Militarization of outer space: present and future challenges from the international legal perspective

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The militarization of outer space has been a concern of the United Nations since the launching of the first satellite, Sputnik I, by the Soviet Union in 1957. Almost immediately after that, the UN established the UN Committee for the Peaceful Uses of Outer Space (UNCOPUOS). It elaborated – amongst others - the “Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies” in 1967 which emphasizes the common interest of mankind in the exploration and use of outer space for peaceful purposes.

On the other hand, outer space has always been used for military purposes. Thus, the difference between “peaceful” and “military” purposes plays an important role in the legal framework of the use of outer space.

In the following, I will analyse the current situation as regards the actual or potential militarisation of outer space.

I will start with

1.) The use of outer space for military purposes
To what extent is outer space already used for military purposes?
Have there been actual plans in this respect?
What are current plans about the military use of outer space?

2.) The current legal framework
What is the current international legal framework with regard to the military use of outer space? Here, of course, the OST and the UN Charter play the most important role.

3.) The Prevention of an Arms Race in Outer Space
What kind of initiatives are there to prevent that outer space becomes a battlefield in the future?

1. The use of outer space for military purposes
Since the beginning of the space age, outer space has been used for military purposes. However, this military use was limited to Earth observation and other support activities by satellites, such as navigation, communication and meteorology.
This is regarded as a “passive, non-destructive use” of outer space for military purposes.
On the other hand, there is, of course, the concern, that outer space could also be used for military applications of an "active, destructive capacity". Such a use would represent an actual and physical threat to objects on Earth and in space.

At the moment, there are no such active, destructive capacities placed in outer space. But many States are concerned that such some States have plans to use outer space also for such active, destructive military applications.

What are the possible “active and destructive” military uses?

“Space weapons”
- Earth-to-Space
- Space-to-Earth
- Space-to-Space

Images: Passive, non-destructive military uses – dual uses:
(1) shows a US Milstar satellite for military communications (see http://en.wikipedia.org/wiki/Milstar)
(2) shows the civilian ESA Envisat satellite. Its data is also relevant for military applications. Just as well a high-resolution civilian Ikonos, Orbview or SPOT satellite (for example) could be shown. Military services are among the largest purchasers of EO data from civilian data providers (e.g. the French SPOT Image).
(3) shows a US GPS satellite
(4) shows an NPOESS satellite. US had in the past military and civilian weather satellites. The attempt to merge the two systems into a single dual use system failed due to organizational difficulties.

Active, destructive military uses – space weapons
- Earth-to-Space
  - Ground-based or ground/air launched anti-satellite weapons (ASAT) or anti-ballistic missile systems (ABM)
    - ground-based lasers (tracking, blinding)
  There are different types of lasers: Chemical Lasers, X-Ray Lasers;
  - missiles tipped with kinetic kill vehicles (destruction by intentional collision)
- Space-to-Earth
  - Kinetic Bombardment ("Rods from God")
See http://de.wikipedia.org/wiki/Weltraumwaffe; Kinetic bombardment with conventional weapons (e.g. Wolframstäbe) is still under research

- **Fractional Orbital Bombardment System (FOBS)**

  FOBS were tested by the Soviets in the 60ies; they would have been launched into Earth orbit in case of a conflict and then be directed to the targets on Earth. However, they are forbidden by the OST, as a nuclear tipping is stationed at least temporarily in orbit; they are not in use any longer see e.g. http://en.wikipedia.org/wiki/Fractional_Orbital_Bombardment_System

**Space to Space Weapons**

Space to space was planned primarily under the Strategic Defence Initiative (SDI) of US President Reagan in 1980ies; currently – at least officially – this is not the case; However, it has to be remembered that any satellite – even a small satellite – can represent a space-to-space weapon, if it is used accordingly, namely directed towards a target in space on purpose in order to destroy it …

- **Space based lasers**
- **Space based kinetic energetic weapons (KEWs) (multiple interceptor rockets, brilliant pebbles)**

**Examples of Space Weapons – 1960’s and 1970’s**

(1) **Dynasoar** would have carried cameras for reconnaissance, but it could also have carried active weapons systems. It was cancelled after several years of development, but much of the work was later used in the development of the Space Shuttle.

