

**House Committee on Science and Technology
Subcommittee on Space and Aeronautics Hearing**

**“The Growth of Global Space Capabilities: What's Happening and
Why It Matters”**

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The Importance of Emerging Space States

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Chairwoman Giffords, Ranking Member Olson, and distinguished members of this Subcommittee, I am pleased to have this opportunity to share with you Secure World Foundation’s insights on the growth in space capabilities throughout the world and why the changes this growth represents are particularly important to U.S. interests. From the emergence of China as a country with a significant human spaceflight program to the launch this September of South Africa’s second indigenous remote sensing satellite, over the past decade, the international space community has experienced many significant changes.

One of the important, but often overlooked, characteristics of the past decade is the rapid emergence of new actors in outer space. Since 1999, the number of States with space systems in orbit has increased from 27 to 37. Countries as diverse as Algeria, Iran, Nigeria, Venezuela, South Africa and Turkey have now become part of the so-called “space club.” Eight States are now also capable of launching satellites into orbit. South Korea will likely soon make that a total of nine.

Countries wish to enter the space realm for a variety of reasons, not least of which is the desire to gain prestige in the international community. Rationales include the following, the priority of which varies depending on the needs of the State:

- **Advance scientific and technical capacity.** Emerging space States see space science and technology as assisting in the development of domestic scientific and technical capacity well beyond the space scene. Information, communication and imaging technologies, especially, have strong links to space science and technology. Even health technologies and the millennia old practice of agriculture are greatly enhanced by space technology.

For example, as an article last week in the *Economist* highlighted, the data from remote sensing space systems and GPS can assist in improving crop yield, and reducing the overuse of fertilizer and seed.¹

- **Improve the management and use of resources and provide better protection against the ravages of natural disasters.** The smaller states place an especially heavy emphasis on space applications. Hence, it is no surprise that Algeria, Nigeria and Turkey decided to enter the space realm by each purchasing a the satellite in the Disaster Monitoring Constellation (DMC),² which acquires a complete, medium-resolution data set of the globe every day. All participating States have access to data from the entire DMC, providing much more coverage and timeliness at lower cost than each State could achieve individually. Data from the DMC has helped those countries tackle the enormous challenge of managing forests, grasslands and waterways, and of responding to natural disasters. Having access to the DMC system has also spurred the creation of training in space technologies in these countries and development of new markets for data products.
- **Enhance access to education and health information throughout the country.** For many developing countries, especially, communication satellite systems can help spread access to educational programs and modern communications and information throughout a nation, particularly those with poor infrastructure or vast geographical extent. Such systems also create opportunities for the development of tele-health and tele-education to serve extended remote areas. Canada and India have been particularly strong in providing tele-services to remote areas. Further, space activities are exciting to young people and help interest them in following careers in science and mathematics, which are needed to develop the country's industrial capacity.
- **Improve national security.** One of the primary drivers of a country's interest in space systems is their use in its national security apparatus. Space technology can especially assist in the improvement of border security. Furthermore, by monitoring potentially hostile activities in neighboring countries, space technology can help reduce tensions between States and preempt conflict.
- **Advance industrial capacity and the economy.** In order to participate more effectively in the global space economy, emerging space States use their entry to build the capacity to design and build space components. This upgrading of their economies can result in demand for products from the United States and other developed countries. In addition, as a recent study carried out by the Space Policy Institute of The George Washington University has demonstrated for GPS technologies, incorporating this space technology into the workflow of transportation services can markedly improve efficiency and reduce costs.³

- **Prestige in the international community.** We must not overlook the role that prestige plays in joining the space club. Identifying with other countries that are more advanced technologically can be a powerful incentive because being part of the growing number of countries with space capabilities indicates a certain level of scientific and technological achievement. This achievement enhances the pride of citizens and augments the reputation of the country in the international marketplace.

The addition to the space environment of spacecraft owned and operated by emerging space States raises both opportunities and challenges for the space community and the governance of space activities. From the standpoint of increased opportunities, having more space players means greater chances for finding other space actors with which to cooperate in order to pursue space science and technology development. Doing so means pooling some resources and saving costs for each individual country.

Cooperation specifically means that States can create beneficial international agreements on space science and applications and on space exploration, allowing them to make advances that they might not achieve on their own. European countries have demonstrated the enormous value of such cooperation in the European Space Agency, a model that other regions have indicated they would like to emulate when conditions are right. Such cooperation can also lead to technological cooperation in other, non space disciplines.

A greater number of space actors means a larger marketplace for space products, of which both established and emerging actors can take advantage. Greater numbers can result in increased demand for a variety of commodities, everything from space launch vehicles to data analysis software and expert advice, all of which can benefit U.S. industry. More States involved in the pursuit of space science also potentially means greater and broader advances in our knowledge of the universe.

