

GLOBAL COMMONS

THE PROTECTION OF GLOBAL PUBLIC GOODS AS A CHALLENGE FOR GERMAN SECURITY POLICY

Julian Voje

“Germany, whose economic prosperity depends on access to raw materials, goods and ideas, has an elementary interest in peaceful competition of thoughts and views, an open world trade system and unrestricted transportation routes.” This quotation from the 2006 White Paper on security policy illustrates how closely Germany’s interests are linked to the globalised economy.¹ Free access to resources and the free exchange of goods and knowledge are key pillars of Germany’s foreign and security policy. In today’s closely networked world, in which almost a quarter of jobs in Germany depend on exports,² an open world trade system and free transport routes are essential to continuing prosperity – in Germany and around the world. With increasing globalisation of markets, even geographically remote conflicts pose challenges for Germany’s security policy.

The “interest in peaceful competition of thoughts and views, an open world trade system and unrestricted transportation routes” cited in the White Paper also reveals the Achilles heel of globalisation: all goods and knowledge made possible through today’s interconnected markets must traverse unprotected transport routes – the global commons. These comprise the four “public spaces”: the



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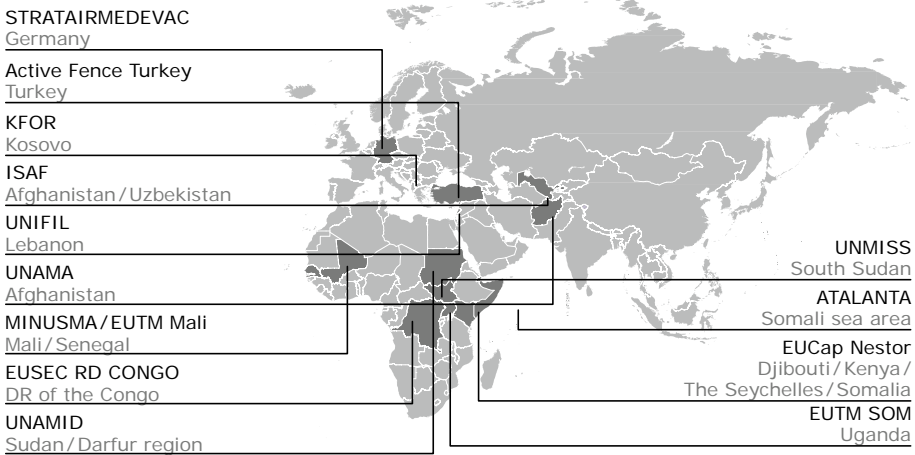
1 | Quoted from: Federal Ministry of Defence (Bundesministerium der Verteidigung, BMVg), *Weißbuch zur Sicherheitspolitik Deutschlands und zur Zukunft der Bundeswehr*, Berlin, 2006, 23, http://bmvg.de/resource/resource/MzEzNTM4MmUzMzMyMmUzMTM1MzMyZTM2MzEzMDMwMzAzMDMwMzAzMDY3NmE2ODY1NmQ2NzY4MzEyMDIwMjAyMDIw/WB_2006_dt_mB.pdf (accessed 10 Sep 2013).

2 | Cf. Bundeszentrale für politische Bildung (bpb), “Zahlen und Fakten. Globalisierung. Außenhandel”, 9 Sep 2013, <http://bpb.de/nachschlagen/zahlen-und-fakten/globalisierung/52842/aussenhandel> (accessed 1 Oct 2013).

high seas, airspace, outer space and cyberspace. They not only make transport possible but are also a resource in themselves. They are therefore also referred to as “global public goods” or “global commons”,³ although they are spaces and not goods that can be traded on the markets. A common feature of all the global commons is that they are not under the control either of any national organisation or of an international body such as the United Nations. Yet many countries throughout the world rely on free access to the global commons. This is in fact their greatest point of weakness, because as public goods they may in times of worldwide security challenges become the target of terrorists, criminals or other perpetrators of violence.

Fig. 1

International deployments of the Bundeswehr



Source: Bundeswehr, as at Jul 2013.

3 | See e.g.: Bundesministerium für Landesverteidigung und Sport Österreichs (BMLV), Österreichs Bundesheer, “Forum Alpbach: Mehr Sicherheit durch gerechte Nutzung von globalen Gütern”, <http://www.bmlv.gv.at/cms/artikel.php?ID=5748> (accessed 5 Oct 2013); Josef Wieland, “Globale Standards als globale Öffentliche Güter”, in: Matthias Maring (ed.), *Globale öffentliche Güter in interdisziplinären Perspektiven*, Karlsruhe, 2012, 235-251, here: 242.

