

Regulating and Limiting the Proliferation of Armed Drones: Norms and Challenges

Geneva Paper 25/20

Cholpon Orozobekova and Marc Finaud
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Security Policy

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About the Authors

Cholpon Orozbekova is a researcher at the Bulan Institute for Peace Innovations in Geneva. Her research has focused on terrorism, religious extremism and proliferation and regulation of armed drones. Before joining the Bulan Institute, Cholpon worked as a Central Asia Analyst and UN Correspondent. Her analytical articles have been published in such international publications as *The Diplomat*, *Asia Times*, and *Jamestown Foundation*. She also worked in international organizations in Geneva. She holds three MA degrees from Geneva-based universities.

Marc Finaud is the Head of Arms Proliferation at the GCSP. He is a former French diplomat with extensive experience in arms control, non-proliferation and disarmament. In 2013-2015 he also worked as senior resident fellow at the United Nations Institute for Disarmament Research.

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I. Key points

- Recent spectacular cases of the use of armed drones have confirmed the rapid proliferation of these weapons over the last decade as more and more countries shift their focus from crewed to uncrewed aircraft. Total transfers of armed drones have been growing rapidly and according to estimates their value will reach US\$80 billion over the next few decades. Already, “more pilots are being trained to fly drones than manned aircraft”.¹
- Recent years have also been marked by a new wave of countries joining the group of drone-producing and -possessing countries. The three main exporters of drones are the United States, Israel and China, but many other countries such as the United Arab Emirates (UAE), Iran, the United Kingdom (UK), Iraq, Belgium, Italy, South Korea, Pakistan, Saudi Arabia and India have begun to invest in drone development projects.
- The landscape of drone transfers from drone-producing to non-producing countries has also changed dramatically in recent years, and the main challenge is that it is now being taken over by states that are not members of the Missile Technology Control Regime (MTCR). A key example is China, which has significantly changed the landscape of drone production and transfers by producing relatively cheap drones and exporting them to other states, particularly in the Middle East, while refusing to participate in arms control regimes such as the Arms Trade Treaty (ATT), Wassenaar Arrangement and MTCR.
- Many countries have started to invest in indigenous drone development programmes, including Pakistan, Iran, Iraq, Russia, South Korea, the UAE, Turkey and even Taiwan. These programmes are aimed at developing sophisticated drones with lethal capabilities. This rapid progression in drone production and proliferation suggests that it is only a matter of time before virtually every country in the world possesses missile-firing drones.
- A review of the control regimes in place to address the issues caused by armed drones suggests that several weaknesses and gaps in these regimes need to be addressed in order to ensure the effective regulation of drone production and transfers.

- The three main arms control regimes – the MTCR, ATT and Wassenaar Arrangement – have many shortcomings, but the chief among them is the limited extent of their membership: none has worldwide coverage. For example, 56 countries chose not to sign the ATT and, among the 130 who have signed it, 32 have yet to ratify it (as of 25 June 2020). The same pattern is also discernible with regard to the MTCR and Wassenaar Arrangement, which are by their very nature export control regimes open only to a limited number of technologically advanced arms-exporting countries. This limited participation coupled with a mismatch between existing provisions and technological advances leads to weak control regimes. These issues are further exacerbated by the growing number of states that have started to dominate the drone production and proliferation market while not being members of existing control regimes. This creates an urgent need to start negotiations and campaigns to ensure the participation of all drone-producing and -exporting countries in order to bring them into the fold of the relevant monitoring regimes.

II. Introduction

THE WORLD'S ATTENTION HAS BEEN DRAWN IN RECENT MONTHS TO A NUMBER OF SPECTACULAR CASES OF THE USE OF ARMED DRONES IN MILITARY OPERATIONS:

- the targeted killing by the United States of Gen. Qasem Soleimani, the head of the Iranian Qods paramilitary force, at Baghdad airport on 3 January 2020, together with pro-Iranian militia leaders;²
- strikes on Saudi Arabia's Aramco oil facilities at Abqaiq on 14 September 2019 by some 25 drones and missiles. The Houthi movement in Yemen claimed to have carried out these strikes, but the United States and Saudi Arabia attributed the attack to Iran, which denied responsibility;³ and
- reports that Turkey had made intensive use of armed drones in Syria to destroy dozens of Syrian battle tanks, infantry fighting vehicles, and air defence systems after several of its own drones had been shot down by Syrian or Russian forces in early 2020.⁴ Previously, Turkey had publicised its manufacture of a new drone, the Songar, armed with a machine gun or grenade launcher, controlled by artificial intelligence, and capable of being used in swarms.⁵

These events are only the visible part of a global phenomenon that started a few decades ago but is now widespread: the resort to uncrewed air vehicles (UAVs) equipped with weapons as a substitute for air strikes previously carried out by crewed aircraft. As a consequence of the attractiveness of the use of drones – for obvious reasons of cost and pilot safety – the international market in armed drones is booming, creating risks of widespread proliferation, especially to non-state actors or states known for their lack of respect for the laws of warfare. This paper analyses these proliferation risks and formulates recommendations on how to mitigate them.

