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End-Use Controls: Recent Technology Developments and Emerging Trends

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Abstract: This article looks at the end-use controls of the US and European states, the application of new technologies for tracking, controlling and deactivating arms in this area, and recent debates about arms transfers to the Middle East. States' end-use controls are employed in the pursuit of a variety of normative, economic and strategic objectives. However, the article finds that only the US has used new technologies to improve its end-use controls and only in the pursuit of strategic objectives. The article also argues that recent arms transfers to non-state armed groups in Libya and Syria may undermine broader attempts to improve global standards in end-use controls.

Keywords: Military technology, dual-use goods, export controls, arms control, conflict
Schlagworte: Militärtechnologie, Dual-Use-Güter, Exportkontrolle, Rüstungskontrolle, Konflikt

Introduction

One key aspect of a states' system for controlling transfers of military goods and dual-use items (referred to here as 'export controls') is the implementation and enforcement of end-use controls.[1] End-use controls are efforts by an exporting state to impose restrictions on how, where, and by whom exported goods and items are used after delivery.[2] In particular, they are aimed at ensuring that 'exported equipment is not diverted to unintended end users or end uses'.[3] End-use controls are implemented and enforced through a range of measures. These include inserting language into the End-User Certificates (EUCs) or commercial contracts attached to a transfer committing the importing state or company to abide by certain restrictions. These restrictions generally consist of (i) a ban on the re-export of the goods to all or certain other states, (ii) a ban on the re-transfer of the goods to all or certain other end-users, or (iii) specific limitations on how, where, and by whom the goods can be used. In addition, states also carry out pre-export risk assessments to determine the likelihood that end-use controls will be violated and post-export monitoring to ensure that they are respected. Post-shipment monitoring can include requesting information certifying that the goods have been delivered, gathering information from official and unofficial sources, and requiring the importing state or company to allow for 'on site' inspections. End-use controls are also supported by record keeping on the part of states and exporting companies so that reported violations can be investigated.

All major exporters of military goods and dual-use items impose some form of end-use controls. However, the specific content of a state's controls, – including the motivation behind them, the

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1 Dual-use items are goods and technologies that have the potential to be used in both civilian and military products.

2 Many best practice documents make a distinction between end-use controls, controls on how exported goods can be used, and end-user controls, controls on who can use exported goods. For the sake of simplicity, this article will refer to both as 'end-use controls'.

3 Wassenaar Arrangement, 'Introduction to end-user / end-use controls for exports of military-list equipment', 3 July 2014.

restrictions that are imposed, the way they are implemented and enforced, and how violations are treated, – varies significantly. This variation reflects differences in the states' export control policies and, particularly, whether it is using them to promote normative, strategic or economic objectives. Since the 1990s, considerable attention has been given to the role that export controls – and especially end-use controls – can play in supporting normative objectives, particularly conflict prevention. Media, NGO and UN reports have detailed numerous cases where arms have been exported to a particular state, only to be diverted to an embargoed destinations or conflict zone in contravention of end-use controls attached to the original transfer.[4] NGOs have pressed governments to adopt stronger standards in end-use controls to address this problem and governments have responded by agreeing to a wide-ranging set of best practice documents and guidelines.[5] To help uncover cases of diversion, states have also sought to develop better mechanisms for identifying arms found in embargoed destinations or conflict zones and tracing their origin.[6] However, export controls and end-use controls are also used to pursue strategic and economic objectives. In particular, end-use controls can help to deny rival states and companies access to particular items and goods. In addition, the waiving of end-use controls can help to win an arms export deal or facilitate the supply of arms to a non-state armed group.

In recent years, the issue of end-use controls has been given greater prominence by the development of a range of technologies that could help states improve their implementation and enforcement.[7] These include technologies that can track the location of weapons, control who uses them and – in some cases – deactivate them remotely. Commentators have argued that such systems can be used to strengthen end-use controls by ensuring that exported arms arrive at their intended destination and to prevent and uncover violations. The issue of end-use controls has also been given prominence by recent debates about transfers of weapons to states and non-state armed groups in Afghanistan, Iraq, Libya and Syria. These transfers have included cases where arms exported from the US and Europe to the Middle East have found their way into the hands of non-state armed groups via theft and deliberate onward diversion. They also include cases where the US and European states have directly supplied weapons to non-state armed groups in Libya and Syria. These developments have generated a discussion about how new technologies could be used to improve end-use controls, particularly for transfers to states and non-state armed groups in the Middle East.

4 'Chapter 4: Trade Update: Transfers, Retransfers, and the ATT', in *Small Arms Survey 2014*, (Cambridge University Press, 2014), pp. 109-143.

5 In particular, the imposition of end-use controls is recommended in the best practices and guidelines of the European Union (EU), the Organization for Security and Cooperation in Europe (OSCE), the United Nations and the Wassenaar Arrangement.

6 International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons (International Tracing Instrument, ITI), adopted by the UN General Assembly in Decision 60/519, 8 Dec. 2005; and Conflict Arms Research, iTrace, <http://www.conflictarm.com/itrace/>, accessed 13 Nov. 2014.

7 See 'Experts discussed smart technology in SALW control', BICC, 26 June 2013, <https://www.bicc.de/press/press-releases/press/news/salw-conf-372/>. The issue will also be discussed at a one-week meeting of UN member states in 2015 held under the auspices of the UN Programme of Action on Small Arms and Light Weapons. 'Report of the Fifth Biennial Meeting of States to Consider the Implementation of the Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects', UN General Assembly, 26 June 2014.