THE GLOBALISATION OF SECURITY POLICY

The world has changed rapidly since the end of the Cold War. Technical progress and a globalised economy have created the “flat world” described by Thomas Friedman.⁴ Geographical distances are now losing their significance. This is beneficial for the transfer of goods and knowledge. For example, a smartphone may be conceived and patented in the USA, but its components are made in South Korea, Japan and other countries, and at the end of the chain it leaves China, where the parts are assembled, to be reimported into the USA.⁵ Thanks to the Internet, news is spread around the world in seconds; books are digitalised and can be accessed (free) via the World Wide Web, no matter where they are physically located.

Security policy, too, is affected by these changes. After the end of the East-West confrontation, globalisation did not bring in its train the “end of history” envisaged by Francis Fukuyama,⁶ in which peace prevails in the world because conflict is brought to an end by the spread of liberal values and democracy. Instead, the cessation of the Cold War resulted in the globalisation of security policy. Rather than being dominated by the stand-off between two heavily-armed blocs, the security scene would from now on be characterised by a host of geographically dispersed disputes. It was also becoming clear even then that the terrorism that was emerging, and hence private actors, would be a major determinant of future security policy. This globalisation of security policy did not pass Germany by. Since reunification the country has had to radically revise its foreign and security policy and in little more than two decades it has undergone a complete transformation. Out of a nation that was originally focused purely on defending itself and the alliance to which it belonged, with armed forces intended

Since reunification Germany has had to radically revise its foreign and security policy and in little more than two decades it has undergone a complete transformation.

4 | Thomas Friedman, *The World Is Flat: A Brief History of the Twenty-first Century*, New York, 2005.

5 | Cf. Wendy Kaufmann, “How the iPhone Figures in the U.S.-China Trade Gap”, National Public Radio, 18 Jan 2011, <http://npr.org/2011/01/18/133029198/Tracing-The-Trade-Deficit-Back-To-The-iPhone> (accessed 12 Sep 2013).

6 | Francis Fukuyama, *The End of History and the Last Man*, New York, 1992.

exports. And since it has few natural resources, the import of resources without which industry cannot function – especially fossil fuels – is equally important. Imports and exports make up almost 70 per cent of Germany's gross domestic product.¹⁰



Eruption of the volcano Eyjafjallajökull on Iceland: Events like this have shown how vulnerable the international network of air routes is. | Source: © S. Olafs, picture alliance / dpa.

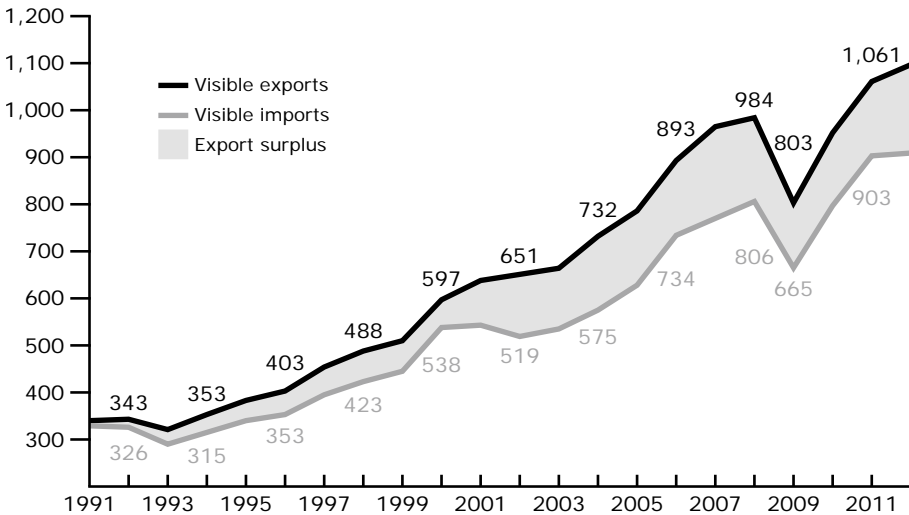
The global commons are the “lube oil” of this global economic engine. Without unrestricted use of the high seas, air space, outer space and cyberspace the international economy would grind to a halt. The goods and knowledge that are the hallmark of globalisation must be transported – either physically by air and water or digitally in space and cyberspace. Transport by sea accounts for the lion's share – 80 per cent – of all traded goods. The shipping of goods is particularly important to Germany, because 80 per cent of its goods are imported and exported by sea.¹¹ In terms of quantity, far fewer goods are transported by air than by sea: by this method of calculation, air freight

10 | Cf. bpb, n. 2.