Starting in the late 20th century, the growth of guided-missile technology led the international community to draw up political and legal rules in order to control the export of such sensitive equipment – subsequently including UAVs – to countries where the risk of uncontrolled and/or illicit proliferation and use is the highest. The first such attempt was the Missile Technology Control Regime (MTCR), which was established in 1987 to harmonise policies for the export of missiles and related technology and has been gradually extended to cover UAVs. The second regime was a voluntary transparency measure, the United Nations Register of Conventional Arms (UNROCA), established in 1991, to which UN member states are encouraged to report their exports and imports of conventional arms, including UAVs. The third was the Wassenaar Arrangement, launched in 1996 as a multilateral export control regime for conventional and dual-use goods and technologies, to which UAVs were added. The most recent initiative is the ATT, which entered into force in 2014 and regulates transfers of conventional arms, including certain categories of UAVs. As we will see in section 2, however, these regimes are far from being universal and all have limitations that make it difficult to impose constraints on UAV exports.

III. A growing market dominated by three actors: the United States, China and Israel

Despite the growing international sales of drones in general and armed drones in particular, there is no consensus among states and no orchestrated joint actions to harmonise trade policies in order to make drone transfers more transparent and accountable. At best one can point to the 2016 initiative of the Obama administration to promote harmonised export controls for armed drones among like-minded countries. On 28 October 2016, 53 states⁶ issued a Joint Declaration⁷ whereby they committed to working to shape international standards regulating the sale, transfer and subsequent use of military UAVs. This Joint Declaration reflected the following important steps: it established the broad consensus that, together with other weapons systems, drones are subject to international law; that states should commit to responsible drone-export practices in line with relevant international arms control norms; and that they acknowledge the benefits of transparency and should thus voluntarily report their exports of drones for military use.

This declaration was a significant first step in uniting states in a joint commitment. However, after President Obama left office there was no real follow-up action to operationalise the declaration and establish clear, concise, and concrete norms to regulate and control the sale and use of armed drones. Since there are no further multilateral agreements or policies to consider, this paper will now proceed with three case studies to help our understanding of state policies vis-à-vis the proliferation of armed drones. The United States, China and Israel have been selected as case studies because they are the largest producers and exporters of armed drones.

A. United States

The United States has an enormous UAV-manufacturing infrastructure that gives the country a dominant position in the UAV market, particularly in terms of military applications. In just 20 years, from 1994 to 2014, the United States authorised the export of at least US\$3 billion worth of UAVs and related equipment, but scholars say that “data is incomplete and industry experts have estimated that US UAV export authorizations from 2005-2012 alone were between \$2 and \$3 billion”.⁸ According to Stimson Center research, the United States currently exports UAVs to 21 countries, including Italy and the UK, which are the “predominant recipients of Category I UAVs⁹ from the United States”.¹⁰

The United States, which had already experimented with remotely piloted aircraft during the Vietnam War, has started being associated with armed

drones that have been labelled as “emblematic of twenty-first century military technologies”¹¹ after waging a “Global War on Terror” that started after the terrorist attacks in the United States of 11 September 2001. Initially the United States used drones only for peaceful purposes such as surveillance, reconnaissance and general espionage, for example in the Balkan wars. But after a decade it started to conduct drone strikes to kill suspected terrorists, and has used military drones for these and other missions in Afghanistan, Yemen, Iraq, Pakistan and Somalia.

Currently the drones manufactured by the United States show significant evolution in UAV technology and are very powerful. As US Air Force General Moseley highlighted in 2006, the United States “moved from using UAVs primarily in intelligence, surveillance and reconnaissance roles before Operation Iraqi Freedom, to a true hunter killer role with the Reaper”.¹² Drone capacity and technology have developed significantly since this statement was made.

Although the United States does not monopolise the drone market and exports fewer armed drones than Israel, there are expectations that, as a world leader and supposedly a guarantor of democracy, the United States should set an example in regulating drones sales, and has “a responsibility to ensure that sales, transfers and subsequent use are responsible and consistent with legal norms”.¹³ However, the Trump administration seems to have a different view on this issue, and the United States has recently changed its drone-export policy towards promoting more sales and earning greater profits from drone sales.

During the Obama administration the United States had followed strict guidelines restricting the sale of armed drones to countries that did not meet specific US criteria (including end-use assurances, lawful use, etc.),¹⁴ while the US Congress also frequently blocked such exports. However, the new export policy adopted in 2018 seems to be a step in the direction of expanding the development and trade of US drones to compete with China.