The increase in the numbers of space actors, coupled with the fact that the established space actors are increasing the numbers of their spacecraft in orbit also increases the need to establish effective governance of the global commons of outer space. Every spacefaring State tends to want its own Earth observing and communications satellite. As a result, we are beginning to experience crowding in certain orbits, such as in low Earth polar, sun-synchronous orbit where most Earth observation satellites are located, and in the geosynchronous orbits (GSO) favored for satellite communications.

As this Committee knows, the increasing growth of orbital debris has also become an important concern in assuring the long-term sustainability of space activities. For the emerging spacefaring States there is another set of issues related to sustainability:

- Have they instituted best operational practices in designing and operating their launch systems and spacecraft?

- Have they signed and ratified the 1967 Treaty on Outer Space and the subsequent Agreements on Liability, Registration, and Return of Astronauts?
- Do they adhere to the orbital debris guidelines agreed to and passed by the United Nations General Assembly?

Since its inception, Secure World Foundation has partnered with other institutions to pursue its mission of addressing space governance issues and the long term sustainability of space activities. For example, just one year ago, we, the European Space Policy Institute, and the International Academy of Astronautics held a workshop in Vienna, Austria focused on the fair and responsible use of outer space.⁴ The workshop, which included analysts from emerging and established space countries, focused on the identification and analysis of key challenges to the achievement of fair and sustainable use of outer space for all space actors, including the newly emerging space States.

Among other things, the workshop emphasized the need for the established spacefaring States to establish appropriate practices to ensure that outer space remains available for the future use of emerging States and guarantees the fair and equitable use of the frequency spectrum for all space actors. By the same token, emerging States have the responsibility to ensure that they act as good citizens by adhering to the international space treaties and to resolutions such as the UN Guidelines on Orbital Debris.

In the view of the Foundation, the United States can improve its own orbital security for commerce, science and national security and gain closer allies within the international community by engaging with the emerging space States. The emergence of new space States raises two key questions for the United States:

1) What can the United States do to assist emerging spacefaring countries in adhering to international best practices in space activities?

It is important to assist emerging states as much as possible to develop clear policies that incorporate the elements of Outer Space Treaty and the other three international Agreements and to bring them into conformity with accepted space debris-reducing practices. Maintaining the benefits we gain from space systems through guaranteeing the long term sustainability of outer space is one of the most important space issues the United States and other spacefaring States will face over the next decade. It is a matter of ensuring space security, space commerce, and the economic and social benefits with which space systems provide us.

Over the past few years, the U.N. Committee on the Peaceful Uses of Outer Space, or COPUOS, has made excellent progress on improving the international governance of space activities. The Committee has developed guidelines on limiting the creation of orbital debris which were passed in 2007 by the General Assembly. The U.S. delegation played a significant part in that effort.

This February, the COPUOS Subcommittee on Science and Technology will begin serious work on a set of so-called “best practices” for space activities. U.S. delegates to COPUOS have played a strong role in both efforts. Committee membership includes many small states that had a major role in crafting the Space Debris Guidelines and they are likely to be helpful in reaching agreement on a best practices document. The United States can continue to play a significant role here by engaging with the small states as well as the larger ones in the work on best practices.

2) Is the United States taking sufficient advantage of the opportunities that the emergence of these States as spacefaring entities present for U.S. policymaking?

The space arena can provide a powerful platform for engaging in what has been termed “Soft Power” by analysts—the use of U.S. technological and economic capabilities to influence policymakers in other countries.

The case of Latin America might serve as a good example where the use of soft power could assist the achievement of U.S. goals. Two weeks ago, Secure World Foundation partnered with CRECTEALC, the Regional Center for the Teaching of Science and Technology in Space for Latin America and the Caribbean [[Centro Regional de Enseñanza de Ciencia y Tecnología del Espacio para América Latina y el Caribe](#)] to hold a workshop focused on sharing the space policies, programs and plans of Latin America.⁵ This workshop specifically included presentations on space policy essentials, space security, international law of outer space, and the structure of U.S. space activities.

Participants expressed appreciation for the focus on policy and legal matters experienced in other countries that they might consider in drawing up space policies and designing national legal regimes that adhere to international space treaties. During the workshop, representatives of several Latin American countries presented their countries’ space policies and activities. They expressed just pride in what they had accomplished, despite the financial and political challenges of bringing a dedicated program of space science and technology into being.

Through NASA, the U.S. Geological Survey and NOAA, the United States has long engaged with Latin America in space science and applications, in a variety of programs. It may be time to increase that engagement, in part to counterbalance the growing influence of China in the region.