11 | Cf. Peter Hefe, “Fragile Wertschöpfungsketten: Zur Notwendigkeit eines deutschen maritimen Engagements”, *Analysen und Argumente*, No. 125, 5 Jul 2013, 1, <http://kas.de/wf/de/33.34915> (accessed 9 Oct 2013); bpb, “Zahlen und Fakten. Globalisierung. Seefracht”, 30 Jun 2010, <http://bpb.de/nachschlagen/zahlen-und-fakten/globalisierung/52531/seefracht> (accessed 12 Oct 2013).

constitutes only one per cent of the global exchange of goods. In terms of their value, however, goods transported by air account for 40 per cent of global trade: this highlights the fact that airspace, too, is an important global common.¹² Worldwide passenger transport must also be taken into account: in 2010 alone there were more than 20 million flights.¹³ When the Eyjafjallajökull volcano in Iceland erupted in 2010, crippling air travel for two months, the losses to the global economy amounted to 148 million euros per day.¹⁴

Fig. 2
Development of German foreign trade 1991 to 2012, imports, exports and export surplus in billion euros



Source: bpb (with data of the Federal Statistical Office), n. 2.

Among the global commons, the high seas are one of the oldest transport spaces. Although flying machines of various sorts have been in use since the end of the 18th century, it was only after the First World War and the invention of reliable propeller-driven aircraft that airspace was

12 | Cf. bpb, "Zahlen und Fakten. Globalisierung. Luftfracht", 30 Jun 2010, <http://bpb.de/nachschlagen/zahlen-und-fakten/globalisierung/52528/luftfracht> (accessed 12 Oct 2013).
 13 | Mark Barrett, Dick Bedford, Elizabeth Skinner and Eva Vergles, *Assured Access to the Global Commons*, NATO, Norfolk, 3 Apr 2011, 14, <http://www.act.nato.int/globalcommons-reports> (accessed 7 Nov 2013).
 14 | Barrett, Bedford, Skinner and Vergles, n. 13, 16.

increasingly opened up.¹⁵ The latest members of the global commons “family” are outer space and cyberspace. The Sputnik crisis of 1957 signalled the onset of the conquest of space and 1991 saw the debut of the World Wide Web as a publicly available service.¹⁶ A feature of all four global commons is that it is rapid technological progress that has made them usable in their present form. Outer space and cyberspace, in particular, are closely linked (satellites are essential for communication via the Internet), while at the same time it is they that make use of the first two global commons possible. The global “just-in-time” exchange of goods would no longer be conceivable without the use of GPS satellites and the near instantaneous exchange of information via the Internet.

If one therefore considers, firstly, the altered global security situation, with its implication that for Germany – as well as other countries – security is no longer defined only geographically and, secondly, the extent to which Germany is integrated into global economic flows, it becomes clear that today’s world has become “flat” in several senses: flat because geographically distant events, such as those in Afghanistan, can have a direct impact on Germany’s security – and flat because interruption of the flow of goods and data anywhere in the world would directly affect the economic prosperity of Germany. It is precisely at this interface between security policy and the economy that the particular importance of the global commons comes into play.

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WHAT ARE THE GLOBAL COMMONS?

Before exploring the subject of the global commons and their precise definition in detail, it is worth examining the meaning of the word *resource*, which is at the heart of these public goods. Some resources are *natural* – that is, they have not been produced and their supply is limited.

15 | Mort Rolleston, “Air Superiority”, in: Scott Jasper (ed.), *Securing Freedom in the Global Commons*, Stanford, 2010, 131-144, here: 132.

16 | Barrett, Bedford, Skinner and Vergles, n. 13, 36.

Fossil fuels, in particular, fall into this category.¹⁷ Resources may also be important on account of their *spatial location*. Satellites, for example, are of this type, since they acquire their significance only on account of their position and function in orbit.¹⁸

These resources are located spatially in the global commons: fish as a food resource exist only in the oceans, a satellite is located in space. At the same time the high seas, as a transport route, are a distinct resource for shipping. The same applies to the other three global commons: on the one hand they contain natural and “location-dependent” resources (e.g. airspace: clean air; space: satellites; cyberspace: information), on the other they function as “vehicles” and are thus distinct resources in their own right. In addition, there is a fundamental distinction to be made between finite, material public goods and intangible, immaterial ones. The first group includes the natural resources that have already been mentioned. The second group comprises intellectual resources such as ideas, knowledge and the information that is available on the Internet.¹⁹

Cyberspace belongs to the intangible, immaterial goods. Uncontrolled access will in the long term destroy them or exclude other users from using them.

The global commons are thus a public good (although not purely). They can be freely accessed by anyone and are controllable by no one, or controllable only with difficulty.²⁰

The high seas, airspace and outer space fall into the first group of finite, material goods. Cyberspace belongs to the group of intangible, immaterial goods. Now, the fundamental problem of the global commons – and one that is

17 | Jochen Schumann, Ulrich Meyer and Wolfgang Ströbele (eds.), *Grundzüge der mikroökonomischen Theorie*, Berlin/Heidelberg, 1999, 401.