Indeed, on 19 April 2018 the US government approved a new policy on the export of uncrewed aerial systems (UAS).¹⁵ This document lays down the primary objectives of the new approach to UAS exports such as: (i) removing barriers to the global UAS market for US drone technology and boosting the export of armed and unarmed drones in order to compete with Chinese exports; (ii) facilitating international partners’ access to US UAS in situations where their use will enhance these partners’ security and ability to achieve shared security or counterterrorism objectives; and (iii) preventing state- or non-state actors from developing capabilities that would undermine the safety and security of the United States and its allies and partners. As UAS Vision, an independent global forum for UAS, commented on the new policy: “the document removed some restrictions on sales of ... advanced drones in order to reinforce the armies of [US] allies and compete with China on the world arms market”.¹⁶

This new US policy on drone exports seems to be focused on weakening the position of the other two key stakeholders – China and Israel – in the market so as to enable US firms to increase their direct sales. The United States became especially concerned from 2008 onwards when China started aggressively marketing and selling replicas of US drones to the Middle East and other regions.¹⁷ However, China is not a member of any of the control regimes referred to above and described below, and does not feel bound by the rules of international arms control regimes. The United States, as a stated guarantor of democracy, should initiate a process to set global common standards for armed drones and make itself an example of their responsible export and use for other countries to follow. At the moment, the new US policy on UAS seems to be oriented towards boosting the competitiveness of US products in a booming drone market increasingly dominated by Chinese products, rather than focusing on long-term goals such as international stability and security.

If we analyse reports and assessments conducted by US think tanks, the growing competition in the drone market has been seen as “an increasing potential threat to U.S. forces”, because the proliferation of these UAVs to small nations will complicate US operations involving some adversary countries. A RAND Corporation assessment analysis says:

Major potential adversaries – China, Russia, and Iran – recognize the utility of this capability and are producing many types of UAVs, including category I systems, for their armed forces. If export controls were successful in restricting some lesser adversaries from obtaining category I UAVs, they will likely be able to indigenously produce or acquire the near-category I systems (e.g., Saudi Arabia).¹⁸

That being said, however, compared to other countries the United States has been a more responsible exporter, because most exports of US-manufactured armed drones have been sold to countries that are signatories to the MTCR Agreement. According to the RAND assessment referred to above, “the only nations to receive U.S. category I or near-category I UAV systems have been U.S. allies and partners”.¹⁹ Many experts argue that countries such as Jordan, the UAE, and Saudi Arabia, after being unable to purchase armed UAVs from the United States, have turned to China to purchase these systems. However, this policy has recently changed.

The US UNROCA annual report for 2017 shows that the Trump administration sold two armed drones in that year: one to an ally, France, and one to the UAE.²⁰

Feeling that the US drone industry was being increasingly challenged by the fierce competition in the market and the growing dominance of other drone-producing countries, the Trump administration decided to make its export policy friendlier towards previously restricted countries. Experts say that there has been intense pressure from members of the US drone industry who were worried that they would lose their lead in this dynamic growth sector, which China was beginning to dominate.²¹ However, other experts say that the market is already dominated by newcomers and it is too late for US efforts to prevent other countries from producing and exporting drones.²²

To sum up, the hope among the international community and experts that the United States would initiate and lead concentrated efforts to mitigate the spread of drone technology and the dangers associated with UAS proliferation is starting to fade. As Kreps and Zenko have highlighted, when ballistic missiles started to rapidly proliferate in the 1980s and 1990s, the United States recognised their unprecedented ability to cause immediate and widespread destruction as a new threat to peace and mobilised all countries to set up control regimes. In terms of drones, however, “not taking measures now to mitigate their spread will only undermine the United States’ long-term interests”, these authors insist.²³ However, it seems that the current US administration has no intention of taking this kind of action, and any change will have to wait until a new administration takes office.

B. China

After the United States under President Obama had started to follow a selective drone-export policy intended to prevent drones from “falling into hostile hands, being used to suppress civil unrest or erode Israel’s military dominance”,²⁴ many countries turned to China to acquire drones, making it an influential exporter. According to Sharkey, China has taken advantage of this “hole in the market” by attracting countries that could not or no longer purchase US-made drones and successfully started developing and supplying armed drones to various countries.²⁵

Scholars and experts refer to China as a “no-questions-asked exporter of drones”,²⁶ since it is not a member of any control regimes. China has agreed informally to abide by the original provisions of the 1987 MTCR Agreement (see section 2.2, below), but not subsequent revisions. According to the Royal United Services Institute (RUSI), China regards the MTCR as not suitable for controlling the proliferation of armed drones and applicable only to missiles.²⁷ Furthermore, according to this RUSI analysis, China sees UAVs as an ideal tool to combat terrorism threats and views all countries in the Middle East as potential clients.²⁸

There are two reasons why China has become a key supplier of armed drones. Firstly, Chinese armed drones are much cheaper than their US-manufactured equivalents. Secondly, China enjoys more space to acquire potential clients by avoiding the constraints of international norms and exporting drones to any country that wants to buy them.