This article looks at the role and application of end-use controls by US and European states and examines what impact new technologies and recent debates about arms transfers to the Middle East are having – and might have – in this area. The first part of the article looks at the way that different 'types' of arms exporters use end-use controls to pursue normative, strategic and economic policy objectives. In particular, the article focuses on three states that were characterised in the 1970s as 'restrictive', 'hegemonic' and 'industrial', arms exporters – Sweden, the US and the UK – and looks at key aspects of their end-use controls. The second part of the article examines the development of new technologies that could potentially help states to improve their end-use controls as well as recent debates about arms transfers to the Middle East and the challenges they pose in this area. The conclusions examine the extent to which the classification system developed in the 1970s still has explanatory value today. The article argues that, while this system still accounts for key aspects of states' arms export policies, it requires modifying and updating to have contemporary meaning. The conclusions also examine the extent to which new technologies are likely to play a role in the application of states' end-use controls. The article argues that although these technologies are being promoted as helping states to pursue 'normative' policy objectives, their use has largely been confined to larger arms exporters – principally the United States – and the pursuit of more 'strategic' goals and that even here their efficacy has been questioned. The article ends by arguing that recent developments with regards to arms transfers to the Middle East – particularly the transfer of arms to non-state armed groups in Libya and Syria – may ultimately undermine broader multilateral efforts that could have a more lasting impact on improving global standards in end-use controls.

Policies and practices in key 'supplier' states

One way to try and understand the variation in state's policies in the field of end-use controls is to revisit attempts made in the 1970s and 1980s to classify arms exporters into different 'types' or 'categories'. One of the most enduring of these attempts was made in 1971 and distinguished between three 'patterns of supply' that influenced exporting states behaviour in the international arms market.[8] These were: 'restrictive', where arms are not supplied in situations where they may be used in a local or international conflict; 'hegemonic', where a dominant power seeks to influence the behaviour of a recipient state through the supply or denial of armaments; and 'industrial', where the primary motivation is to maintain an advanced domestic defence industry through the promotion of exports. The position of the supplier within the international system determined which pattern of behaviour it pursued. Hence, Sweden and Switzerland's desire to maintain their neutrality in the East-West struggle and avoid involvement in local conflict led them to pursue mainly restrictive patterns of behaviour. Meanwhile, the dominant positions within the two major systems held by the Soviet Union and the United States led them to pursue largely hegemonic patterns of behaviour. Lastly,

8 Blackaby, F., et al (eds), *The Arms Trade with the Third World*, (Almqvist & Wiksell 1971).

Britain's and France's need to maintain an advanced domestic armaments base led them to pursue mainly industrial patterns of behaviour.

Based upon this framework, one would expect states involved in 'restrictive' patterns of supply to have well-developed end-use controls and to use them to prevent transfers that might be used in a local or international conflict. In addition, one would expect states involved in 'hegemonic' patterns of supply to have well-developed end-use controls and to use them as a means of furthering their national security interests. Finally, one would expect states involved in 'industrial' patterns of supply to have less well-developed end-use controls and to avoid using them in cases where it might jeopardise its economic interests. This structuralist depiction of state behaviour leaves little room for the notion that norms and values generated at the national level, via pressures exerted by commercial interests, NGOs, and parliaments, or the international level, via processes of inter-governmental coordination and policy exchange, could have an impact upon a state's export control policies. Since the 1980s a number of studies have demonstrated the ways in which a mix of systemic and normative factors have driven the development and implementation of states' export control policies.[9]

The next section of this article looks at three states that were understood in the 1971 characterisation to be engaged in 'restrictive', 'hegemonic', and 'industrial' patterns of supply, that is Sweden, the US, and the UK respectively. Each case study examines whether this characterisation holds true today and the extent to which it is able to account for the key aspects of each state's policies in the field of end-use controls.

Sweden

The implementation and enforcement of Swedish end-use controls appears to reflect 'restrictive' patterns of behaviour in arms export controls. Sweden pays close attention to the implementation of end-use controls for exports of both military goods and dual-use items. These controls are implemented and enforced by the inclusion of language in EUCs and through a mixture of pre-export risk assessments and post-export monitoring. In particular, all exports of military goods and dual-use items to non-EU member states are subject to restrictions that confine use to specified end-users and make onward re-exports subject to Swedish approval.[10] Sweden has previously stated that it also sometimes requires the inclusion of a clause in its EUCs that allow Swedish officials to carry out on-site inspections to ensure that end-use controls are being respected.[11] However, these controls were never implemented on a systematic basis, largely due to a lack of capacity and resources.[12] Today, it appears that on-site inspections controls are no longer included as an element in Swedish end-use controls.[13]

The manner in which Sweden responds to cases in which end-use controls appear to have been violated could also be seen as an attempt to ensure that Swedish weapons are not diverted to conflict zones or subject to misuse. Sweden produces and exports a range of anti-tank missiles and recoilless rifles that due to their ease of use and size are attractive to conflict parties and vulnerable to diversion. In 2009, AT-4 anti-tank missiles that had been exported from Sweden to Venezuela in the mid-1980s were found in the hands of the Revolutionary Armed Forces of Colombia (FARC) in Colombia.[14] The re-export of the arms by Venezuela without Swedish permission would represent a violation of end-use controls attached to the original export.[15] In response, the Swedish licensing authority (ISP) launched an investigation and suspended all exports to Venezuela.[16] ISP was unsatisfied with Venezuela's response to its enquiries and stated that closer coordination between the two states would be required before any new exports to Venezuela would be permitted.[17] In 2012 M3 recoilless rifles that had been previously exported from Sweden to India in 2003 were found in the hands of the Myanmar army.[18] The re-export of the arms by India without Swedish permission would represent a violation of end-use controls attached to the original export. In response, the Swedish licensing authority launched an investigation. India responded to the ISP's enquiries and – unlike in the case of Venezuela – there are no indications that export licensing to India was affected by the case.