18 | J. Susan Buck, *The Global Commons: An Introduction*, Washington D.C., 1998, 3.

19 | *Ibid.*, p. 3.

20 | Joseph E. Stiglitz and Carl E. Walsh, *Mikroökonomie*, Munich, 2010, 293 et seq. Like national public goods (e.g. German motorways), global public goods are not purely public goods. In the case of a purely public good, the marginal cost of procuring an additional good is precisely zero and it is not possible to exclude an additional person from using it. None of the four global commons can be used by anyone to an unlimited extent free of charge. For example, an unlimited number of ships cannot pass through the Strait of Malacca, and it is not possible for every user to make unlimited use of the Internet.

also relevant to security policy – is that, while they constitute a public good and hence one that can be accessed freely by all consumers, *uncontrolled* access will in the long term destroy them or exclude other users (such as states or trading companies) from using them. In economics this phenomenon of the overuse of a public good is termed the “tragedy of the commons”.²¹

This concept derives from the areas of common land (woods, meadows, ponds and lakes) that remained in communal ownership until the end of the 19th century. If these commons were not regulated by the community, they were at risk of being overused by individual members of the community and hence eventually destroyed. The thinking is that if each user maximises his own profit without restriction, the result is that the entire community is eventually left with nothing. In the case of the global commons, however, users of many global public goods can in practice be excluded from the outset (e.g. from free use of the Internet). The overuse of global public goods is a particularly important issue in development cooperation, although the focus here is usually on the natural resources within the global commons – e.g. the avoidance of overfishing in the oceans or the reduction of global air pollution. The global commons as a resource in their own right – as a “vehicle” – are less central to the debate.

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THE IMPORTANCE OF THE GLOBAL COMMONS FOR SECURITY POLICY

From the point of view of security policy, free access to information on the World Wide Web is now just as important an aspect of the global commons as the free use of transport routes. The quotation from the security policy White Paper previously cited highlights this dependence of Germany, which “has a principal interest in peaceful competition of thoughts and views, an open world trade system and unrestricted transportation routes” – and hence a principle interest in free access to the high seas, airspace, outer space and cyberspace. In contrast to the case of

21 | Garrett Hardin, “The Tragedy of the commons”, Science 162, 1968, 1243-1248.

public goods provided on a national basis, such as national defence or health care, there is in the global domain no supervisory authority to control the public goods and guarantee free access to them. While international agree-

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ments exist in some areas – such as shipping and aviation – no national or supranational institution is able to ensure free, unimpeded access to the global commons at all times and in all places. The area that needs to be overseen (which includes cyberspace) renders any comprehensive supervision simply impossible. From the point of view of security policy, this is one of the great weaknesses of the global commons: all actors are free to determine both how they use these global public goods and whether, if it lies within their power, to make access difficult or impossible for other users.

A tension therefore arises between the wish of all the states that benefit from these spaces to have free access to them, and the desire of individual actors to exploit the commons in pursuit of their own agenda. As already implied in the “tragedy of the commons”, maintenance of the global commons depends on cooperation between all the actors involved. There are, however, three reasons why this poses a particular challenge:

1. Not all countries are aware that joint use of the four commons can only be sustained in the long term through global cooperation. Power rivalries and the desire to improve one’s own position in the short term – as can be seen, for example, in relationships between Russia, China and the USA – can make dealings with these vital arteries of the world economy a zero sum game. Two examples of this are the battle for resources in the Arctic and the management of space debris (which can destroy satellites).
2. Some actors do not share the definition of the global commons. For example, some shipping lanes lie in the catchment area of coastal states that lay claim to the territory (e.g. on the Strait of Malacca²²). Defining the

22 | NATO, *NATO Reports – Assured Access to the Global Commons: Workshop 6*, 2010, 3, http://www.act.nato.int/images/stories/events/2010/gc/report06_singapore.pdf (accessed 7 Nov 2013).

area as a public good seems to them to be simply a pretext for reducing their revenue. A similar situation exists in relation to the Internet. Because the Internet is not detached from the physical world, everything in cyberspace is also stored in a location that belongs to someone. Here again a tension arises between individual actors with particular interests (e.g. companies such as Google or service providers) and the welfare of users in general, who require uninterrupted free access.

3. As has already been made clear in the case of the Internet, one of the greatest challenges in connection with use of the global commons is the inclusion of private actors in an overall strategy for maintaining free access to them. The Internet depends on servers, shipping on ports, aviation on airports and satellite signals on corresponding stations on Earth. These things are not necessarily all in state hands: they may belong to private individuals or companies. Companies, in particular, maximise their profits with an eye on their return on investment and they are not intrinsically interested in the general good or in national prosperity. In this case the "tragedy of the commons" may involve an individual actor withdrawing his service for economic reasons, thereby denying people at large access to one of the global commons.

