush Administration, has left NASA's Moon/Mars exploration program punctuated with a question mark.

Russia, the U.S., Japan, and Europe—the "Old Men" of the Space Age—are under pressure, from the "young" and emerging space powers in Asia, to do more. And, as noted nervously by a number of speakers at the Congress, the space exploration plans of all nations will be defined by how the global financial crisis is resolved. Clearly, only a global bankruptcy reorganization, and a return to "American System" economic

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1. For details on the scientific goals of the Chinese, Indian, Russian, Japanese, and U.S. lunar missions, see, "Mankind Is Going Back to the Moon!" *21st Century Science & Technology*, Spring/Summer 2007.

investment policies, as outlined by Lyndon LaRouche, will create the basis for the next decades in space.

### **China: Dramatic New Milestones**

In a presentation on Sept. 24, to celebrate the 50th anniversary of NASA, Griffin remarked that if China successfully launched its Shenzhou VII spacecraft the following day, the number of Chinese people in space would “outnumber the number of Russians and Americans in space,” referring to the crew on the International Space Station (ISS). Griffin, who visited China’s space facilities two years ago, believes that using the technology already under development, China could launch a manned mission to orbit the Moon, before the U.S. is ready to return there by 2020. In an interview with the BBC during a trip to London in July, Griffin added that, “it is possible that if China wants to put people on the Moon, and if it wishes to do so before the United States, it certainly can. As a matter of technical capability, it absolutely can.”

In a hastily organized “late breaking news” presentation on the Shenzhou VII mission, on Oct. 2, Dr. Li Ming, of the Chinese Society of Astronautics, explained to the IAC participants that China’s interest in manned space flight went back to the 1960s, when studies were done, but these were cancelled the following decade. Starting in the 1990s, he said, the “technology has developed very rapidly.”

Showing film footage of the Shenzhou VII mission, he reported that two hours after China’s first-ever space walk, an 80-pound accompanying satellite, developed by the Chinese Academy of Sciences, was released from the main craft. Subsequent articles have noted that this BX-1 subsatellite orbited near the Shenzhou, taking more than 1,000 close-up photographs. After the astronauts had returned to Earth, the BX-1 subsatellite was commanded from mission control to circle Shenzhou’s orbital module, which stays in orbit empty.

Through this exercise, China demonstrated the ability to fly two spacecraft safely in close proximity; remotely maneuver a spacecraft, with a high degree of accuracy; and use the subsatellite to relay data from the orbital module back to Earth.

China plans next to orbit a small unmanned space lab, known as Tiangong 1, which will receive visits from at least two unmanned Shenzhou spacecraft. Shenzhou VIII, launched unmanned, will rendezvous and dock with the laboratory. Shenzhou IX would be the second unmanned ship to dock with the lab, and Shenzhou X

would be the next manned mission, delivering a crew to live and work in space. The three craft would be launched in quick succession, over the next two or three years. This first space lab would be manned for short periods of time, and used to master the complex skills needed for a later permanent manned presence in orbit.

The next step in China’s three-phase lunar program will be the launch of Chang’e-2, before the end of 2011. This second lunar mission would deploy two landers, carrying two rovers, which would be placed at different locations on the Moon, to get a more complete picture of its surface. The third mission would include the return of a sample of lunar soil to Earth.

### **India’s First Lunar Mission**

At the opening ceremony of the Congress, Dr. B.N. Suresh, from the Indian Space Research Organization (ISRO), announced that India’s first foray into deep space, its Chanradayaan-1 mission, would be launched to the Moon at the end of October. He explained that India’s spacecraft would do a simultaneous mapping of the Moon in three dimensions, producing a better resolution visual map than previous missions.

On Oct. 22, an up-rated version of India’s Polar Satellite Launch Vehicle sent the spacecraft aloft, and when, on Nov. 8, ISRO announced that Chandrayaan-1 had successfully entered lunar orbit, India became the fifth country to send a spacecraft to the Moon.

India is now carrying out conceptual studies for its second lunar mission, Chandrayaan-2. It will consist of both an orbiter and a lander, with Russia building a rover, which will use a robotic arm to collect samples, and conduct *in situ* analysis of the soil.

In part, due to China’s successful manned space program, India is developing the technology to put people into space. At the Congress, ISRO experts presented the space- and ground-based equipment that a manned space mission would require, focusing on the autonomous capabilities that monitor all hardware systems, so “no single point failure shall jeopardize the mission,” nor “result in loss of life.”

### **Up and Coming: South Korea**

Although its progress has not attracted that much international attention, South Korea is becoming a new space power. Last April, Korea’s first astronaut, scientist Yi So-yeon, went into space aboard a Russia Soyuz, and spent 11 days on the ISI. Her flight generated widespread excitement throughout the country.

More than 36,000 Koreans had applied for the mission, which was the result of an agreement signed with Russia in 2005.

At the IAC, on Oct. 2, a 50-strong delegation of space and political officials hosted a “Korea night,” to acquaint attendees with the broad-ranging South Korean space program, and invite them to their country for the next IAC, in September 2009.

At the reception, astronaut Yi conveyed her country’s commitment to continuing its manned space program. Well aware of the unique Korean political situation, before her flight last April, Yi said she hoped her flight would encourage closer ties between the divided Koreas, and help reconciliation. “I hope someday they will be one, and I hope the North Korean people will be happy with my flight,” she said.