However, in other ways the implementation and enforcement of Swedish end-use controls reflects 'industrial' patterns of behaviour. In particular, the differing responses to Venezuela and India's reported violations of Swedish end-use controls could be seen as a reflection of India's greater importance as a potential buyer of Swedish arms as compared to Venezuela. Until the Rafale was selected in 2012, Sweden had hoped that India would purchase the Swedish made Gripen as part of its planned purchase of 126 combat aircraft and in 2013 India signed a letter of intent for the purchase of 114 Swedish built FH-77B 155mm towed guns.[19] By contrast, all Swedish arms exports to Venezuela were suspended in 2006 in order to comply with US re-export restrictions.[20] At the same time, it could also be argued that the difference in response to the two cases reflects the fact that in the case of Venezuela the alleged unauthorised re-export concerned a transfer to an armed non-state actor while in the case of India it concerned a transfer to another state, albeit one that was subject to an EU arms embargo, as well as the higher level of cooperation provided by India.

9 For example, see Davis, I., *The regulation of arms and dual-use exports: Germany, Sweden and the UK* (OUP, 2002).
10 ISP, Forms & Certificates, 4 Dec. 2013; and Bromley, M. and Dermody, L., 'Addressing unauthorized re export or re transfer of arms and ammunition', SEESAC, 2015 (forthcoming).
11 Greene, O. and Kirkham, L., 'Small arms and light weapons transfer controls to prevent diversion', Biting the Bullet, 2007, p. 18.
12 Berkol, I. and Moreau, V., 'Post-Export Controls on Arms Transfers', GRIP, 2009, p. 23.
13 Swedish Inspectorate for Strategic Products, 'Forms and Certifcates', <http://www.isp.se/sa/node.asp?node=1215>, 4 Dec. 2013.
14 'Colombia seizes rocket launchers from the FARC', *Janes' Defense Weekly*, 20 July 2009.
15 Sveriges Radio, 'ISP: 'Detta är ytterst allvarligt'' ['ISP: 'This is extremely serious''], 27 July 2009.
16 Bromley, M. and Dermody, L., 'Addressing unauthorized re export or re transfer of arms and ammunition', SEESAC, 2015 (forthcoming).
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19 'Dassault Rafale bags $10.4 bn deal to supply 126 multi-role combat aircrafts to IAF', *Press Trust India (PTI)*, 31 Jan. 2012; and 'Desi Bofors to plug gap in Army's long-range firepower', *The Times of India*, 7 March 2013.
20 'SAAB follows US line and spurns Venezuela', *Jane's Defence Weekly*, 16 Aug. 2006, p. 20.

The United States

The implementation and enforcement – and non-enforcement – of US end-use controls appear to reflect 'hegemonic' patterns of behaviour in arms export controls. The United States has the most wide-ranging set of end-use controls of any state. Importers are required to sign end-use monitoring agreements and the US carries out a mixture of pre-licensing risk assessments and post-shipment monitoring. All exports of military goods and dual-use items are subject to restrictions that confine use to specified end-users and make onward re-exports subject to US approval. These controls on re-export also apply to foreign manufactured products that include components classed as military goods.[21] In most cases, importing states and companies must also agree to allow US officials to carry out on-site inspections to ensure that end-use controls are being respected. These inspections are carried out under the Golden Sentry and Blue Lantern programmes for military goods and the Extrancheck programme for dual-use items. Actual and potential buyers of US weapon systems frequently complain about US post-shipment monitoring and threaten to take their business elsewhere.[22] Nonetheless, US arms exports continue to grow and sales certain regions – particularly to the Persian Gulf – have soared in recent years. In addition, India – which complains loudest about US end-use controls – has purchased over $8 billion of US weapon systems since 2001 and – after lengthy negotiations and the inclusion of certain caveats – signed an agreement on end-use controls with the US in 2009.[23]

The US frequently uses end-use controls and political pressure to convince states and companies to abandon planned exports that conflict with US national security interests including, in recent years, transfers to China and Venezuela.[24] The restrictions on China are largely aimed at slowing China's process of military modernization which poses a threat to the US ability to project force in the Western Pacific.[25] The US also lowers its standards in end-use controls to facilitate transfers that support broader national security interests. These include arms transfers to anti-government rebel forces, such as anti-Sandinista forces in Nicaragua and anti-Soviet forces in Afghanistan in the 1980s. Most recently, the US has facilitated the supply of arms to anti-Assad forces in Syria. This reportedly involved encouraging Croatia to supply arms to Jordan and to ignore Jordan's violation of its end-use commitments when re-exporting the arms to Syria.[26] These also include arms transfers to nascent security forces in allied states, such as the post-2001 supplies to the Afghanistan and Iraq armies. Susan Waltz has described these types of 'lawful but covert, undisclosed, incompletely monitored, or unregistered' transfers as the US' 'shadow policy' in arms export controls.[27] The US has sought to retain the freedom to carry out these types of transfers during the negotiation of international standards on SALW and arms export controls. In particular, during the negotiation of the 2001 UN Programme of Action on SALW and the 2013 Arms Trade Treaty (ATT) the US played a key role in blocking calls for the inclusion of a prohibition on arms transfers to non-state armed groups.[28] The US has sought to resolve this contradiction by improving standards in end-use controls for such 'shadow' transfers, though the extent to which these efforts have been successful is open to debate (see below).