China's production and export of drones have significant implications for international security and relations. International experts raise concerns about how China has been exporting military drones to countries in the Middle East that might use such weapons in armed conflicts. Specifically, China has started to develop a production line in Saudi Arabia for up to 300 Wing Loong II drones (with long-range strike capability and satellite links) and potentially the CH-5 (with a wingspan of 21 metres, a payload of 1,000 kg and a range of 10,000 km):

This deal alone will provide Saudi Arabia with up to 300 Category I and near-Category I UAVs. Similarly, China has signed deals for potential production lines in Pakistan and Myanmar, although the status of that deal and which CH variant they will produce are unclear.²⁹

In addition, in July 2017 the China Aerospace Science and Technology Corporation announced that Beijing was ready to mass produce its CH-5 drone for export. This is a heavy drone with Category I capabilities. "Although no official sales have been reported, China is prepared to sell this category I UAV in the near future", says the RAND analysis.³⁰

The major concern among the international community is how long China will remain a "no-rule binding exporter". According to RUSI estimates based on interviews with Chinese military officials, Beijing is not necessarily opposed to the establishment of a new set of rules to apply specifically to drones, but disputes some of the issues related to imposing export controls on UAVs. And even though no official documents are available that give insights into specific guidelines, Beijing applies only two criteria when choosing customers for its drones: firstly, only states can acquire Chinese drones, so that they will not fall into the hands of non-state actors; and, secondly, Beijing gives priority to countries that want to use drones to fight terrorism.³¹ These two criteria suggest that any state in the world can acquire Chinese drones, since there are no barriers to prevent them from doing so.

The Chinese government seems to have no intention of changing this policy in the near future, because “it prides itself on not taking any side”³² and thus sees all countries as potential clients. In reality, many countries that had been rejected by the United States consider China as a saviour that is willing to provide them with drones. For example, Jordan – a country sandwiched between political adversary states and non-state actors such as Hamas and Hezbollah and facing a high threat from the non-state group Islamic State – was exploring the possibility of acquiring US Predator drones. After being rejected by the United States, Jordan acquired two Chinese CH-4B drones that are capable of firing missiles. Saudi Arabia also acquired Wing Loong and CH-4 armed drones from China and signed an agreement with China at the end of 2019 to develop its own drones under licence and with training from the Chinese state-owned Chengdu Aircraft Industry Group.³³

Each year China organises the Air Show China in Zhuhai, where it demonstrates the capabilities of its armed drones. The growing number of exhibitors and the sophistication of the drone technology on display are indications of the Chinese government’s strong commitment to the development and sale of drones. Defence industry experts suggest that developing countries in Asia, Africa and the Middle East are more likely to turn to China to buy armed drones because there are no restrictions on such purchases, especially given their low prices compared to US and Israeli drones. However, experts warn that, although China is acting normally by exploiting the gap in the market, the quality of Chinese drone technology is “unproven in comparison to ... US and Israeli alternatives”,³⁴ even though there are no recorded incidents to suggest that Chinese drones might be of poor quality, and there have been no complaints from states that have imported armed drones from China.

China is not too far behind the United States in terms of the sophistication of its drone technology, especially taking into account that China is benefitting from not being a member of the three principal control regimes and having no internal restrictions to distinguish among potential clients who wish to acquire drone technology. There is a current technology gap between US/Israeli and Chinese drones, but it seems to only be only a matter of time before China catches up. In 2019 a US Department of Defense report noted that

the acquisition and development of longer-range UAVs is increasing China's ability to conduct long-range ISR [intelligence, surveillance and reconnaissance] and strike operations. Multiple armed UAV types are under development, in testing, or in the initial phases of deployment. In addition, China successfully tested the AT-200, which it claims is the "world's first large cargo UAV".³⁵

It seems that China has positioned itself confidently in the market and is determined to continue to develop and sell drones and their related technology.

This fierce competition in the production of drone technology is a part of the arms race with the United States, and China's military development over the past two decades shows that

its behaviour, rationales, and resource allocations since the 2000s are tending more towards a classic form of arms racing, which is intensive, competitive, and offensive in nature. This is especially true as China seeks to race from behind and narrow the gap with the US.³⁶

The major challenge stemming from China's military development is the lack of transparency, especially since experts highlight that China only releases a defence white paper every two years. As Cheung underscores, there are cosmetic rather than substantive changes in the most recent white papers that do not address a deepening sense of distrust and concern that the international community has over China's military intentions and long-term defence trends: "Core transparency issues such as detailed breakdown of defence budgets and disclosures of weapons programmes and force deployments continue to remain off-limits. This can only fuel uncertainty and the needs for other countries to take counter measures".³⁷

We believe that the production and export of drone technology also demand transparency and compliance with international norms. For some time China has been a major exporter of drones, but has not been a member of any of the principal multilateral regimes. China's Ministry of Foreign Affairs commented that Beijing "keeps contacts and exchanges"³⁸ with these regimes. However, this gives China a free hand to decide which guidelines it wishes to follow and which to ignore. China, as a permanent member of the UN Security Council and party to most other multilateral agreements, would improve its image as a responsible actor if it made more comprehensive efforts to join the relevant arms control regimes and comply with them.