Moreover, from the point of view of security policy the global commons are not militarily and strategically relevant only in passive terms (if access to them is denied); they are also relevant in active terms. The atmosphere and the high seas play a particularly important part in military planning. In contrast to space and cyberspace, they are of practical geostrategic significance, because they serve as a vehicle for the physical transport of military equipment. More than a century ago, in 1890, the American historian and geopolitical commentator Alfred Thayer Mahan described the oceans as "a great highway [...] a wide common"²³ that enables countries to exercise their military influence. If a nation has global sovereignty over

The global commons are only militarily and strategically relevant if access to them is denied. The atmosphere and the high seas play also a particularly important part in military planning.

23 | Cited from: Alfred Thayer Mahan, "The Influence of Sea Power Upon History", in: David Jablonsky (ed.), *Roots of Strategy: Book 4*, Mechanicsburg, 1999, 79.

the seas and the air, it can project its military power without hindrance. If to these domains are added the third space of the global commons, outer space with the use of satellite-based data, and the possibilities of modern Internet communication in cyberspace, the efficiency of this power projection increases exponentially. Since the end of the Cold War the USA, for example, has had almost unlimited opportunities for using the first three of the global commons.²⁴ This has enabled it to intervene militarily in geographically remote places without a long preparatory phase – as was emphatically demonstrated in Iraq in 2003 and in Afghanistan in 2001. From the point of view of Germany's security policy, the supremacy of its NATO ally has always paid off. During the NATO deployment in Kosovo (1999), for example, the USA bore the main burden of the air operations.

Having considered the defining features shared by the different global commons and the principal challenges associated with their use, it is worth examining the high seas, the atmosphere, space and cyberspace individually and considering their relevance to security policy.

GLOBAL COMMON I: THE HIGH SEAS

Modern logistics depend on the functioning, undisrupted transport of goods on the world's oceans. However, 75 per cent of these trade routes pass through narrow passages that make them susceptible to disruption.

As has already been described, the oldest transport corridor of the four global commons, the high seas,²⁵ plays a key part in both global and German trade. The oceans make up 70 per cent of the world's surface; 80 per cent of the world's population lives near the coast and modern "just-in-time" logistics depend on the functioning, undisrupted transport of goods on the world's oceans.

24 | Cf. Barry R. Posen, "Command of the Commons: The Military Foundation of U.S. Hegemony", in: *International Security*, Vol. 28, No. 1, 5-46, here: 8.

25 | The high seas are defined in Article 86 of the 1982 Convention on the Law of the Sea as: "[...] all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State".

However, 75 per cent of these trade routes pass through narrow passages that make them susceptible to disruption.²⁶ But it is not only for global trade that the high seas are an important and in many places vulnerable transport space. For the NATO partners they will also continue to be a key geostrategic factor in crisis prevention and intervention. NATO missions will be inconceivable without the maritime dimension.²⁷ Three factors relating to the high seas have been identified as posing challenges for security policy: firstly, power rivalries played out on the oceans; secondly, criminally motivated attacks on ships (piracy); and thirdly, blocking of transport routes by terrorists.

Three factors relating to the high seas have been identified as posing challenges for security policy: power rivalries, piracy and blocking of transport routes by terrorists.

Two examples of maritime power rivalries will serve to illustrate the first of these factors: the exploitation of the mineral resources being discovered in the Arctic and the issue of unclarified ownership rights in the South China Sea are both giving rise to conflict in this global common. In the Arctic, Russia is keen to secure initial access rights to resources that may come to light as a result of global warming.²⁸ In the South China Sea, China sees itself as the pacemaker and is seeking to secure its access to important transport routes and rich fishing grounds.²⁹ Neither campaign has been without consequences. The USA, in particular, wants to secure its influence in both regions. Although these emerging conflicts will not necessarily develop into head-on confrontations, they are nevertheless at odds with the cooperation that maintenance of the global commons requires.

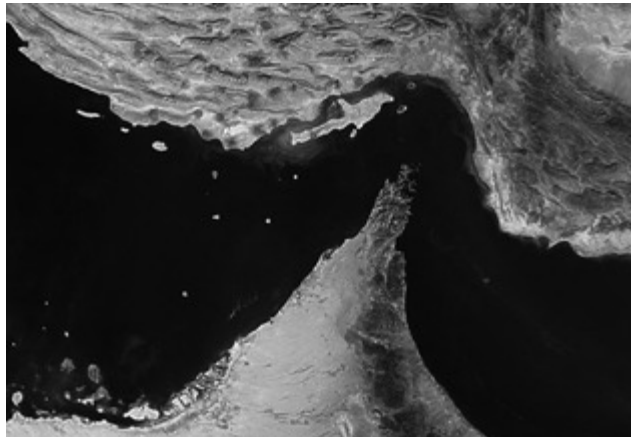
26 | NATO, *Alliance Maritime Strategy*, 18 Mar 2011, 2, http://www.nato.int/nato_static/assets/pdf/pdf_2011_03/20110318_alliance_maritime-strategy_CM_2011_23.pdf (accessed 10 Oct 2013); Hefele, n. 11, 1.