However, in other ways the implementation and enforcement of US end-use controls reflects 'restrictive' and 'economic' patterns of behaviour. For example, the US has a large number of programmes focused on curbing supplies of arms to conflict zones, terrorists, and international criminal organizations.[29] In addition, the US is modifying aspects of its end-use controls in response to concerns that they are adversely affecting its economic interests by leading foreign companies to exclude US-made components from their products to avoid being subject to US export controls.[30] Under the ongoing Export Control Reform (ECR) – a wider set of initiatives aimed at simplifying US export controls – a large number of components are being removed from the US list of controlled military goods. As a result, manufacturers in a group of 36 trusted states will be better able to incorporate them into their products without becoming subject to US export controls.[31] A number of commentators have warned that the ECR will affect the US's national security interests by helping states subject to US embargoes gain access to US dual-use items and military goods.[32]

The United Kingdom

The implementation and enforcement – and non-enforcement – of UK end-use controls appear to reflect 'industrial' patterns of behaviour in arms export controls. The UK pays close attention to the implementation of end-use controls for exports of both military goods and dual-use items. However, UK policy is primarily focused on pre-export risk assessments rather than post-export monitoring. Certain transfers of military goods are subject to government-to-government agreements concerning where and how they can be used. In addition, states and companies importing military goods and dual-use items must commit to not re-export them if they will be used for any WMD-related purposes and states importing MANPADS must commit to not re-export them without UK approval. However, the UK does not require all importers to sign binding end-use commitments that restrict use to specified end-users and make onward re-exports subject

21 Gustavus, J. D., 'What U.S. and Chinese companies need to know about U.S. export control laws applicable to China', WorldECR, Oct. 2013.
22 Bekdil, B. 'Turks Take Umbrage at U.S. Arms Monitors', *Defense News*, 27 Nov. 2006; and 'Indian irritation with end-use monitoring', *StratPost*, 22 July 2009.
23 Kronstadt, K. and Pinto, S., 'India-U.S. Security Relations: Current engagements', Congressional Research Service (CRS), 13 Nov. 2012, p. 25.
24 Agüera, M., 'Spain Draws Fire for Sale of Material to Venezuela', *Defence News*, 25 Apr. 2005, p. 13; US State Department, 'Message Delivered: Chinese Attempt to Procure Illicit Satellite Components', 9 May 2008, via Wikileaks.
25 US Department of Defence, 'Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2013', 2013, pp. 11-12.
26 Chivers, C. J., and Schmitt, E., 'Saudis Step Up Help for Rebels in Syria With Croatian Arms', *New York Times*, 25 Feb. 2013.
27 Waltz, S., 'U.S. Small Arms Policy: Having It Both Ways', World Policy Journal, Summer 2007, pp. 67-80.
28 Holtom, P., 'Prohibiting Arms Transfers to Non-State Actors and the Arms Trade Treaty', UNIDIR Resources, 2012.
29 Waltz, S., 'U.S. Small Arms Policy: Having It Both Ways', World Policy Journal, Summer 2007, pp. 67-80.
30 US State Department, 'Subject: Airbus: Fears of Defense Trade Controls Hurt US Exports', 5 June 2008, via Wikileaks.
31 The White House, Fact sheet: Announcing the revised U.S: Export Control system, Press release, 15 Oct. 2013.
32 Benowitz, B. and Kellman, B., 'Rethink plans to loosen U.S. controls on arms exports', Arms Control Association, Apr. 2013.

to UK approval. In addition, the UK does not require importers to allow UK officials to carry out on-site inspections to ensure that end-use controls are being respected. Since 2006 the UK Working Group on Arms (UKWG) and the Committee on Arms Export Controls (CAEC) have called for all exports of UK military goods to be subject to binding end-use commitments and for the UK to adopt a more robust system of post-shipment monitoring based on US practices.[33] The UK government has consistently opposed fully implementing these proposals, arguing that its polices on end-use controls reflect what it is able to achieve both legally and practically. The UK defence industry has also argued against more restrictive end-use controls, maintaining that they would be a deterrent for trade and would harm the UK's economic interests.[34]

The manner in which the UK government responds to cases in which end-use controls appear to have been violated could also be interpreted as an attempt to avoid jeopardizing future arms sales. For example, in 2009 reports indicated that 76-mm guns for corvette navy vessels containing UK-manufactured components had been used by Israel during its military offensive in the Gaza Strip.[35] The export of the components was subject to a government-to-government agreement stating that UK military goods supplied to Israel would not be used in the Palestinian territories. In response, the UK revoked five export licences but maintained that Israel had not violated the government-to-government agreement.[36] The UK took a similar line in response to 2003 reports that UK-manufactured Scorpion 90 tanks had been used by the Indonesian military in Aceh.[37] These exports were subject to a government-to-government agreement stating that UK military goods supplied to Indonesia would not be used in Aceh. Again, the UK government maintained that Indonesia had not violated the government-to-government agreement.[38]

However, in other ways the implementation and enforcement of UK end-use controls reflects 'restrictive' patterns of behaviour. In particular, while it has rejected fully implementing UKWG and CAEC recommendations on end-use controls, the UK government has implemented some of its demands. For example, in 2010 the UK government began requiring companies and states importing UK military goods to commit to not re-export them to countries subject to a UN, EU or OSCE embargo.[39] In addition, while the UK does not require importing states and companies to allow officials to carry out on-site inspections, it has become more willing to carry out other aspects of post-shipment monitoring, particularly tasking embassies with collecting information on how weapons are used after delivery. In 2006 the UK government stated that it 'does not use end-use monitoring to check on exports of concern.'[40] However, in 2011 the UK government stated that it uses 'overseas posts and other sources' to uncover cases 'where UK origin goods have been re-exported in undesirable circumstances.'[41] Moreover, the UK does take issues concerning exports to embargoed destinations and conflict zones into account during its pre-export risk assessments. For example, in 2008 the UK refused an application for a brokering licence for the transfer of 130 000 Kalashnikov assault rifles from Ukraine to Libya due to concerns that the arms would be re-exported to Chad or Sudan.[42]