(2) This is supposedly a picture of a **Soviet ASAT satellite system**. The Soviets had a system stationed in orbit for a few years. However, it may be more useful to launch an ASAT from ground to be able to reach a wider range of different orbits/targets.

(3) The **Soviet Almaz Military stations**, see: http://en.wikipedia.org/wiki/Almaz

  The US was also planning to have a manned orbital space station, called "**Manned Orbital Laboratory**". Military astronauts were selected and trained and hardware was built, but while the Soviets launched several Almaz stations, the US programme was eventually cancelled. see: http://en.wikipedia.org/wiki/Manned_Orbital_Laboratory

(4) A "**self-defence**" **gun** developed for the Almaz station. It was supposedly fired in space for test purposes. (http://www.russianspaceweb.com/almaz_ops2.html)
Examples of Space Weapons – 1980’s

(1) **The SDI-Programme** of US President Reagan: There are two problems of KEWs in space: (1) the high speed of space objects (7.8 km/s for satellites in Near Earth Orbit) represents a big difficulty for KEWs; (2) they are auto-routing and can therefore be easily misled, for example, by dummies.

The SDI-Programme therefore included the idea to place hundreds or even thousands of such auto-routing rockets in outer space.

(2) **KEWs**: But also the SId-successor project “GPALS” (Global Protection Against Limited Strikes” (1991) and the National Missile Defence Act of 1999 of President Clinton included KEW in its **Ballistic Missile Defence (BMD)-System**. The focus is to destroy ICBMs in their on the “midcourse phase” in outer space. (ICBMs have three phases: boost phase, midcourse and terminal phase.) The space segment should be covered by interceptor cannons, known as “brilliant pebbles”. 700 to 1000 of them should be stationed in Earth orbits at an altitude of 200 to 400 km.

(3) **Lasers**:

The X-Ray lasers would benefit from a positioning in outer space – in contrast to being ground based or air based – as there would not be a deviation of the laser because of gravitation or atmosphere.

The chemical long-range lasers need – because of the quality of the laser – a dislocation in outer space.

(4) **Sovjet Polyus 80t Satellite Testbed for the Soviet “SDI” Programme**

(failed on launch)

**United States ASAT Capability – 1980s**

(1) **Air-launched Vought ASM-135 Anti-Satellite Missile (ASAT)**

  - Developed in response to similar developments in the USSR
  - Tested on 13 September 1985, destroying the „P78-1 SolWind“ Solar Observatory in a 555 km orbit

(2) **Homing “Kill Vehicle” (= KEW)**

1984, the U.S. Army demonstrated a successful kinetic energy kill vehicle in the **Homing Overlay Experiment**. The kill vehicle in that experiment weighed over 200 kilograms and was about the size of a refrigerator (= rather large and heavy, rocket-launched)
Chinese Anti-Satellite Missile Test – January 2007

• 11 January 2007: A kinetic kill vehicle launched by a medium range ballistic missile destroyed the inactive Feng Yun 1C (FY-1C) polar orbiting meteorological satellite at approx. 860km altitude.
• Resulted in considerable increase in the volume of human-made space debris, forcing several active satellites to take evasive maneuvers

Controlled De-Orbiting of US193 – February 2008

• To disable the out-of-control US193 satellite
• Used an SM3 interceptor, deployed on Aegis-class ships worldwide
• Interception of US193 on 21. February 2008 at an altitude of 247 km

The developments of space weapons have raised the concern of the international community that outer space may be included in national military efforts of States and become a battlefield in the future. It is therefore necessary to look more closely to the rules of international law governing space activities.

2. The current legal framework

The military use of outer space by passive, non-destructive means was already generally known at the time of the conclusion of the OST. Only a few States have protested against them and asked for a general prohibition of all military uses of outer space including “dual use applications” of satellites. This included for some years also the SU which considered the use of reconnaissance satellites as espionage and in contradiction with general law. However, this position has never been very credible as also the SU used its satellites also for these purposes.

