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TAB

Military use of space and possibilities for arms control in space

Summary



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TAB

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SUMMARY

Space has long been an area of deployment for military systems. Some 170 purely military satellites orbit the earth, performing functions for the armed forces like surveillance, early warning, communication and control. There are signs now that a threshold is being crossed in military use of space – in future weapons systems could be further developed to the point of deployment whose stationing on earth or in space could initiate an arms race.

On the initiative of the Subcommittee for Disarmament, Arms Control and Nonproliferation, the present TAB report uses space armament as an example to analyse the interaction between technological forces and political and military goals and paradigms. From the perspective of arms control policy, the report analysis the possibilities for stopping or containing developments which could evolve into a hazard to the security and stability of the international order.

TECHNOLOGICAL FORCES, CHALLENGE OF ARMS CONTROL

The great relevance of technology for defence policy and the role of modern armed forces is undisputed. New technologies make possible improvement in quality and force of weapon systems and units and open up novel options for political and military action. The use of improved and expanded technological options in the next few years can be expected to have decisive impact on the role and options for action of the military, the stability of the international order and ultimately warfare.

Arms control policy is facing these new challenges and must respond to structural changes in the international system and the pace of technology in the Information Age. For this reason and also because of the changing defence policy environment, the agenda for a preventive arms control policy should be extended as early as possible to include evaluation and design of research, development and testing with military relevance and their consequences.

This also applies to scientific and technological developments in the field of military use of space. Not least because of new technological possibilities, space is increasingly being accorded a key function from the point of view of military planners and of the security policy of the leading military powers. Global expenditure on military R&D is growing for concepts, technologies and systems. The use of space for security needs is becoming a central element in strategies,



doctrines and planning. The USA is the most important driving force behind this trend. Space is increasingly regarded there as a central civil and military resource with the highest priority. Its military uses opens up numerous options for gaining and securing information superiority, prevention, deterrence and waging war which the military and politicians perceive as attractive.

Of the developments listed, the focus is particularly on those which lead to the »weaponisation« of space through relatively passive use – for systems of surveillance, communication and control. This addresses particularly the option of stationing weapons systems for use to, in and from space. From the perspective of arms control policy, this trend poses a problem, as it emerges that existing space law instruments and existing arms control agreements are unsuitable for slowing further militarisation of space, let alone preventing it.

THREATS AND CAPABILITIES: THE DOCTRINE OF »SPACE CONTROL«

Since the end of the face-off between the blocs and the Cold War, there has been a decisive change in the threat facing western security policy. The issue is no longer one of massive threat from a clearly identifiable competitor, but rather an accumulation of diffuse risks which are difficult to predict. Possible future crises and conflicts are ethno-political conflicts or conflicts over resources in specific regions, the threat and use of weapons of mass destruction by statal and substatal actors, and the danger of international terrorism, which has strongly influenced security policy debates since 11 September 2001. Experts believe that there is also a threat from »information operations« (»cyberwar«). Another threat which is emphasised is the proliferation of rockets, other launch platforms and satellites. At the beginning of 2001 US Defence Secretary Donald Rumsfeld cited »missiles, terrorism and information warfare« in a single inter-related context.

As the only remaining superpower, the USA feels particularly subject to these risks, and also challenged to respond to them at all levels. Through its new security policy concepts and goals, and through its actions it is accordingly determining the content and pace of new developments which the other states feel are confronting them.

Since around the mid-90s, the key strategic US documents have increasingly been focusing on space in the discourse on military threats and capabilities. As an »area of responsibility«, space already represents a civil and military resource which is vulnerable to and threatened by hostile actors. However, space also

represents a medium which offers interesting military opportunities for taking protective measures, achieving deterrence, global information superiority and military superiority in and through space.

The report of the Space Commission set up by the Administration reached the following conclusions in 2001 based on its threat assessment:

- > The USA is more dependent than any other country on the use of space. At the same time, its space systems are vulnerable.
- > Countries hostile to the USA possess or are obtaining the means to disrupt or destroy US space systems.
- > The USA accordingly presents an attractive target for a »space Pearl Harbor«.