New technologies and challenges

In recent years a range of new technologies have been developed for tracking, controlling and deactivating weapons. These technologies have been promoted as potential tools for helping address problems relating to the misuse of arms, including the implementation and enforcement of end-use controls.[43] Systems for tracking the location of weapons have been developed by a number of companies, most of which are based on embedding a transmitter that reports its location. The US already uses these types of technologies for certain exports of larger weapon systems and systems for small arms are becoming increasingly available.[44] Systems have also been developed that remotely track and monitor the shipping containers in which weapons are transported to ensure that they reach their destination and are not tampered with en route.[45] Systems for controlling who can use weapons have been available for small arms since the 1990s. In these 'smart-gun' technologies the weapon only becomes activated when it is in contact with the user's fingerprint or, in most cases, in close proximity to a watch or ring worn by the user.[46] Most of these systems are being developed with the intention of marketing them to civilian gun owners in the US. However, they have yet to be manufactured on a large scale, partly because of the resistance of the US pro-gun lobby, which warns that such systems could ultimately allow for greater government control over gun owners.[47] A range of technologies is also available for deactivating weapons. For example, landmines and MANPADS have been developed and deployed that cannot be reactivated after their battery has expired. More advanced technologies disable the weapons if they leave a particular area or allow for them to be remotely deactivated.[48] To date, these systems have mostly been utilized for larger weapons but at least one

33 UK House of Commons Defence, Foreign Affairs, International Development and Trade and Industry Committees, *Strategic Export Controls: Annual Report for 2004, Quarterly Reports for 2005, Licensing Policy and Parliamentary Scrutiny,* (The Stationery Office: London, 2006), pp. 51-53.
34 UK House of Commons Business, Innovation and Skills, Defence, Foreign Affairs, and International Development Committees, *Scrutiny of arms export controls (2011)*, (The Stationery Office: London 2011), ev. 9.
35 Clegg, N., 'We must stop arming Israel', *The Guardian*, 7 Jan. 2009.
36 British Parliament, Committees on Arms Export Controls, *Scrutiny of Arms Export Controls (2010): UK Strategic Export Controls Annual Report 2008, Quarterly Reports for 2009, Licensing Policy and Review of Export Control Legislation* (The Stationery Office: London, Mar. 2010).
37 Barnet, A., 'UK tanks roll on Indonesian rebels', *The Guardian*, 13 July 2003.
38 British Parliament, Select Committee on Foreign Affairs, Quadripartite Committee, 'Examination of witnesses', 25 Feb. 2004.
39 UK House of Commons Business, Innovation and Skills, Defence, Foreign Affairs, and International Development Committees, *Scrutiny of arms export controls (2010),* (The Stationery Office: London 2010), pp. 27-30.
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41 UK House of Commons Business, Innovation and Skills, Defence, Foreign Affairs, and International Development Committees, 'Scrutiny of arms export controls (2012)', (The Stationery Office: London 2012), p. 61.
42 US State Department, 'Subject: UK Denies Licenses for Export of Kalashnikovs to Libya', 6 Nov. 2008, via Wikileaks.
43 Ashkenazi, M., 'Smart guns and smart people: The technology and its future', in Ashkenazi, M., Isikozlu, E. and Kösling, M. (eds.), 'Smart Technology in SALW Control', BICC Brief 49, pp. 36-33.
44 *The Economist*, 'Kill switches and safety catches', 30 Nov. 2013.
45 See Powers International Homepage, <http://www.powersintlinc.com/technology.html>, accessed 18 Jan. 2015.
46 See Armatic Homepage, <http://www.armatix.de>, accessed 18 Jan. 2015.
47 Stuart, H., 'The Gun Lobby and a Dumb Law Are Keeping Us From Safer Guns', *Huffington Post*, 16 Jul. 2014.
48 *The Economist*, 'Kill switches and safety catches', 30 Nov. 2013.

company – the Irish manufacturer TriggerSmart – has plans to develop mechanisms that could be used for small arms.[49]

The issue of end-use controls has also been given extra prominence in recent years due to debates about transfers of arms to state and rebel forces in Afghanistan, Iraq, Libya and Syria. First, arms previously supplied by European states to the Middle East have been re-exported to rebel forces in Libya and Syria in potential violation of end-use controls attached to the original export. For example, in 2011 7.62-millimetre M80 ball ammunition exported from Switzerland to Qatar in 2009 were found in the hands of non-state armed groups in Libya.[50] In addition, in 2012 OHG-92 hand grenades exported from Switzerland to the UAE in 2003-2004 were found in the hands non-state armed groups in Syria.[51] In the first case and possibly the second case the original transfer from Switzerland had been subject to a ban on re-exports.[52] Second, arms supplied by the US and European states to the nascent security forces in Afghanistan after 2001 and Iraq after 2003 have been subject to wide-scale theft, onward diversion and misuse. These supplies involved private contractors that were subject to US sanctions and had weak or non-existent end-use controls.[53] US arms supplied to Afghanistan have been found with the Taliban and arms supplied to Iraq have been found with a variety of non-state armed groups including, most recently, Islamic State (IS).[54] Third, the US and European states have debated carrying out, or have actually carried out, weapons transfers to armed non-state groups in Libya and Syria and, more recently, to Peshmerga forces in Northern Iraq, raising concerns about potential onward diversion and misuse. In 2011, France supplied arms to Libyan non-state armed groups and, since early 2013, France, the UK and the US have discussed supplying arms to Syrian non-state armed groups.[55] In 2014 the US and a number of European states, including the UK, France, the Netherlands and Germany, began supplying arms to Peshmerga forces in Northern Iraq that were battling the IS.[56]