In the framework of arms limitation and arms reductions treaties, such as the ABM or the START treaties – including the latest START Treaty of 8 April 2010 –, such uses have been even explicitly recognized and protected as “national technical means of verification”. Today, one can say that the use of satellites for – also – military purposes is generally accepted by the international community. It is estimated that today appr. 70% of satellite launches are dedicated to such uses. In the 1970ies, this portion amounted to approximately 60%.
It is interesting to note that, in outer space, a distinction has been drawn – from the beginning - between two different types of military uses:

1. the passive, non-destructive use of outer space for military purposes
2. the active, destructive use of outer space for military purposes

The distinction between passive and active military uses of outer space was also maintained at the UNISPACE II conference in Vienna in 1982. There, three categories of military uses of outer space were distinguished:

1. support systems, i.e. satellites for communication, meteorology and navigation which can also be used for civil purposes; they were not mentioned as particularly positive or negative;
2. military surveillance systems, like high resolution cameras, electronic intelligence systems, radars, early warning systems and nuclear test detectors; some countries wanted to include them in a general ban of military activities in outer space, but others emphasized their stabilising effect for verification of arms control treaties as “national technical means of verification”
3. space based weapons, in particular ASAT weapons, laser and particle beams weapons, which the conference included in its recommendation to the General Assembly, in particular to its disarmament committee, to urgently undertake the necessary steps to negotiate a multilateral treaty on arms prohibition and control for outer space.

This differentiation is quite original.
It is not exactly in line with International Humanitarian Law, where support activities – such as observation and communication – for military purposes are clearly regarded as “military”. The most striking difference is the importance of marking such military devices.

By contrast, in outer space, “spy satellites” have never been particularly marked, even if they have been registered with the UN register of space objects. They just contain under the rubric “general function of the object”, phrases like “Earth observation” or “research”. The reason why one would nevertheless know that they are military satellites is that as the “appropriate designator” sometime appears the “Ministry of Defense”.

The IAEA Statute also uses the terms “peaceful purposes” and “military purposes” but does not define them. The Agency shall support the peaceful use of atomic energy and ensure that it is not used to further “any military purpose”.

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In this context, the explosion of nuclear devices has been developed as the decisive factor. It would be difficult to argue that the development of a device which involved the same technology and characteristics as did a weapon does not further a military purpose. This kind of a definition came with the NPT 1968 which made clear that the technology and fundamental characteristics of nuclear weapons and other nuclear explosive devices, whatever their denomination, were the same. So, the NPT prohibits the transfer of “nuclear weapons or other nuclear explosive devices”. With this exception, all States retain the right to develop research, production and use of nuclear energy for “peaceful purposes” (Art. IV).

What does the Outer Space Treaty say about “peaceful purposes”?

The most important principles in this respect are contained in the preamble, in Art. I and Art. III.

■ (Preamble OST)
The States Parties to this Treaty ....“Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes, ...”

■ Art. I OST

The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

■ Art. III OST

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

The wording of the treaty speaks of “common interest of all mankind”. This should be achieved – inter alia – in accordance with international law, including the UN charter, in the interest of maintaining international peace and security (applying a systematic and contextual interpretation of the Treaty as mandated by Art. 31 of the VCLT)
This leaves two clear options: the use of military force on the basis of a mandate of the UN Security Council according to Art. 42 of the Charter and in the exercise of the right to self-defence in accordance with Art. 51.

It follows that these kind of military uses of outer space are not prohibited by the term “peaceful”.

However, there are two main questions following from this:

1. **Will all military activities in outer space which are to be used in a UN mandate or for defence-purposes be in accordance with international space law?**
2. **Is the protection of passive military support systems by military means in conformity with international space law?**

The increasing use of passive military devices for support activities makes the respective States more vulnerable. This leads to an increasing need to safeguard those devices and protect them also by military means.

The US Space Policy of 2006 is a clear example of this.