27 | NATO, *Maritime Strategy*, 1-4; cf. also: Julian Voje, "Zur geostrategischen Bedeutung von U-Booten", *Internationales Magazin für Sicherheit (IMS)*, No. 2, 2008, 48-49, here: 48.

28 | "Kampf um Rohstoffe: Russland schickt Raketenkreuzer in die Arktis", *Spiegel Online*, 15 Sep 2013, <http://spiegel.de/wirtschaft/unternehmen/a-922330.html> (accessed 7 Nov 2013).

29 | Christoph Hein, "Säbelrasseln über dem Meer", *Frankfurter Allgemeine Zeitung*, 11 Aug 2012, <http://faz.net/aktuell/wirtschaft/-11851303.html> (accessed 11 Oct 2013).

The second challenge for security policy, that of criminally motivated attacks, is a growing problem around the Horn of Africa and on the West African coast, with attacks by pirates ranging from relatively minor “hit-and-run” attacks on ports to the hijacking of entire merchant ships on the high seas. Anti-piracy missions such as the European Union’s Operation Atalanta, in which Germany is involved, illustrate the attempts that are being made to protect shipping lanes.³⁰ The positive side effect of this piracy is the growth in cooperation between the affected states that it engenders. Although they are not engaged in joint operations, China, India, Russia and the USA are all active off the coast of Somalia.



Satellite picture of the Strait of Hormuz: Iran has repeatedly threatened the blocking of this vital artery of the global economy. | Source: Jacques Descloitres, NASA, flickr ©🇩🇪.

The third challenge for security policy arises from the activities of terrorists and other agents of violence who represent an asymmetric threat. Choke points of international shipping, such as the Strait of Malacca and the Strait of Hormuz, are targets for those seeking to capitalise on the lack of general control over this public common with the minimum means. A single attack could block these narrow channels and cause damage costing billions of

30 | Cf. David Petrovic, “Bekämpfung der Piraterie: Ein Aspekt maritimer Sicherheit für Deutschland”, *Analysen und Argumente*, No. 129, 27 Sep 2013, <http://kas.de/wf/de/33.35520> (accessed 10 Oct 2013).

euros.³¹ Iran has repeatedly threatened to block the Strait of Hormuz, demonstrating that it is not only private actors such as terrorists who have an interest in using the blocking of vital arteries of the global economy for their own purposes. Advancing technical developments – such as the recent invention of a missile launcher that can be transported in a cargo container and is capable of destroying an aircraft carrier by remote control,³² – make it ever easier for attackers to achieve their aims.

GLOBAL COMMONS II AND III: GLOBAL AIRSPACE AND OUTER SPACE

Global airspace and outer space are closely connected. For one thing, there is no precise definition of where global airspace ends and outer space begins. A widely accepted distinction between the two areas puts the dividing line 80 kilometres above the Earth's surface, this being the last point at which a flying object still obtains aerodynamic lift.³³ At the same time, global airspace is heavily dependent on satellite-based communication. These days any flight, either commercial or military, involves the use of GPS signals, live air traffic control and satellite-based weather forecasting, to mention only a few of the issues involved. As in the maritime domain, there is in aviation an international flight zone that is available for use by all nations as a global common. No part of outer space is subject to any national jurisdiction.³⁴

As in the maritime domain, there is in aviation an international flight zone that is available for use by all nations as a global common. However, no part of outer space is subject to any national jurisdiction.

A feature common to both the maritime and the aviation zones is that they are very vulnerable and any attempt to secure them must rely heavily on cooperation between state and private bodies. In the field of aviation, the attacks of 11 September 2001 with the subsequent cancellation

31 | Jörg Eschenfelder, "Ein Anschlag genügt und alles steht still – Der bedrohte Welthandel. Piraten und Terroristen in der Straße von Malakka", *IMS*, No. 2, 2008, 20-22, <http://ims-magazin.de/index.php?p=artikel&id=1233835500,1,gastautor> (accessed 10 Oct 2013).

32 | "New Russian weapon system hides missiles in shipping container", *Homeland Security News Wire*, 28 Apr 2010, <http://homelandsecuritynewswire.com/new-russian-weapon-system-hides-missiles-shipping-container> (accessed 10 Oct 2013).

33 | Cf. Rolleston, n. 15, 132.