Closely linked with the theme of the military significance of space is defence against attacking ballistic missiles. The number of states with long-range missiles or corresponding programmes has not changed decisively in the last 20 years. However, the focus has shifted to states like North Korea, Iran and Iraq which are objects of concern. Not least because of these, the assessment in US policy has become that a threat from ballistic missiles is possible in future to the USA and its inhabitants and is already present to US troops and interests abroad (together with its allies and friends). The events of 11 September 2001 are not officially seen as proving that the threat of international terrorism specifically cannot be averted with anti-missile defence systems. On the contrary, together with reduced offensive nuclear potential and improved conventional capabilities, missile defence is now an integral component of a new triad for deterrence and the use of force if deterrence fails.

Even in 2001, the high-level commission headed by the present Defence Secretary Donald Rumsfeld had classified US national security interests in space as national top priorities and recommended that the USA should develop the means to deter hostile attacks in and from space or defend against these (»space control«). These means also included weapons stationed in space. Plans and statements by the Bush Administration build on this, showing increased interest in the military use of space. Achieving »space superiority« is both a goal and a key aspect in the transformation of the US armed forces.

Recent discussions and activities are strong indications that in the USA the stage is being set for increased military use of space in future. After terminating the ABM agreement there is now scope to achieve the goal of transforming the US military in space as well. As a result, financial, technological and organisational efforts are being made in order to exploit, expand and protect existing possi-



bilities and capabilities. In addition, the necessary technological capabilities are to be established in the national interest for both defensive and offensive use of space as a means of waging war. A high-ranking official expressed this new orientation in a nutshell: »I believe that weapons will go into space. It's a question of time. And we need to be at the forefront of that.«

THE TECHNOLOGICAL BASIS FOR KEY MILITARY FUNCTIONS

From the perspective of politicians and the military, new technologies play the key role in achieving the desired goals and military capabilities. Specifically, the »space control capabilities« and increasingly the »space force application capabilities« are based on the assumption of advanced technologies and systems. For numerous military applications, increased research, development and demonstration activities are accordingly being implemented to create this basis. structures and keynotes are as follows:

A look at US military R&D planning helps form a picture of the promotion and objectives of the »enabling technologies«. Briefly summarised along the central »mission areas«, these structures and keynotes are as follows:

- > For the space shuttle, there are efforts to improve propulsion technology. Closely associated with this are further efforts to develop low-cost, low-maintenance reusable shuttles, to ensure rapid and flexible transport of payloads into space. A remote goal is the »space plane«, which can be operated in the same functional way as an aircraft as the situation requires. Concepts for a »transatmospheric aircraft« are being pursued with the aim of acquiring a means to maintain space superiority and to improve the global presence by rapid deployment from space at any point in the world.
- > For the further improvement of satellite operations, two keynotes are propulsion technologies and fuels. A striking trend is the development of small satellites. Highly-maneuvrable microsattellites or service robots are opening up new possibilities for military deployment in combating foreign satellites.
- > Satellites and other systems in space are support systems for controlling global military deployments on earth, and potentially also for the application of force in and from space. Improving their diverse functions, such as early warning, surveillance, guidance and communication or environmental monitoring was the aim inter alia of establishing global satellite systems such as the US Global Positioning System, and a network of antenna stations for controlling and managing the military's own satellites. Work is in progress on improved sensors

for satellites to improve the early warning system and track missiles.

- > Highly important are research and development efforts to provide usable weapons systems for use in space (such as »killer satellites«), from space (such as space-based laser weapons or kinetic energy weapons for striking targets on earth) and to space (such as air-based laser weapons to combat satellites).

WEAPONS SYSTEMS FOR SPACE

Militarised space has long been a fact. A whole armada of satellites for purposes such as navigation, surveillance and communication is now in orbit. Specifically, they perform the function of »force multipliers« by increasing the efficiency of military operations on land, sea and air (»space force enhancement«). However, the USA has now set the stage for further advances: the aim is to limit the capabilities of potential opponents to use space-based systems for military action (»counter space«) and to develop US capabilities to threaten and apply force from space against terrestrial goals. The future potential of space is to be fully utilised by providing a range of »force application capabilities in, from and through space«.

What is the current state of space armament? Leaving aside unconfirmed reports of Chinese parasite microsattellites, there are currently no implemented space-based weapons systems known. Space-based laser weapons and space-based missiles (both for the purposes of missile defence) are just as much in the research and development stage as military microsattellites.

