



Approaches to Achieving a Secure and Sustainable Space Environment^{*}

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Since the early 1960s, the world has slowly but steadily moved toward greater use of outer space to support a wide variety of economic, societal, and security needs. Whether in support of widely diverse civil applications, such as rapid disaster assistance, smooth functioning of mobile phones, delivery of communications and health services to rural areas, rapid transfer of financial data, resource management, precision agriculture and weather forecasting, or security applications such as reconnaissance, communications and surveillance, our dependence on space systems is deep and wide.

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Now, for the first time in history, developed and developing countries alike depend on space systems to promote and protect all aspects of human security. This is a key point. That dependence is growing, as increasing numbers of States enter the space realm.

Yet, at the same time, threats to the safe and secure use of space systems are also increasing. The authoritative *Space Security Index 2008*, which has just been released, cites several worrisome trends: a sharp increase of orbital debris in low Earth orbits, increasing spacecraft crowding in key orbits, and the proliferation of destructive technologies that threaten to undercut the secure and sustainable use of Earth orbit, and to undermine human security.¹

The threat from destructive space technologies and the debris they cause was brought into sharp focus in January 2007 with the Chinese test that resulted in the deliberate demolition of one of China’s own satellites, and again in February 2008 when the United States destroyed an ailing U.S. satellite in orbit. Though the debris caused by the two events were not comparable

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– the Chinese test left thousands of pieces of debris that will remain for years in the same orbits that are used by Earth observing satellites and the weather satellites that we use every day for weather forecasting, while the debris from the U.S. event entered the atmosphere and burned up within weeks – together, they highlight the potential for conflict in space to vastly reduce our ability to use outer space for the substantial benefits space activities provide. The economies and well being of both highly developed and emerging space States alike could be at risk.

So, what can be done to reduce the threats to the secure and sustainable use of outer space and to international security? Fortunately, non-governmental organizations (NGOs), individuals and States have begun to recognize these threats and are responding with various international efforts.

Earlier this year, China and Russia, for example, jointly submitted a draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT)² at the UN Conference on Disarmament (CD). Yet, the difficulty of obtaining agreement on definitions, verification, and other aspects of an international treaty on space arms control has caused several parties to pursue interim and complementary alternatives.

As we at the Secure World Foundation³ see it, those interested in achieving space security must follow several paths simultaneously. Both diplomatic and technical avenues must be pursued, because providing international guidelines for space activities requires a thorough understanding of the advantages and limitations of pursuing certain technical choices in regulating space activities.



The United Nations Headquarters in New York City. Image: United Nations.

On the diplomatic side we are working with UN Institute of Disarmament Research, the UN Committee on the Peaceful Uses of Outer Space (COPUOS), and several NGOs, on investigating or supporting diplomatic approaches. Specifically, we are working with the American NGO, the Stimson Center, on a draft Code of Conduct for outer space activities. This Track II diplomacy effort, which sets out a group of operating principles, has been developed by NGOs from Canada, France, Japan, Russia and the United States. Among other provisions, this code calls for States to accept the responsibility to:

- ◆ “Develop and abide by rules of safe space operation and traffic management.
- ◆ Share information related to safe space operations and traffic management and to enhance cooperation on space situational awareness.
- ◆ Mitigate and minimize space debris in accordance with the best practices established by the international community in such agreements as the Inter-Agency Debris Coordination Committee guidelines and guidelines of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space.
- ◆ Refrain from harmful interference against space objects.”⁴

More recently, the European Union has been working on its own Code of Conduct, which it is now briefing to non European States for input and refinement. It expects to release a final draft early in 2009. This is the first major effort by a group of States, rather than NGOs, to define such a Code. It could be a major step forward toward more formal agreements in support of the secure and sustainable use of outer space.

One of the difficulties in crafting appropriate responses to the space security dilemma is that outer space is unlike the realms of land, sea, and air that we experience daily. Space experts must be trained in understanding the physics of space and the ways in which objects function there. For example, in the stark vacuum of outer space, objects in orbit tend to stay in orbit unless some force causes them to come back to Earth. Furthermore, objects travel at incomprehensible speeds, upwards of seven kilometers per second, and when even a small object the size of a marble strikes a spacecraft at these speeds, it can destroy the spacecraft. As a result, we lose the economic, social, or security benefits that the spacecraft may have provided.

Because of these facts, generalized approaches to the sustainable use of outer space that do not seek to specify internationally agreed-upon safe and secure operational procedures for space activities are likely to fail. To fill this void, France has begun an effort led by Mr. Gerard Brachet, former Chairman of COPUOS, to use a technical, bottom-up approach to the safe and sustainable use of space. He has convened an informal working group of space experts to develop a set of guidelines for safe and sustainable operations in outer space. Members of this group have contributed to a draft that is expected to be completed by the June 2009 meeting of COPUOS. This October, the initial draft was presented to 32 representatives of some 20 States or commercial organizations at the International Astronautical Congress in Glasgow, Scotland, so the effort has excellent support from many States.

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The adoption last year by the UN General Assembly of the Space Debris Mitigation Guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space,⁵ was a major step forward on limiting the production of orbital debris that can harm space activities. Now the space-faring States need to follow up and put these guidelines into State practice.

Another important international effort centers on space situational awareness (SSA). This is the attempt to determine the type of objects orbiting in near Earth space and the orbits they are in. The U.S. Air Force maintains a network of ground-based optical and radar facilities that keep track of the 18,000 or so man-made objects in orbit bigger than a fist. Through NASA, it publishes an open catalog of orbital elements that commercial and non-U.S. satellite operators can use to guide their spacecraft and avoid collisions. However, the accuracy of the positional information in this open catalog is not sufficient for critical spacecraft maneuvers. More detailed, accurate information is needed. Yet this information is generally not available except to close U.S. allies and to certain commercial operators because of its military sensitivity. Even

there, the needed warnings of interference or collision may come too late because the Air Force often lacks the personnel to provide this information quickly to non-U.S. government entities.

Recently, other countries are making moves to develop or improve their own SSA capabilities, which will reduce the tactical security advantage that the United States holds in this important arena. In recognition of this fact, it is beginning to work with other countries to find ways to cooperate on SSA. The Secure World Foundation is working with the U.S. Center for Defense Information and the U.S. Air Force Academy Eisenhower Center for Space and Defense to promote dialog among countries and commercial space operators about cooperative SSA, through a series of conferences. The first was held in 2006, and the second last year in the London headquarters of satellite operator Inmarsat.⁶ Next spring, this technical event will be held at the headquarters of satellite operator Intelsat in Washington, DC.

Together, these technical, bottom up efforts provide important technical underpinnings and confidence building measures for any diplomatic effort to chart a course for the secure and sustainable use of outer space. Others are also under way. Achieving a secure and sustainable space environment is a matter both for UN COPUOS and the UN CD. The Secure World Foundation is devoted to working with both institutions and with other entities to dialogue on this important issue. Only when all of us, working together, have achieved such a space environment will it be possible to count on maintaining, improving, and expanding the use of space for the many benefits that space activities provide.



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1. <http://www.spacesecurity.org/>.
2. <http://www.fmprc.gov.cn/eng/wjbj/zjzg/jks/jkxw/t408634.htm>.
3. <http://www.SecureWorldFoundation.org>.
4. Code of Conduct: <http://www.stimsoncenter.org>.
5. United Nations Document A/AC.105/890.
6. See <http://www.cdi.org/friendlyversion/printversion.cfm?documentID=4148>.



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