34 | Barrett, Bedford, Skinner and Vergles, n. 13, 20 et seq.

of flights and the effects on air transport of the volcanic eruption in Iceland mentioned above illustrate the vulnerability of the world's closely interlinked flight network. Even minor attacks on airports can in the worst-case scenario force thousands of passengers to spend the night in the terminal.³⁵ Thus an attack on a major international airport, which would be relatively easy to organise, could cause disruption around the world.³⁶ All users therefore depend on airports – many of which are privately operated – being adequately secured. In addition, aviation is also affected by the development of new planes and weapon systems which in the wrong hands are capable of inflicting major damage. In particular, the increasing sophistication of drones and anti-aircraft missiles is one of the greatest emerging challenges to aviation.³⁷

In outer space the principal issues relevant to German security policy are the management of space debris and anti-satellite weapons (ASAT). Contrary to first impressions, outer space is very fragile and is reaching the threshold of its tolerance. Both government and private operators use this global common extensively: there are thought to be more than 1,100 satellites currently orbiting the Earth.³⁸ In 2007 China made history in space when it destroyed a defective weather satellite with an ASAT rocket; thousands of particles of space debris still remain in the Earth's orbit. There are also suspicions that the country is working on an "anti-satellite satellite" that could attack other objects with robotic arms. However, it is not actually very difficult to knock out a satellite – any object fired at sufficient speed will do the job – and satellites fitted with robotic arms could also be used to carry out maintenance tasks.³⁹

35 | "Chaos am Münchener Flughafen", Sueddeutsche.de, 6 Jul 2012, <http://sueddeutsche.de/muenchen/erding/1.1404698> (accessed 10 Oct 2013).

36 | Barrett, Bedford, Skinner and Vergles, n. 13, 23.

37 | Ibid., 24. On the problem of drones: Frank Sauer, "Drohnenkrieg. An der Schwelle einer neuen Drohnenökonomie", *Frankfurter Allgemeine Zeitung*, 18 Aug 2013, <http://faz.net/aktuell/politik/-12537028.html> (accessed 10 Sep 2013).

38 | Cf. "SATCAT Boxscore", CelesTrak, <http://celestrak.com/satcat/boxscore.asp> (accessed 7 Nov 2013); cf. Barrett, Bedford, Skinner and Vergles, n. 13, 27.

39 | Dwayne Day, "China's ASAT enigma", *The Space Review*, 4 Mar 2013, <http://thespacereview.com/article/2251/1> (accessed 7 Sep 2013); Robert Beckhusen, "China's Mystery Satellite Could Be a Dangerous New Weapon", <https://medium.com/war-is-boring/630a858923ec> (accessed 7 Oct 2013).

Other countries that want to have continued access to this global common must campaign for standardised legal regulations on the use of space. To prevent the “tragedy of the commons”, all actors involved must act in unison. In addition, countries such as Germany that do not want to lose access to the use of space must invest in research and collaborate with private institutions. In its 2010 space strategy the German government acknowledged the importance of this global common and encouraged closer links between research and government planning.⁴⁰

GLOBAL COMMON IV: CYBERSPACE

Cyberspace as the fourth global common is a particularly vivid example of the tension between interconnectedness and vulnerability. The interception of communications by the American National Security Agency (NSA) illustrates the efforts state institutions make to control this global common.⁴¹ On the Internet boundaries between state and private actors are particularly blurred. Free access to information via Google, Facebook or YouTube is a public good, yet any server that transports data over the network is owned by a particular company or other service provider. The quantity of data involved (“big data”⁴²) exceeds what the NSA has so far been able to collect.⁴³ Free access can thus become the subject of state monitoring and – as

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40 | Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie, BMWI), “Making Germany’s space sector fit for the future. The space strategy of the German Federal Government”, Berlin, 2010, http://dlr.de/dlr/PortalData/1/Resources/documents/raumfahrtstrategie_der_bundesreg_2010.pdf (accessed 7 Nov 2013).

41 | See also: “Wir brauchen internationale einheitliche Rahmenbedingungen bei der Cyberabwehr”, Dr. Hans-Georg Maaßen, President of the Federal Office for the Protection of the Constitutions (Bundesamt für Verfassungsschutz), X. International Law Conference, Konrad-Adenauer-Stiftung, event contributions, Berlin, 18 Oct 2013, <http://kas.de/wf/de/33.35750> (accessed 7 Nov 2013).

42 | In fact the mass of available information is already being traded as the “oil” of the future, cf. Bitkom, *Big Data*, http://bitkom.org/de/publikationen/38337_73446.aspx (accessed 7 Nov 2013).