In responding to the challenges posed by these transfers, supplier states have discussed using different technologies to improve end-use controls. However, the only state that has definitely used these new technologies is the United States and, even here, questions have been raised about the impact they have had. Following the investigation into the Syria case, the Swiss licensing authority stated that its end-use controls would be strengthened to ensure that similar unauthorised re-exports did not take place. This included inserting a clause into EUCs that would allow the Swiss authorities to carry out on-site inspections and ensuring that EUCs are signed by a high-level government representative and, in certain cases, endorsed by a diplomatic note.[57] However, there are no reports indicating that Switzerland has begun to ask states to accept the inclusion of technology for tracking, controlling or deactivating weapons. In addition, there are reports that the UAE has responded to the proposed changes in Swiss arms export policy by looking for other arms suppliers that maintain less intrusive standards of end-use controls.[58]

The US has sought to improve standards in end-use controls for transfers to Iraq and Afghanistan by using a range of new technologies. After 2006 Iraqi soldiers receiving US weapons began having their fingerprints, photographs, and iris scans registered.[59] In 2013 it was reported that the United States had begun transferring arms to Afghanistan in shipping containers able to report their location and as well as any attempted break-in.[60] However, the impact of these efforts remains uncertain. Stuart Bowen, the former Special Inspector General for Iraq Reconstruction (SIGIR), has stated that end-use controls remained a problem in Iraq even after new standards due to a lack of oversight over the weapons after they were transferred to Iraqi personnel.[61] In 2014 IS seized Humvees, helicopters, antiaircraft cannons and M1 Abrams tanks from the Iraqi army that had previously supplied by the US.[62]

A number of governments have explored ways in which new technologies could be used to ensure that effective end-use controls are applied to transfers to non-state groups in Libya and Syria and, more recently, to Peshmerga forces in Northern Iraq. In 2012, a number of high-profile US commentators argued that Syrian rebel groups should be provided with MANPADS that cease functioning after a set period of time or which require activation codes.[63] In addition, France has reportedly investigated the possibility of supplying arms to Syrian groups that could be remotely deactivated.[64] However, the extent to which any of these technologies have actually been incorporated into weapons systems delivered to non-state armed groups in Syria is difficult to establish. Indeed, greater emphasis appears to have been placed on more 'traditional' mechanisms of end-use monitoring, such as marking and record-keeping and the deployment of personnel on the ground to oversee the distribution of weapons.[65]

49 TriggerSmart Homepage, <http://www.triggersmart.com/Pages/index.aspx#>, accessed 16 Nov. 2014.
50 'Libysche Rebellen schiessen mit Schweizer Munition' [Libyan rebels shoot with Swiss ammunition], *Tages Anzeiger*, 21 July 2012.
51 Schweizer Granaten im syrischen Konflikt' [Swiss grenades in the Syrian conflict], *Sonntags Zeitung*, 1 July 2012.
52 'Schweiz liefert wieder Waffen nach Katar' [Switzerland again provides weapons to Qatar], *Tages Anzeiger*, 28 Dec. 2011; and Swiss State Secretariat for Economic Affairs, 'Swiss hand grenades in Syria: conclusion of investigation and measures', 21 Sep. 2012. It is unclear if the UAE had contravened the ban on re-exports since they had donated the arms to Jordan and – at the time of the initial export from Switzerland – Swiss end-use controls did not mention donations.
53 Bromley, M., et al. 'Transfers of small arms and light weapons to fragile states: strengthening oversight and control', SIPRI Insights on Peace and Security, Jan. 2013, pp. 3-4; 'Stabilizing Iraq: DOD cannot ensure that US-funded equipment has reached Iraqi security forces', US Government Accountability Office, July 2007; and 'Afghanistan security: Lack of systematic tracking raises significant accountability concerns about weapons provided to Afghan National Security Forces', US Government Accountability Office, Jan. 2009.
54 Conflict Armament Research, 'Islamic State Ammunition in Iraq and Syria', Oct. 2014.
55 Ducquet, N., 'Business as usual? Assessing the impact of the Arab Spring on European arms export control policies', Flemish Peace Institute, March 2014.
56 'Germany to supply arms to Kurds fighting 'IS' militants', *Deutsche Welle*, 1 Sep. 2014.
57 Swiss State Secretariat for Economic Affairs, 'Swiss hand grenades in Syria: conclusion of investigation and measures', 21 Sep. 2012.
58 Donaghy, R., 'The UAE's shadowy dealings in Serbia', *Middle East Eye*, 15 Aug. 2014.
59 Buongiorno, M., 'Small arms in Iraq vulnerable to theft and diversion', Federation of American Scientists, 12 May 2010.
60 *The Economist*, 'Kill switches and safety catches', 30 Nov. 2013.
61 Harte, J. and Smith, J. 'Where does the Islamic State get its weapons', *Foreign Policy*, 6 Oct. 2014.
62 Bradley, M., 'Insurgents in Iraq Seizing Advanced Weaponry', *Wall Street Journal*, 6 Jul. 2014.
63 Sagalyn, D., 'Could New Technology Cut Risk of Giving Syrian Rebels Anti-Aircraft Missiles?', *PBS*, 5 Nov. 2014.
64 Keaten, J., 'France studies how to track arms for Syrian rebels', *Associated Press*, 6 June 2013.
65 'German soldiers begin training Kurds', *The Local*, 6 Oct. 2016, <http://www.thelocal.de/20141006/german-soldiers-begin-training-kurdish-peshmerga-iraq-isis-islamic-state-bundeswehr>.