In 2004 China's application to join the MTCR was rejected "due to concerns that Chinese entities continued to provide sensitive technologies to countries developing ballistic missiles, such as North Korea".³⁹ According to the Arms Control Association's analysis, China, as a key contributor to Pakistan's missile development and provider of sensitive technology to countries like North Korea and Iran, failed to issue a comprehensive list of controlled items requiring government approval before their export. This was the main reason why its application to join the MTCR was rejected. Sixteen years after this rejection, if it wishes to reapply to join the MTCR, China first needs to publish a list of controlled items and pledge that it will comply with existing international norms or contribute to shaping new ones regarding drone sales and other military exports.

For the last decade China issued white papers in which it described its commitments and intentions to be a part of international arms control norms. In September 2005 China issued a white paper entitled "China's Endeavors for Arms Control, Disarmament and Non-Proliferation"⁴⁰ in which it stated that the right of all countries to equal participation in international arms control, disarmament and non-proliferation regimes was essential.

Specifically, with regard to missile technology, China advocated the establishment of a fair and non-discriminatory multilateral mechanism universally accepted by the international community as part of a missile non-proliferation regime. Beijing has issued at least three documents on non-proliferation and arms control; however, the Chinese government's political willingness to enforce strong export controls has been seriously doubted. Unfortunately, the reality of China's policies seems to contradict its official declarations.⁴¹

UNROCA contains some data on China's arms transfers, but it seems that Beijing does not submit a full report with detailed information on the country's arms exports. For example, China's annual report for 2017 does not mention any transfers of armed drones, even though Beijing has been exporting them to dozens of countries.⁴² China has never bowed to international pressure for greater transparency in terms of its armaments, whether conventional or nuclear, despite its aspiration to be a recognised and respected international actor. But it may be sensitised by its trading partners to the advantages of increased transparency, whether as part of its deterrence policy or because its competitors can demonstrate that openness has not hampered their export ambitions.

C. Israel

Israel has a long history of developing drones, and used them for surveillance over Egypt before the 1973 Yom Kippur War and in the First Lebanon War in 1982 to locate targets so that piloted aircraft could attack them. This indicates that the first versions of Israeli drones were not capable of firing missiles, but were used to identify targets for strikes by piloted aircraft. In 1973 Israel had already developed drones that could take off and land independently while being controlled remotely and had cameras that transmitted video footage in real time.

By 1982, drones were a key element in providing real-time intelligence for the top Air Force brass sitting in Canary, the command post deep underground in central Tel Aviv. They also played a key role in knocking out Syrian anti-aircraft missile batteries in Lebanon.⁴³

Since then, as experts observe, the research into, development and production of innovative drone technology remain “a high priority in Israel – both for domestic use and for export purposes – and indeed, Israel continues to be one of the world’s leading developers and vendors of UAV technology”.⁴⁴

Israel Aerospace Industries (IAI) started to manufacture drones in 1974.⁴⁵ In 1979 IAI brought into service the Scout surveillance drone, while another Israeli company – Tadiran – developed the Mastiff drone in competition with the Scout. Both drones were used to conduct surveillance and target acquisition missions over Lebanon, Syria and Egypt.

Israel’s war and combat history, combined with its early entry into the drone field, has provided it with a competitive edge in the market for exporting drones. According to a Stockholm International Peace Research Institute (SIPRI) analysis, 41 per cent of the world’s drones came from Israel between 2001 and 2011, and drones now account for up to 10 per cent of Israel’s military exports.⁴⁶ Although US and Chinese competition has reduced this Israeli lead, according to experts Israel “remains in the top three if not the top two” drone exporters.⁴⁷

Furthermore, according to a Drone Wars UK research report, Israel has exported drone technology to some 50 out of the 76 countries thought to have drones. The Sri Lankan armed forces used Israel’s IAI Super-Scout and Searcher II drones in operations against Tamil Tiger (LTTE) rebels from 1996 onwards.⁴⁸ In January 2008 the Sri Lankan government abandoned a truce with the LTTE to pursue victory in a military offensive called the Humanitarian Operation, in which it used “some significant advanced surveillance systems in the form of unmanned aerial vehicles (UAVs) from Israel”.⁴⁹

Israel exports roughly US\$500 million worth of UAV-related products each year,⁵⁰ and the country’s production of drones will increase annually by 10 per cent over the next five years. This growth can be explained by the strict policies of the United States, which impose regulatory constraints on Israel’s US competitors that keep their ability to market their drones in check, creating a vacuum that Israeli firms are well positioned to fill thanks to the technological superiority of their products over those of the Chinese.⁵¹

Although the United States now has the capacity to produce large, sophisticated drones, in the 1980s it was learning about the drone production process from Israel and bought its first drones from that country. The Israeli Air Force, hoping to convince the United States to cooperate with Israel in drone development, wanted to demonstrate how effective its miniature and pilotless planes could be. The US defense secretary, Caspar Weinberger, visited Tel Aviv in 1979 and met with top Israel Defense Forces officials:

Weinberger’s visit to Israel paved the way for a huge deal between Israel Aerospace Industries and the Pentagon for the sale of 175 upgraded Scout UAVs, which were given the name Pioneer in the United States. They were used by the US Navy, Marines and Army until 2007.⁵²

Israel continued to invest in drone development programmes, equipping drones with more precise cameras and lasers so that they could hit targets more accurately. This included drones that were able to track a moving target, transmit an image of the target directly to the operational command centre, provide real-time links with decision-makers and fire the missile to destroy the target.