43 | Cf. “Grenzen der Vereinbarkeit von Freiheit und Sicherheit”, X. KAS International Law Conference on the subject of “Cyber Security”, event contributions, Berlin, 18 Oct 2013, <http://kas.de/wf/de/33.35751> (accessed 7 Nov 2013).

in China and Myanmar – can result in users being denied access to information.⁴⁴

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However, it is not only state institutions for whom cyber security is a matter of concern. The private sector is also affected by attacks on the Internet. Targeted attacks on companies (either ideologically motivated or designed to weaken a competitor) and industrial espionage are part of everyday life for businesses in Germany and cause damage to the tune of billions of euros. For perpetrators of organised crime, in particular, the Internet provides lucrative targets that can be homed in at low cost. If one also considers data in the ubiquitous “cloud”, which must also be stored on a server, the vulnerability of this medium becomes even more evident.

The cyber attack on Estonia in 2007 and the attack on Iran in 2010 by the Stuxnet virus (reportedly developed by the USA and Israel⁴⁵) have demonstrated that the Internet can also be used for military purposes – as a vehicle for a targeted attack on a state. The fundamental problem in dealing with such attacks is that the attackers are difficult or impossible to identify. It is hard to predict how and with what the attacked state will then respond.⁴⁶ Both the European Union and the German government have published strategies for dealing with cyber threats. Both strategies emphasise the role of private actors and of society as a whole in curbing the risks associated with the Internet and state that threats can only be contained by imposing international rules.⁴⁷

44 | NATO, ACT Workshop Report, *NATO in the Cyber Commons*, 10 Oct 2010, 1, http://www.act.nato.int/images/stories/events/2010/gc/report05_tallinn.pdf (accessed 7 Nov 2013).

45 | Barton Gellmann and Ellen Nakashima, “U.S. spy agencies mounted 231 offensive cyber-operations in 2011, documents show”, *Washington Post*, 31 Aug 2013, http://washingtonpost.com/world/national-security/2013/08/30/d090a6ae-119e-11e3-b4cb-fd7ce041d814_story.html (accessed 7 Nov 2013).

46 | NATO, too, has explored the threat of cyber attacks in some depth and has included cyber threats in its security strategy of 2010: NATO, *Strategic Concept 2010*, http://www.nato.int/strategic-concept/pdf/Strat_Concept_web_en.pdf (accessed 10 Jul 2013).

47 | Federal Ministry of the Interior (Bundesministerium des Innern, BMI), *Cyber-Sicherheitsstrategie für Deutschland*, ▶

CONCLUSION

The globalised world of today has indeed become “flatter”. As a result, security policy must be globally conceived. Conflicts at the other end of the world can have a direct impact on Germany’s security. At the same time, Germany has entered into a virtually symbiotic relationship with the world economy. This intertwining of economic and security-related strands highlights the particular importance of the global commons: without free access to the high seas, global airspace, outer space and cyberspace the world, and hence Germany, cannot survive economically.

The global commons are the Achilles heel of globalisation. If every user accesses them without restriction, the risk is that ultimately no one will be able to access them at all. This applies to all four spaces of the global commons. Individual actors can “lame” entire spaces with limited means (as in the case of piracy) or with sophisticated weapons (as illustrated by the problem of drones). For example, blockage of the Strait of Malacca would very quickly cause damage worth billions of euros. The same applies to all the global commons.

For German security policy and for all countries that have an interest in free use of the global commons, this has implications in three areas. Firstly, they must be prepared to take active steps to counter acute disruption to one of the four commons. The campaign against piracy off the coast of Somalia is a successful example of joint action of this sort. The assumption of security-related responsibility for protection of the four “areas” – including by Germany, which is heavily dependent on them – must be internationally agreed. Secondly, existing rules that leave scope for interpretation (e.g. regarding the Strait of Malacca) must be improved, and rules must be drawn up for areas that are still largely unregulated (especially space). This issue must be pursued by the United Nations

The assumption of security-related responsibility for protection of the four global commons must be internationally agreed.

http://bmi.bund.de/SharedDocs/Downloads/DE/Themen/OED_Verwaltung/Informationsgesellschaft/cyber.pdf (accessed 10 Sep 2013); European Commission, *Cybersicherheitsplan der EU für ein offenes, freies und chancenreiches Internet*, 7 Feb 2013, <http://ec.europa.eu/digital-agenda/news-redirect/9589> (accessed 7 Nov 2013).

and by the EU as a “driver” – but also by Germany, which can make clear its interest in international rules. Thirdly, all countries must work to ensure that private actors understand that they are all “in the same boat” and must do their bit to conserve the global public commons. States should not, however, attempt to boost security by replacing the established provision of goods and services by private actors. The inability to control these actors is a major challenge, since they must work together for the good of all, but in it lies also their greatest benefit. A glance at the Internet with its free competition of ideas is sufficient to reveal this advantage. If all countries support the conservation of the global commons, all will continue to benefit from them in future.