Conclusions

The analysis of Swedish, US and UK arms export controls indicates that the categorisation drawn up in the 1970s still holds a certain level of explanatory power in terms of accounting for differences in states' end-use controls. In general, the policies on end-use controls pursued by Sweden, the United States, and the UK are those you would expect from states pursuing 'hegemonic', 'industrial' and 'restrictive' patterns of supply. That said, the analysis also shows the limitations of this structuralist framework for understanding all aspects of a states' export control policies. In particular, non-systemic economic and domestic forces have meant that US end-use controls reflect 'industrial' and 'restrictive' along with 'hegemonic' patterns of behaviour. Meanwhile, pressure exerted by NGOs and parliament has led the UK's policies to look 'restrictive' in certain respects while economic pressures have made Sweden's look 'industrial' in others. This mixed picture reflects the extent to which arms export policies are pushed and pulled in a range of different directions by both international and domestic pressures and often fail to conform to rigid principles. Noteworthy also is the extent to which Sweden and the UK failed to exhibit any signs of 'hegemonic' behaviour in their policies on end-use controls. Indeed, given the competition in the international arms trade there seems few prospects for any state but the US to use its end-use controls as an effective mechanism for influencing the behaviour of other states.

States face a range of challenges in seeking to integrate new technologies that can track, control and deactivate weapons into their end-use controls. Aside from the cost of these new technologies, the most crucial of these challenges is the political sensitivity of trying to convince recipients to accept weapons with these types of technologies embedded. Any weapons system embedded with a tracking device could also potentially be accessed by others, enabling them to determine the position of the troops carrying it. Moreover, any system that confines use to particular individuals could potentially malfunction in battle and shut down completely. Finally, states are unlikely to be keen about purchasing weapons that can be over-ridden or disabled by the supplier state. The US clearly has the strongest chance of convincing buyer states to purchase such weapons, given its dominance over sections of the global arms market. The US is already able to convince states to agree to intrusive levels of end-monitoring agreements and has, in some cases, convinced certain recipients to accept weapons with these types of technologies installed. However, it appears to have mainly done so as part in the pursuit of strategic policy objectives, such as the arming of Iraqi and Afghan security forces. The prospects for other suppliers to use these technologies seem less certain. It's noteworthy that neither the UK nor Sweden has seriously considered using these types of new technologies to support their end-use controls. Moreover, Switzerland's efforts to apply more effective end-use controls to the UAE that didn't involve these technologies appear to have convinced the UAE to look for less demanding and restrictive suppliers.

The most effective means of preventing cases of diversion to unintended end users or end uses do not require new technologies to operate. They consist of robust pre-export risk assessments, effective mechanisms of stockpile management, the destruction of surplus stockpiles and the marking of arms.[66] However, while states have supported the wider adoption of these practices in international forums, many have struggled to implement them in practice, even when provided with considerable assistance. In general, experience shows that such programmes cannot exist in a vacuum and depend upon effective state institutions and political commitment to operate as intended. This would also be true of the new technologies described above. Absent state capacity and political will on the part of the recipient state, their ability to act as a real impediment to diversion would always be in doubt.

As noted, the use of technologies that are able to track and disable weapons has been discussed in relation to the supply of arms to non-state armed groups in Syria, though the extent to which they have actually been used in practice is unclear. However, perhaps the bigger issue is not whether these technologies could improve standards on end-use controls in relation to transfers to non-state armed groups, but whether in pursuing such transfers states are undermining broader international cooperation in the field of end-use controls.

Since the mid-2000s the principle that end-use controls should be an integral part of states export control systems has become a more established and respected global norm, even among states that previously paid only lip service to the issue. China, Russia, and states from the former Soviet Union have often been accused of not doing enough to respond to violations of their end-use controls. However, in October 2006 Russia issued a resolution on post-shipment creating stronger mechanisms in end-use controls.[67] The new mechanisms are thought to have been put in place in response to evidence presented to Russia by Israeli officials in 2005 and 2006 indicating that Russian anti-tank missiles and rocket propelled grenades had been diverted from Syria to Hezbollah. Since then, Russia has taken a number of steps to prevent cases of illicit diversion and the proliferation of MANPADS. This reportedly led Russia to impose an effective moratorium on arms sales to both Iraq and Pakistan because of the risks of onward diversion.[68] China has also taken a stronger interest in end-use controls in recent years, again defying its image as a state that cares little for these matters.[69] Finally, the 2013 Arms Trade Treaty (ATT) pays close attention to 'diversion' and even many states that were lukewarm to the treaty overall were keen to see the issue included.[70]

However, the extent to which this growing awareness of the issue could be turned into more effective cooperation may be being undermined by disagreements over the supply of arms to non-state armed groups in Libya and, more recently, Syria. Even among European states – which have spent many years

66 United Nations, General Assembly, Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects, 20 July 2001.
67 Holtom, P., 'Small arms production in Russia', Saferworld, March 2007, pp. 15-17.
68 US State Department, 'Subject: Addressing Russian arms sales', 26 Oct. 2007, via Wikileaks.
69 Bromley, M., Duchatel, M., and Holtom, P., 'China's Exports of Small Arms and Light Weapons', SIPRI Policy Paper, Oct. 2013.
70 In particular, Article 11 of the ATT obliges export, import, transit and trans-shipment states to take a range of measures to ensure that transferred arms are not diverted to 'the illicit market, or for unauthorized end use and end users'. Arms Trade Treaty (ATT), adopted 2 Apr. 2013.

negotiating the harmonisations of arms export policies – there have been strong differences about whether these supplies should take place, to say nothing of the deep divisions between the US and certain European states and Russia, China and others. This lack of consensus could ultimately undermine efforts to build broader international standards on end-use controls, something that would far outweigh the benefits brought by the use of new technologies.