Israel is under pressure to remain a key drone producer because of its volatile security environment. Its adversaries such as Iran and non-state actors such as Hamas and Hezbollah possess different types of drones and use them to penetrate Israeli air space and test and provoke Israel’s defences. “While Israel enjoyed complete aerial superiority in the field of drone warfare in recent decades, its lead is being increasingly challenged”, says Sadot, pointing to the fierce competition with the United States and China.⁵³ Sadot observes:

While Israel holds a robust array of aerial defences and aerial interceptor batteries capable of stopping drones as well as various rocket barrages, enemy drones create new types of challenges that threaten Israel and will require its military to continuously adapt in the years to come.⁵⁴

Furthermore, Israel is not a norm-complying producer and/or exporter. Israel has never reported any drone transfers to UNROCA, is not a party of either the MTCR or the Wassenaar Arrangement, and only signed the ATT in 2014, but has not ratified it. Therefore, the country has no legal obligation to comply with any control regimes, and it is evident that in the interests of international security the international community should initiate negotiations to ensure that Israel becomes a full member of such regimes.

IV. Review of existing regimes to regulate armed drones

The proliferation of armed drones falls under the framework of several international regimes, which are discussed below. The first takeaway from an analysis of these existing regimes is that, with one exception, no strict binding rules exist, since the norm of international cooperation in this regard is voluntary, making unsanctioned non-compliance a possibility. The ATT is the only legally binding instrument of these regimes, but it also has its own limitations. Therefore, there seems to be a clear lack of comprehensive and strong international regulatory mechanisms to govern the export and use of drones in general and armed ones in particular.

In fact, UN Institute for Disarmament Research (UNIDIR) experts admit that “There is a need for a transparent and inclusive multilateral process to develop international standards applicable to armed UAVs”.⁵⁵ This insight proves particularly valuable when we realise that not all drone-producing states are members of existing control regimes, which means that membership of and subsequent adherence to these mechanisms varies across states. As a result, some of the major producers of armed drones are not members of some of the most crucial control regimes. While the United States and Israel have signed but not ratified the ATT (and the United States has recently withdrawn its signature), China is not a member of any of the control regimes.⁵⁶

Country	MTCR	ATT	Wassenaar Arrangement
United States	Joined in 1987	Signed in 2013, but did not ratify; withdrew its signature in 2019	Member
Israel	Non-member	Signed in 2014, but did not ratify	Non-member
China	Non-member	Non-signatory	Non-member
UK	Joined in 1987	Signed in 2013 and ratified in 2014	Member
Belgium	Joined in 1990	Signed in 2013 and ratified in 2014	Member
France	Joined in 1987	Signed in 2013 and ratified in 2014	Member
Germany	Joined in 1987	Signed in 2013 and ratified in 2014	Member
Iran	Non-member	Non-signatory	Non-member
Pakistan	Non-member	Non-signatory	Non-member
Iraq	Non-member	Non-signatory	Non-member
Italy	Joined in 1987	Signed in 2013 and ratified in 2014	Member
UAE	Non-member	Signed in 2013, but did not ratify	Non-member
South Korea	Joined in 2001	Signed in 2013 and ratified in 2016	Member
India	Joined in 2015	Non-signatory	Non-member
Turkey	Joined in 1997	Signed in 2013, but did not ratify	Member

Table 1: Drone-producing countries' membership of control regimes

According to the 2017 UNIDIR study referred to above, the world needs multilateral discussions under the auspices of the UN to lay down ad-hoc rules for armed drones. The study concludes that,

in this regard, a useful step would be for States to put forward a United Nations General Assembly resolution that highlights both use and proliferation concerns about armed UAV policies and practices, and establishes a mandate for the development of standards in order to improve the transparency, oversight and accountability of armed UAVs in all their aspects.⁵⁷

Therefore, it becomes clear that there are several gaps in the regulatory mechanisms in place for armed drones, especially considering that there is no common understanding of which norms are applicable to drones in the first place. As such, we shall now focus on an analysis of these norms to see which provisions apply or could apply to the regulation of armed drones.

