OPINION & ANALYSIS

INTERNATIONAL LAW AND THE MILITARY USES OF SPACE

By Ambassador Thomas Graham

December 1, 2001 marked the 42nd anniversary of the signing of the Antarctic Treaty, which preserved the continent as a non-militarised, nuclear-weapon-free area – the first arms control agreement of the modern era. The debate that preceded the negotiation of that treaty is remarkably similar to contemporary discussion on the future of outer space. In the early to mid-1950s, there were about a dozen countries vying for scientific, economic and military interests on Antarctica, an uninhabited, borderless and lawless land. In time, and after much debate, those twelve states – with others joining afterward – decided that the greater interests of all of the affected parties would be served best if the continent could be preserved for peaceful uses and that those interests could best be protected through a legal arrangement rather than the use or deployment of military forces. Thus, the Antarctic Treaty was signed on December 1, 1959.

Today, the international community is faced with similar questions about how to protect the opportunities and assets associated with the use of outer space. Here again we have a borderless realm rich in commercial, scientific and military potential and questions about how best to preserve those assets. Will military deployments and the weaponisation of space be required to defend critical assets? Indeed, is – as some have suggested – the weaponisation of space an inevitable evolution of current and historic realities? Or is it possible, or even desirable, to craft instead a legal arrangement preserving space as a peaceful realm? Perhaps a third way could present itself: for example, could some combination of approaches whereby both legal restraints and militarisation are part of the equation? These are but a few of the questions facing those who are working to protect access to space.

A great deal rides on the answers to these questions. Scientifically, the stakes are quite high, with everything from the International Space Station to the Hubble telescope and the exploration of Mars potentially affected by instability and unpredictability in outer space. The commercial implications are even greater. As Michael Krepon wrote in *Foreign Affairs* earlier this year, space-technology industries generated $125 billion in profits in 2000, and by 2010, the cumulative US investment in space is expected to reach as much as $600 billion, roughly the equivalent of total current US investment in Europe.[1] Clearly, it is now more important than ever to protect space assets in the best manner possible.

Similarly, it is also clear that outer space is becoming a more dangerous place. Several countries, including Russia and China along with the United States, have developed sophisticated anti-satellite weapons, and several others are thought to be seeking such technologies. If they continue to proliferate, anti-satellite weapons have the potential to dramatically undermine fundamental US interests, including national security and international commerce. Krepon cites in his article, for example, a May 1998 failure by a single *Galaxy IV* satellite that caused 80 percent of the pagers in America to go dead, affecting some 37 million users.[2]

The realisation of the increasing vulnerability of the United States to attacks against space assets has caused some to encourage Washington to begin to deploy defensive weapon systems to protect those assets from new weapons. While this could appear to make sense on a visceral or superficial level, a thoughtful analysis of the history of military development reveals basic flaws with this notion. Most importantly, history categorically demonstrates that effective defensive weapon systems will inevitably be countered by effective offensive systems, sparking an ever-spiralling arms race that ultimately leaves all sides less secure.

For evidence supporting this contention, one need look no further than the second half of the 20th century and the nuclear arms race that dominated it. Until the United States and the Soviet Union signed the Anti-Ballistic Missile (ABM) Treaty in 1972, effectively preventing each side from deploying defensive systems, the world was engaged in a nuclear confrontation constantly threatening to escalate out of control. For this reason, I believe that – as with the Antarctic Treaty and the strategic nuclear arms control accords of the last three decades – the international community of space-faring nations will ultimately recognise the need for restraint and seek to develop some legal regime to preserve outer space as a non-militarised – or at least non-weaponised – realm. It is crucial that this happen as soon as possible.

Some have suggested that the basis for such a regime already exists. Indeed, international law – including efforts to control weapons – is no stranger to the space environment. The Outer Space Treaty, signed in 1967, bans the deployment of weapons of mass destruction in Earth orbit, or in orbit around any celestial body, or elsewhere in space. It also limits the use of the moon and other celestial bodies to peaceful purposes.

The Outer Space Treaty joined the Antarctic Treaty and later the 1972 Seabed Arms Control Treaty, which limits the deployment of weapons of mass destruction on the ocean floor and in the subsoil thereof, in a unique class of arms control agreements sometimes referred as "non-armament treaties". These agreements were intended to – and have been successful in – preventing the deployment of weapons in areas where they have not previously been present. Today, after more than three decades, space, the ocean floor and the Antarctic all remain free of weapons of mass destruction.

These non-armament treaties, it should be noted, are the natural forefathers of the contemporary nuclear-weapon-free zone treaties. Collectively, the Treaties of Tlatelolco (Latin America and the Caribbean), Raratonga (the South Pacific), Pelindaba (Africa) and Bangkok (Southeast Asia) have preserved the land area of the entire Southern Hemisphere as a region free of nuclear weapons, a most important contribution to international peace and security.