It says: “The US considers space capabilities – including the ground and space segments and supporting links – vital to its national interests. Consistent with this policy, the US will: preserve its rights, capabilities, and freedom of actions in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; respond to interference; and to deny, if necessary, adversaries the use of space capabilities to US national interests.”

It follows that with regard to the threat of weaponisation of outer space, we must also look to the international framework as it regulates the deployment and use of weapons in outer space at all.

Here we address the issue of arms control in outer space.

### 3. Prevention of an Arms Race in Outer Space

In respect of the banning of weapons from outer space, Art. IV, para 1 OST says:

**Para 1: States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.**

This provision is generally regarded as a “partial” demilitarisation of outer space.

It prohibits the deployment of weapons of mass destruction.
However, the placement of conventional weapons in outer space is not prohibited. Nor is the use of weapons of mass destruction prohibited, if the weapon is placed on Earth.

With regard to the Moon and Celestial Bodies, the demilitarisation is extended further in para 2. It prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies.

Generally, these provisions are regarded as inadequate to prevent the weaponisation of outer space.

This was the reason why, in 1981, Italy on behalf of the Western European and Other States group introduced a draft resolution to the United Nations entitled “Prevention of an Arms Race in Outer Space”.

Against the background of the development of ASAT-Tests of the US and the USSR, the resolution called on the Committee on Disarmament (today the Conference on Disarmament, or CD) to “consider as a matter of priority the question of negotiating effective and verifiable agreements aimed at preventing an arms race in outer space.”

It demanded to negotiate a verifiable agreement “to prohibit anti-satellite systems.”

The Resolution demanded from all States “to prevent an arms race in outer space … and to prevent outer space from becoming an area of military confrontation” and held that such use would be “contrary to the spirit of the [Outer Space Treaty]”.

This was the beginning of a process called “PAROS”. It includes annual resolutions of the GA which reiterate the need for a comprehensive agreement to prevent weaponisation of outer space. The most recent GA Resolution is from 12 of January 2010.

In 1985, the CD created an Ad hoc Committee on PAROS. The definition of the mandate, however, turned out to be difficult. Most of the States wanted to start concrete negotiations about a prohibition of space weapons.

The US objected such a mandate. It was of the opinion that the UN Charter, existing multilateral treaties in outer space, bilateral and multilateral arms control regimes together with customary international law already provided an equitable, practical and extensive legal system for ensuring the use of outer space for peaceful purposes.

In 1995, the negotiations came to a complete standstill, primarily because of the linkage with other disarmament issues (eg China and Pakistan who were against a Fissile Material
Cut-Off Treaty without including also existing stocks, and with “Transparency in Armaments”).

Since then, China and Russia have been trying to advance negotiations on a treaty preventing the weaponisation of outer space with a number of proposals. One comprehensive draft was submitted in 2002, the most recent draft is of February 2008, namely the “Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects”. This treaty aims not only at banning space weapons but also to prohibit the threat or use of force against space objects which would ban ASAT and ABM weapons, either ground based or mounted on aircraft. So far, however, no consensus in the CD about this issue is foreseeable. The US position is that it is willing to discuss the issue at the CD, but not to negotiate a treaty on it. However, there is a significant interest among scholars and practitioners also within the US who would consider such a prohibition also beneficial to the US and enhancing its national security situation.

4. Conclusion

The weaponisation of outer space and an arms race in outer space are topical issues. The process of a treaty is at its course but not yet very likely to be achieved soon. In the meantime, other ways forward have been explored. The tendency seems to go into the direction of non-binding international instruments. In recent years, a number of “Code of Conducts” have been developed in order to increase transparency, consultation and cooperation. States seem to prefer such instruments to which they subscribe on a voluntary basis. Their commitment to follow the rules contained therein seem to be dictated very much by self interest. Because, as one US scientist Laura Grego has recently put it:

“Even from a strictly military utility point of view, there is very little to be gained and much to be lost from introducing weapons into space.”

Because: “No foreseeable space based technologies would allow one country to prevent another from deploying space weapons…”