A. The Arms Trade Treaty and UN Register of Conventional Arms

The first document that we will review is the ATT, which establishes legally binding standards for regulating the global trade in conventional weapons. The ATT was adopted in 2013 after seven years of intense negotiations and met strong opposition from some major arms-exporting countries. It is the first international legally binding instrument to increase transparency, responsibility, and accountability regarding states' international trade in conventional arms and cooperation in combating illicit arms trafficking and diversion: "the treaty sets minimum standards that all its States Parties should introduce and implement at the national level, including comprehensive legislation, national control lists, case-by-case risk assessment of arms transfer licence requests, and reporting measures".⁵⁸

Should the ATT be applied to armed drones? The answer is clearly yes. The ATT covers eight categories of arms as listed under Article 2.1 of the treaty: battle tanks, large-calibre artillery systems, missiles and missile launchers, attack helicopters, armoured combat vehicles, combat aircraft, small arms and light weapons. However, the ATT does not provide definitions for any of these categories of conventional weapons. Article 5.3 of the treaty only

encourages states parties to apply the treaty to the “broadest range of conventional weapons”, but obligates them to use national definitions that would not cover less than the descriptions used in UNROCA, which includes armed drones under the category “combat aircraft and unmanned combat air vehicles (UCAV)”.⁶⁰

Since 2009 there have been discussions and initiatives to add armed drones as a new category to UNROCA. The 2013 Group of Governmental Experts on the Continuing Operation of the United Nations Register of Conventional Arms recommended definitions for both uncrewed combat aircraft and uncrewed attack helicopters, and recommended that member states include armed drones in their annual reports. According to a 2015 UN Office for Disarmament Affairs (UNODA) study, “In accordance with the terms of the Arms Trade Treaty, those definitions for UAVs are also included in the scope of the Treaty”.⁶¹ The UNODA experts concluded that due to a number of “unique characteristics that give them greater potential to be misused”,⁶² UAVs should be addressed as a distinct category of weapon system for the purpose of arms control. This study and subsequent discussions led to the creation of a subcategory for armed drones in UNROCA. In 2016 a new subcategory, subcategory B, was added to Category IV of UNROCA and gives a complete description of a UCAV, describing it as an “Unmanned fixed-wing or variable-geometry wing aircraft, designed, equipped or modified to engage targets by employing guided missiles, unguided rockets, bombs, guns, cannons or other weapons of destruction”.⁶³

During the 2013 UNROCA review, a Panel of Governmental Experts concluded that “UAVs are included within the fourth and fifth categories of the Register (combat aircraft and attack helicopters, respectively)”.⁶⁴ Since armed drones have now been classified in their own subcategory, the implication is that states should voluntarily report the export of armed drones in their annual report to UNROCA, and ATT states parties should apply the treaty’s prohibitions and export assessment obligations to drone transfers.⁶⁵

However, despite these efforts, the ATT has two main weaknesses. Firstly, states parties’ reporting of exports of armed drones is limited. States parties are obliged to submit their annual reports to the ATT Secretariat and disclose arms transfers for all listed conventional weapons, including each armed drone that is either exported or acquired. “Indeed, the ATT annual report template has sub-headings for the categories of ‘combat aircraft’ and ‘attack helicopters’, allowing States Parties to report separately on imports and/or exports of manned and unmanned aerial vehicles in these categories”.⁶⁶ According to Stimson Center experts, “though the ATT does not explicitly reference drones within its scope, the treaty does implicitly apply to drones”.⁶⁷ Even though the major achievement of the ATT is that states have started to submit annual reports for the last three years listing their drone transfers, the lack of sanctions in case of non-compliance means that there is a real possibility of these declarations being faulty, i.e. hiding

the true number of drone transfers or even not reporting any transfers. So, the first weakness of the ATT is that it requires states parties to report on their conventional arms exports and imports, but this is left to each state party's good faith and there is no means of ensuring compliance with this requirement. Also, no mechanisms are available to check the information provided in states' annual reports. The ATT Secretariat has no mandate to analyse the reports and, for instance, signal inconsistencies between reports of exporting states and importing states. This can only be done by other states, civil society organisations or researchers. However, positive tendencies can be identified in that some states have become more transparent and have indicated their procurement of armed drones in their annual reports. In its 2017 annual report to the ATT, Belgium indicated that it authorised the export of two armed drones (valued respectively at US\$1.7 million and US\$10.5 million) to the United States and UK.⁶⁸ In its 2017 annual report Slovakia disclosed that it imported two armed drones from Israel.⁶⁹ This trend was also followed by the United States. In its 2017 report to UNROCA it listed two drone sales: one MQ-9 Reaper to France and one Predator to the UAE.⁷⁰ "Such disclosures help to further cement the practice of reporting on drone transfers both to the UN Register and the ATT", highlight Stimson Center experts.⁷¹ In practice, most ATT states parties send the same report to the UN Register and the ATT.