Mögliche Kriegsbilder der Zukunft und ihre Konsequenzen für deutsche Sicherheitspolitik

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Abstract: The article analyses future trends in technologies and their possible military use on strategic and tactical levels to elaborate on risks for the population and critical infrastructures in Germany in the decades to come. It seems that non-state actors using longer range ballistic missiles and unmanned aerial vehicles could achieve a „deep-strike"-capability. In addition to other forms of warfare like economic, financial and ideological warfare, this can directly influence political decisions and affect possible major destructions in western societies like Germany. On the state level, special operation forces and proxies can become the preferred means for future warfare also in Europe.

Keywords: New technologies, acceleration of military operations, swarm tactics, military actions other than war
Schlagworte: Neue Technologien, Beschleunigung von Militäroperationen, Schwarmtaktik, Militäroperationen jenseits von Krieg

1. Einleitung und Methodik

Dieser Beitrag ist auf der Grundlage einer Studie[1] für das Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (BBK) entstanden. Im Rahmen der Studie wurde untersucht, welche Möglichkeiten direkter oder indirekter Schäden durch denkbare Kriegshandlungen auf mittelfristiger (fünf Jahre) und langfristiger Zeitachse (mehr als zehn Jahre) für Deutschland entstehen und welche möglichen Risiken daraus erwachsen können. Dabei zeichneten sich gerade in der langfristigen Perspektive Herausforderungen für die Sicherheitspolitik Deutschlands ab, die hier näher dargelegt werden sollen.

Für den langfristigen Zeithorizont der Studie wurden Methoden der Zukunftsanalyse benutzt. Hier wird vor allem von der Trendanalyse Gebrauch gemacht. Die Trendanalyse bezieht sich auf die möglichen Schäden, die durch zukünftige Veränderungen kriegerischer Handlungen in Deutschland entstehen könnten. Es geht dabei nicht um die Vorhersage zukünftiger Kriege, sondern um das Risiko eines möglichen Schadens, der sich für Deutschland aus zukünftigen Kriegshandlungen direkt oder indirekt ergeben könnte.

Die Trendentwicklungen[2] in Bezug auf Krieg[3] werden auf der Basis von ausgewerteten Zukunftsanalysen und Studien, insbesondere aus den militärischen Bereichen der USA, Großbritanniens und Chinas beschrieben. Außerdem werden Elemente aus der Risikoanalyse der nachfolgend zitierten BBK-Studie verwendet. Bestandteile des Risikos[4] sind demnach das Schadensausmaß und die Eintrittswahrscheinlichkeit des Schadensereignisses. Das Schadensausmaß zukünftiger Kriege kann nur abgeschätzt werden, da es ebenso wenig vorhergesagt werden kann wie der Eintritt zukünftiger Kriege. Das Schadensausmaß eines Krieges hängt von den eingesetzten Waffen und Kriegsmitteln (kurz: Fähigkeiten), deren strategischer und taktischer Nutzung durch die beteiligten Akteure sowie deren gesamtgesellschaftlicher Zielstruktur in Bezug auf ihre Verwundbarkeit ab. Offensiv bekämpfen sie das Zielspektrum der Gegner, defensiv schützen sie ihr eigenes Zielspektrum. Abhängig von den gewählten Zielkategorien (feste und bewegliche Ziele), ihrer Verortung im geografischen Raum oder anderen Dimensionen und ihren Verwundbarkeiten werden die Waffensysteme nach der beabsichtigten Wirkung (vernichten, zerstören, lähmen, zeitlich begrenzt ausschalten, etc.) gewählt. Hierdurch wird direkt oder indirekt das Schadensausmaß bestimmt.

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1 Hans Georg Ehrhart/Götz Neuneck (Projektleiter), Zukünftige sicherheitspolitische Bedrohungen und Risiken unter Aspekten der Zivilen Verteidigung und des Zivilschutzes Abschlussbericht (Version 3.2) 10. Juli 2014 (unveröffentlichter Bericht).

2 Ministry of Defence, DCDC. 2010. *Strategic Trends Programme, The Future Character of Conflict*, London; Qiao Liang und Wang Xiangsui. 1999. *Unrestricted Warfare*, Beijing: PLA Literature and Arts Publishing House; US Joint Forces Command, 2007. *Joint Operating Environment, Trends and Challenges for the Future Joint Forces through 2030*, Norfolk, December; US Joint Forces Command, 2010. *Joint Operating Environment 2010*, Suffolk.

3 Als Krieg wird im Weiteren die von der Arbeitsgemeinschaft Kriegsursachenforschung (AKUF) benutzte Definition in Anlehnung an den ungarischen Friedensforscher István Kende (1917-1988) verstanden. Darüber hinaus sollen auch solche als Kriege gelten, die von AKUF als „bewaffnete Konflikte" bezeichnet werden, Wolfgang Schreiber, *Kriege und bewaffnete Konflikte 2012*, AKUF Analyse Nr. 11, S. 7, Hamburg, http://www.akuf.de, Zugriff: 26.11.2013.

4 BBK, Methode für die Risikoanalyse im Bevölkerungsschutz, Band 8, Glossar, S. 59, „Risiko ist das Maß für die Wahrscheinlichkeit des Eintritts eines bestimmten Schadens an einem Schutzgut unter Berücksichtigung des potenziellen Schadensausmaßes."