In a side conversation at the conference, one of the organizers of next year’s meeting in South Korea, told this writer that his government hoped that a delegation from North Korea would attend the 2009 IAC in the South, and that the invitation would be made at the “highest level” of the government.

### **Russia: Rising from the Ashes**

Under the direction of the top leadership of the country, Russia is rebuilding and expanding its space capabilities, which were nearly destroyed by a decade of “liberal” economic policy, enforced by the IMF.

At the IAC, the deputy head of the Russian space agency, Alexander Medvedshikov, explained that Russian space projects that had been left unfinished, such as the Glonass space navigation constellation, would now be completed, with increased funding.

Medvedshikov reported that construction had started on a new launch facility, at the mothballed Svobodny military site, called Cosmodrome Vostochny [Eastern], and that the first launches are scheduled for 2016.

The workhorse of the Russian manned space program for the past 50 years—the Soyuz—will be replaced by a more modern version, and eventually, an entirely new spacecraft. There have been negotiations with the European Space Agency on developing a next-generation replacement for the Soyuz, which have been inconclusive. At the Congress, Medvedshikov indicated that Russia would be developing it “on their own.”

During a session on Moon Exploration, Olga Zaitseva, deputy director for planetary exploration at the Lavochkin Design Bureau, which builds Russia’s ro-

botic spacecraft, outlined the upcoming Russian lunar missions. The first Lunar-Glob craft, scheduled to be launched in 2012, will send an orbiter to the Moon. This mission will also include a set of four small penetrators to study the subsurface. Technology from the Phobos-Grunt mission to Mars, which Russia plans to launch next year, will be applied to the lunar mission, to the maximum extent possible, Zaitseva said.

There will be a second Lunar-Glob mission, she said, which will deploy a lander and a rover, for a one-year mission. The landing site will be at the south pole of the Moon, with investigations to detect water ice, and to study surface magnetic anomalies. Russia will make use of its extensive experience from the lunar missions of the 1970s, in developing the lander and rover. International cooperation is also expected in this second Lunar-Glob mission.

The second phase of Russian lunar exploration, termed Lunar-Grunt, will begin with the delivery of a heavy, long-range rover, equipped to collect soil samples, and do primary chemical processing, and will include a robotic complex to transfer the samples to a future vehicle. It will deploy a radio beacon to aid in precision landing of a second craft to follow. Then, samples that have been collected will be transferred to an ascent vehicle, which will take off from the Moon’s surface, and deliver the samples to Earth. This two-mission second phase is envisioned in the 2014-15 time frame.

A fascinating proposal for a possible third phase was also described in the presentation, of a lunar base, or “polygon,” which would be delivered unmanned to the Moon. This technology complex would be used to support later manned missions. The automated base could include transportation, communications, and power-producing functions, and perform “housekeeping” tasks to keep the base in working order, until people arrive. It could include scientific modules, with autonomous scientific stations, long-range rovers, and telescopes.

### **Meeting the Challenge**

At the Glasgow conference, the “Old Men” of space presented a fresh look at their own plans, goaded by the developments in Asia.

The European Space Agency (ESA), is considering either partnering with Russia on a next-generation manned space vehicle, or man-rating its own Ariane 5 rocket, and developing a manned version of the cargo-

carrying Automated Transfer Vehicle, which was sent to the International Space Station earlier this year.

In an IAC paper discussing the “European Options for Crew Transportation,” engineers from ESA and the European aerospace industry noted that, with the retirement of the U.S. Space Shuttle in 2010, Europe could fill in, and provide crew transportation. The study indicates that from five to eight years after a decision is made, Europe could have an initial manned transport capability.

Like Europe, Japan has flown astronauts on Russian and American spacecraft, and built a laboratory for the ISS, but, in the 1990s, halted development of its own spaceplane. Similar to Europe, which would have to upgrade its Ariane 5 launcher to carry crew, as discussed at the Congress, Japan is considering upgrading and man-rating its HII vehicle.

And the U.S.? The only nation to have landed men on the Moon, robotically visited every planet in the Solar System, and peered into the universe with giant space telescopes, has been given a “vision,” but inadequate resources to carry it out.

During the plenary session with the heads of space

agencies, on the first day of the Congress, NASA Administrator Griffin found himself defensively responding to sniping criticism of the agency’s programs. “Despite what you read on Internet blogs,” he stated, “progress on Ares and Orion [the next manned craft and rocket] is going quite well.”

Griffin was sitting on a panel with representatives from the nations that are partners on the International Space Station. They are concerned that the U.S. will abandon participation on this \$100 billion, 20-nation facility, in 2015, as President Bush has proposed. Griffin had to part company from the President, in order to assure them that he “cannot imagine that happening.”

Cognizant of the impressive strides Asia is making in space, some U.S. space supporters have tried to concoct a “space race” with China, or India, to scare legislators into supporting NASA. As China, India, South Korea, and other nations have demonstrated, that is not their reason for exploring space.

Griffin often states that great nations lead great projects. As advances in Asia demonstrate, the commitment that nations make to explore space is one measure of that greatness.

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