The USA and Russia have long had technological capabilities to disrupt and possibly to destroy satellites from the ground (or air), and the technologies are being continuously upgraded. The Peoples Republic of China is also currently working on acquiring these capabilities. Besides lasers and high-power microwave systems, these include primarily the technological competence of the USA and Russia in the form of air-based anti-satellite systems.

Any state with nuclear weapons is technologically in a position to use a high-atmosphere nuclear explosion to damage satellites (including their own) in a number of orbits. Further proliferation of ballistic missiles and nuclear weapons could increase the number of states and substatal actors with this capability in the next few years.



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Attacks against the terrestrial part by satellite systems (conventional, electronic) offer yet another possibility for disrupting or damaging these, which is available to far more conceivable actors, as it involves less technological sophistication.

Besides these existing options for use of weapons in, from and through space, additional options can be expected in the near future. How might the further course of development look?

Considering the strategic thinking and goals in the US planning documents and the technologies discussed and pursued to achieve these goals, the following hypotheses can be formulated and presented for discussion on the further technological development of the weapons in question.

- > There is much to suggest that microsattellites and service robots for use against other satellites may be a first step towards achieving the goal of comprehensive »space control«.
- > Air-based laser weapons against (tactical) ballistic missiles are being developed on an ongoing basis. This could improve their suitability for use against space targets to the point where an air-based laser could become an efficient option.
- > Development of ground-based kill vehicles for use against satellites is relatively far advanced. Due to further R&D activities in connection with missile defence projects, these developments are being accelerated, so that anti-satellite systems with kinetic energy (KE) warheads may soon be ready for deployment.
- > Ground-based laser weapons for disruption are already available. Lasers to damage or destroy space targets are options which can be expected to be viable in the medium term.
- > Ground-based high-power microwave weapons to disrupt satellites are capable of deployment in the short to medium term.
- > Space-based laser weapons to destroy ballistic missiles (even before the end of firing) are currently being pursued with reduced effort, the deadlines for tests and stationing have been pushed well back.
- > Space-based KE concepts for use against intercontinental ballistic missiles (in the launch phase) are being pursued further, despite the major technical problems to be solved.

From the arms control policy point of view, it is a fact that the military options listed here are not prohibited in any phase of development up to and including deployment.

Numerous states see this potential expansion of military space systems as a danger to the stability of the international order. The concern is that a global spiral

of measures and countermeasures could set off a general arms race. The question that arises here is whether and how arms control policy could prevent these possible developments.

LEGAL FRAMEWORK AND POLITICAL CONCEPTS FOR ARMS CONTROL

International arms control law and prevailing arms control agreements do not constrain the military use of space. As an overview, we can say:

Currently, stationing nuclear weapons and other weapons of mass destruction in the earth's orbit or on the moon etc, establishing military bases, testing weapons and manoeuvring on celestial bodies etc, any nuclear testing in space and military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects. Existing agreements accordingly do impose certain restrictions on the military use of space, but there are substantial gaps.

The current regime permits at least the use of military personnel for civilian purposes, the stationing and use of satellites for surveillance, communication and navigation for military purposes, the stationing and defensive use of conventional weapons, and overflying by missiles and ASAT weapons (except for nuclear weapons) stationed in space. Since termination of the ABM agreement, tests and stationing of missile defence systems with non-nuclear space components are also permitted. Finally, there are no rules which set narrow limits to the use of space weapons.

Although the great majority of states have expressed concern for years about the danger of an arms race in space, there has been no further development of the legal regulatory structure for many years. One reason for this is that differences of opinion between the USA and China have blocked the Geneva Conference on Disarmament (CD) since the second half of the 90s. This blockade situation has become still more rigid recently. While the current US Administration emphasises that in its view the existing space arrangements are sufficient, China has made it clear that negotiations at the CD on other issues – and specifically on a ban on the production of fissile material for weapons purposes (FMCT – »Fissile Material Cut-Off«) – are dependent on more intensive work on the problem of a threatening arms race in space. For this purpose China presented with Russia a joint proposal to the CD on the question of space armament in May 2002.