In recent years, China has taken a strong interest in Latin America and has actively assisted both Brazil and Venezuela in their space efforts. China and Brazil jointly developed and operate the CBERS Earth resources satellite system. Data from this system are available for free to countries neighboring Brazil and to other countries who wish to build a ground station.⁶ Other cooperative agreements in Earth and space science are underway. Just a year ago, China launched into orbit a DFH4 communication satellite that it had sold to Venezuela. The sales agreement included a technology transfer arrangement that resulted in some 90 Venezuelan engineers and technicians having direct involvement in China in the satellite’s construction and launch. Satellite Simon

Bolivar is now located at 78 degrees East Longitude over Uruguay and provides communications for most of Latin America with C band satellite communications. This satellite has enabled Venezuela to extend its influence throughout Latin America and the Caribbean.

The United States could extend its own engagement with Latin America through teaching programs, perhaps with the U.N.-affiliated CRECTEALC, which has campuses in Mexico and Brazil. It could also explore more vigorously than it has cooperative space science and space applications efforts. However, the current onerous ITAR regulations make certain types of technology cooperation extremely difficult. ITAR is a serious issue that impedes the U.S. ability to cooperate effectively with emerging and established space countries alike. ITAR reform would go a long way to fix this impediment. We need a regulatory framework that assists, not impedes, the creation of new markets and enhances international cooperation and competition.

One specific thing the United States might do with Latin America is to take an active part in the Space Conference of the Americas that will be held in Mexico in November 2010. This conference will bring together all of the major Latin American and Caribbean countries that are interested in outer space for several days of presentations, discussions and sharing of ideas. The United States could gain a lot not only from attending this important event but also from offering some specific science and technology initiatives for the countries attending.

In short, we at SWF mostly see space developments among emerging space States as opportunities rather than as threats. In general, the United States can bolster the long-term security climate in space by working with emerging space states to build space capacity, especially in space science and applications, where ITAR restrictions intrude relatively little. Enhanced ability to make use of the benefits that space systems provide also means a broader market for U.S. goods and services, especially high technology consumer items like GPS devices.

Just as important, however, is the need to assist emerging space States to develop space policies having a global, long-term sustainable approach. Since the beginning of the space age, the United States has constructed a range of policies, legal instruments and interagency practices to guide its space efforts. These can be instructive to emerging space States who are just developing their space-related policies and laws.

Countries that gain an economic and political stake in the space environment by having systems in orbit are more likely to be inclined to pitch in to preserve the space environment for their benefit. Nevertheless, it is important to work with all possible spacefaring countries to ensure that the space environment remains available for all for the many benefits space systems provide.

Finally, these reflections lead to the overall need for the United States to develop an overarching space strategy that goes beyond any necessary revisions to U.S. space policy and includes both

military, civil, and commercial components. Such a strategy would go a long way to clarify the direction of U.S. investments in space science, space applications, the human exploration of outer space, and the nature and scope of U.S. involvement in the international community.

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Secure World Foundation (SWF) is a private operating foundation headquartered in Superior, Colorado and with offices in Washington, DC and Vienna, Austria. The Foundation is dedicated to maintaining the secure and sustainable use of space for the benefit of Earth and all its peoples. SWF engages with academics, policy makers, industry, scientists and advocates in the space and international affairs communities to support steps that strengthen governance of outer space and delivery of the benefits of space to Earth. <http://www.SecureWorldFoundation.org>

¹ "Harvest Moon: Artificial Satellites Are Helping Farmers Boost Crop Yields," *Economist*, 7 November 2009, p. 73.

² http://www.dmcii.com/about_us_constellation.htm. The DMC satellites were designed and constructed by SSTL of the United Kingdom. <http://www.sstl.co.uk>. DMC participants are: Algeria, China, Nigeria, Spain, United Kingdom, and the Spanish company, Deimos. Turkey was part of the original constellation but its satellite has reached the end of life.

³ Henry R. Hertzfeld, "Space as a Utility: An Exploration of GPS in Commercial Use," Report to Secure World Foundation, May 2009.

⁴ European Space Policy Institute, November 2008 conference, "Fair and Responsible Use of Outer Space," <http://www.espi.or.at/>.

⁵ The SWF-CRECTEALC workshop: <http://www.secureworldfoundation.org/index.php?id=192&page=CRECTEALC>

⁶ Jose Carlos N. Epiphano, "CBERS: Remote Sensing Cooperation Between Brazil and China," *Imaging Notes*, Summer 2008, Vol. 23, No. 2, http://www.imagingnotes.com/go/article_free.php?mp_id=134.