Some have suggested that a legal regime to prevent the weaponisation of space could be crafted simply by expanding or building upon the Outer Space Treaty. There may be some merit to this notion, especially considering the fact that the Treaty has more than 90 states parties. But the Outer Space Treaty is not the only legal arrangement affecting or related to the use of space. The ABM Treaty, as part of its ban on the deployment by the United States and Russia of national missile defense systems, prohibits the testing and deployment of space-based interceptors. As you will recall, the space-based elements of President Reagan's "Star Wars" programme in the 1980s were the core of Soviet objections to that program.

Importantly, the ABM Treaty also prohibits interference by either party of the other's monitoring satellites. Indeed, the need to protect satellites and other space assets used to ensure effective verification of compliance with a variety of arms control accords – assets which typically fall under the rubric of national technical means (NTM) of verification – is a crucial reason to seek a non-weaponised space environment. Such space assets have long been used to verify compliance with the Strategic Arms Reduction (START) Treaties as well as the Conventional Armed Forces in Europe (CFE) Treaty.

Ensuring non-interference with these assets is crucial to ensuring peace and security for the 21st century because of the central role they play in preserving confidence in the nuclear arms control and non-proliferation regime. President Reagan's devotion to the Russian adage of "trust but verify" was absolutely correct. Without space-based NTM, this would be virtually impossible – a reality that US and Soviet negotiators were keenly aware of during the START and CFE talks.

Such considerations apply not only in the bilateral US-Soviet context, but also to the broad range of multilateral arms control accords. For example, activities detected through space-based NTM can be used to trigger requests for onsite inspections pursuant to the Comprehensive Test Ban Treaty (CTBT) – once, of course, that treaty is brought into force. It is important to recall that suspicions Israel and South Africa may have conducted an atmospheric nuclear test in the South Atlantic during the late 1970s were driven by disputed readouts from an American *Vela* satellite.

At present, satellite imagery is regularly used to track activities that could reveal programmes to develop weapons of mass destruction in countries of concern around the world. These are crucial efforts that we must never allow to be disrupted, especially not with relatively simplistic weapons systems that could someday be deployed to counter military anti-satellite defense systems. Given the relentless progression of technological development, ensuring that these monitoring and verification measures are protected is a reality that can only be achieved through international law.

Active defences – that is, the deployment of devices intended to deflect, destroy or render unworkable offensive weapons – cannot by themselves be expected to provide adequate protection of space assets in the long term. Already today, states have developed tiny parasitic satellites that float through space and discreetly attach themselves to larger satellites. Once attached, their purpose is to hang around like barnacles on the underside of a boat, await instructions from remote operators on earth, and detonate on command when needed. And this is only the beginning of what is likely to be – if left unfettered – an inexorable progression in capabilities. Some way to defend against these

devices may very well be found, but our would-be attackers will certainly find ways to counter those defences. Some agreed legal regime predicated upon mutually beneficial and, of course, verifiable restraint must be developed.

The groundwork for a comprehensive treaty regime preventing the militarisation of outer space has been laid, and the importance of this objective is clear. Much work remains, but the creation of a space regime, under which the international community decisively enshrines space as a peaceful environment, is the only thoroughgoing alternative to a weaponised space free-for-all in which the United States and the rest of the world is rendered forever vulnerable to the vagaries and fluctuations of technological development.

Notes and References

1. Michael Krepon, "Lost in Space: The Misguided Drive Toward Antisatellite Weapons," *Foreign Affairs*, Vol.80, No. 3 (May/June 2001), p. 7.
2. Ibid.

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FOSTERING NUCLEAR TRANSPARENCY IN SOUTH ASIA THROUGH COOPERATIVE REMOTE SENSING PROJECTS

By Gaurav Rajen

Introduction

Cooperative projects using commercial satellite imagery to study nuclear facilities can provide a non-intrusive beginning in greater nuclear transparency between India and Pakistan. The aim of this paper is to investigate cooperative framework agreements involving India and Pakistan that could form the basis for such projects.

Thermal signatures of reactor effluents can be used to determine whether reactors are operating or not. A determination of whether a facility is operating has obvious relevance to verifying that a facility that has been shut down has not recommenced operations. This could be of importance if India and Pakistan ever shut down reprocessing facilities as a part of regional or international agreements. Estimating the quantity of fissile materials being produced in a reactor is a prerequisite to developing fissile materials accounting systems. As officials gain confidence and trust through an initial remote sensing experiment, they could steadily increase the intrusiveness of the cooperative monitoring and begin to share data from the installations being studied. Eventually, shared data on the temperature rise of the reactor coolants and the radioactivity of the spent fuel produced could allow more exact measurements of the quantities of fissile materials being generated. More intrusive monitoring schemes would be based on systems developed by the International Atomic Energy Agency (IAEA) using thermal-hydraulic reactor power monitors to confirm the absence of unrecorded production of plutonium at two large research reactors in the Republic of Korea and Indonesia.[1]

Cooperative monitoring projects of the sort being proposed here require existing agreements to provide a framework for implementation. The next section presents information on several such agreements.

Frameworks for Cooperative Satellite-Based Remote Sensing and Environmental Studies

The United Nations, under the auspices of its Office for Outer Space Affairs (UNOOSA) in Vienna, has elaborated a set of principles relating