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However, the Sino-Russian proposal and further initiatives by other actors at CD have also shown that recently there has been a move away from arms control policy maximal concepts. De facto, China, in cooperation with Russia, is taking more account of the US position, and is accordingly backing compromise solutions. China and Russia are no longer pressing for demands which would not only prevent the stationing of weapons in space («weaponisation») but also a missile defence system with space components, possibly because of their own interests in missile defence systems. The current Sino-Russian position focuses on regulation of space-based weapons through a ban on stationing. There is no more talk of regulating tests in space or terrestrial weapons which can reach space. All nations would accordingly be free to develop and test space-based weapons to the point of deployment. In addition, deployment of a missile defence system with space components would be possible, provided that these components are not weapons (e.g. sensors).

Despite these signs of a closing of the gap, agreement on the core problems of space arms control (stationing weapons in space, and the ASAT issue) is still remote. Currently, the main issues are exploring ways to overcome the blockade and critically reviewing options for regulation. The large number of possible approaches to regulation which have been discussed can be roughly divided into two groups: Establishing bans on (space) weapons and confidence and security-building measures for space (CSBM).

The most important categories in establishing bans on weapons are space-based weapons and ASAT systems. In addition, there is regulation of specific zones in space where e.g. weapons could be banned above a certain altitude.

CSBM may help (among other things) to increase the transparency of space activities, to prevent aggressive actions and accidents or to promote cooperation in civil space travel. Such confidence and security building measures for space generally also include concepts which aim at establishing »Rules of the Road« for this area, or a »Code of Conduct« for space activities. Finally, there are other possibilities for action, such as unilateral waivers of space weapons by one or more states. Measures like this would have the aim of setting the issue of space armament permanently on the political agenda, and so overcoming the current standstill.

ARMS CONTROL FOR SPACE – »MISSION IMPOSSIBLE«?

In view of the entrenched front between the USA and the other actors, it may seem utopic to discuss the advantages and disadvantages of possible arms control policy options for space. However, experience teaches that political configurations are in a constant state of change at both national and international level. Efforts to achieve initial small advances should accordingly be continued.

From a pragmatic point of view, the chances of implementation and the attainable goals look more or less as follows:

- > If we focus in the current situation on the priority of breaking up the existing blockade and bringing some movement into embedded positions, there is the option of initiating a process of discussion or negotiation without the USA (and other states not prepared to negotiate). This process could take place outside the CD, involving actors in civil society (such as NGOs active in this field). If the USA and other nations are kept away from negotiations, extensive agreement should in fact be easier to achieve. This would, however, then have less importance for arms control policy than an agreement involving all the major space powers. Such a process is accordingly only worthwhile if there is sound reason to hope that the USA (and any other states not interested in negotiation) would be integrated into it during or after conclusion of the negotiations.
- > Another option would aim to overcome the standstill by initiating a process of discussion or negotiation exclusively on confidence and security-building measures (CSBM). As the USA has indicated its willingness to engage in talks on these issues, this approach would have the advantage that the decisive actor was already on board. The price of this would be initially leaving aside discussion of substantial arms control measures. Such an approach to political action would at first be concerned with goals capable of achievement in the short term, with the aim of creating a more favourable climate for negotiations with more relevance for arms control policy.
- > The most difficult option to achieve is the third: here, the goal would be to achieve – with the participation of as many states as possible, including the USA – regulation of offensive and aggressive space weapons, starting at the level of a ban on stationing. The chance of integrating the USA in such a process currently seems extremely small and the danger of reaching deadlock in negotiations seems great. However, the attempt to reach agreement with the USA at such a level (admittedly lower) on an arrangement including a substantial ban would be worth intensive diplomatic and civil efforts. The results of such a process of negotiation would be more valuable for arms control policy than a



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comprehensive agreement without the USA or confidence and security building measures which ignored the core problems.

Developments in the last few years and the prospects for the immediate future do not justify any great hopes for a contemporary arms control policy for space. New technological developments and political initiatives on the one hand make this an extremely important field for preventive arms control policy action, and a majority of the international community and many NGOs see it in these terms. On the other hand, there is no real progress being made in tackling this area politically. Overcoming the current blockade in this area is accordingly the most important political challenge. In this situation, even small advances (such as negotiating individual confidence building measures for space) would be a worthwhile goal.

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