The second weakness of the ATT is that it is far from being universal: 56 states have not signed and 32 signatory states have not yet ratified the treaty (as of 25 June 2020). This means that those countries that have signed the treaty but are not states parties have no legal obligation to comply with the detailed provisions of the treaty, especially with regard to reporting. The United States and Israel – two leading drone-producing countries – have signed but not ratified the treaty, and the Trump administration decided in April 2019 to "un-sign" it.⁷² China is among the non-signatory states,⁷³ and together with Russia and India was among the states that abstained when the ATT was adopted. From the very beginning of the ATT process "the Chinese government had deep doubts about the necessity and appropriateness of an international treaty regulating the arms trade".⁷⁴ China played an active role during the negotiations for the ATT, and as a result the international community expected that it would sign the treaty. Indeed, China sells cheap arms to poor countries and most of these countries had been supportive of the treaty. It is thus something of a paradox that eventually China did not sign the treaty. The main reason was that Articles 6 and 7 of the ATT refer to possible violations of human rights by importing states as a criterion for denying exports. China considered these articles to be speculative and could serve as grounds for biased export denials by some arms-exporting countries. The other reason was that China is determined to fully develop its arms production industry and, as a state that both exports and imports arms, was worried that the treaty would impose restrictions on its sales of and access to weapons.

Israel's position with regard to the ATT appears to be sceptical rather than active and positive. At the beginning of the ATT negotiations Israel supported the idea of promoting a responsible arms trade and participated actively and constructively in the process. But its enthusiasm seemed to wane, and "Despite early action and interest Israel was one of the last states to sign up to the Treaty before its entry into force in December 2014".⁷⁵ Since then Israel has remained a signatory state, but its delay in ratifying the treaty may be related to domestic and procedural considerations, since its export control system is compatible with ATT reporting requirements.⁷⁶ It continues to take part in meetings of states parties among some of the signatories.

The ATT has a strong potential to limit the irresponsible transfers of armed drones, but much work is still needed to persuade states to join and ratify the treaty. In particular, the ATT has poor track record among Asian countries, "especially with regards to the major arms importing and manufacturing states such as India, China, Pakistan and Indonesia".⁷⁷ Given the fact that Asia-Oceania is the world's second largest arms-importing region after the Middle East and is developing its own arms export potential, with India and China supporting and encouraging this regional defence export market, the absence of these states "undermines the effectiveness and seriousness of the Treaty on the Asian continent".⁷⁸ The same could be said of Russia's rejection of ATT membership, although it is lagging behind as a producer and exporter of armed drones.⁷⁹

The annual reports to the ATT were supposed to bring transparency to the flow of arms in the world. However, experts argue that "the current reporting has been ineffective in fulfilling this objective".⁸⁰ At the Fourth Conference of States Parties in Tokyo in August 2018 the ATT Secretariat highlighted that only 48 states had submitted their reports for 2017 of the 89 required to do so. Moreover, while the number of states parties to the treaty had grown, the number of annual reports received has actually declined in terms of the percentage of required reports: 79 per cent for 2015, 71 per cent for 2016, and only 64 per cent for 2017.⁸¹ This trend has continued and, for the 2018 reporting period the reporting rate has fallen to 60 per cent.⁸² Despite the treaty's legally binding nature, not all states parties are strictly following the reporting requirement, which undermines the treaty's effectiveness.

Despite these drawbacks, many experts argue that the ATT has all the provisions needed to control armed drones. They agree that the ATT's capacity to regulate armed drones should not be underestimated, since it is clear that the treaty covers this type of weapon, while the UN Register contains a clear and concise definition of armed drones. In this context the main concern would be the behaviour of some states and how some important drone-exporting countries have not attempted to join the treaty. However, many experts consider that the status of being a signatory state (as opposed to one that has ratified the treaty) does not free such states from treaty obligations. In cases where armed drones are used in armed conflict even by a state not party to the ATT, the norms of international humanitarian law codified in the 1977 Geneva Protocols, as well as customary humanitarian law, would apply. However, it is clear that the treaty has not been fully effective because of the lack of universal membership, and the international community needs to make stronger efforts to ensure that more states – especially the major arms-exporting states – join the ATT.

In sum, even though the ATT and UNROCA have been successful in terms of increasing the transparency of the arms trade, these instruments cannot make a strong impact on regulating exports of armed drones unless significant changes are made in the export control regimes or alternative regulatory regimes that have been established. The reason is that the three largest producers of armed drones – the United States, China and Israel – do not comply with the ATT as non-states parties and thus never submit annual reports to the treaty. In recent years states have tended to change national policies to overcome increased competition in the market and enable more transfers of armed drones, “despite the absence of clear standards and understandings”.⁸³ Thus, Woodhams warns that “the limitations of existing arms control mechanisms will only become more pronounced”.⁸⁴ It is urgent that negotiations with China, Israel and the United States be resumed, and especially China should be encouraged to join the ATT and change its arms trade policy if necessary to comply with ATT provisions. Some recent expressions of interest from Chinese officials may offer a glimmer of hope in this regard.⁸⁵

B. The Missile Technology Control Regime

The second regime that should be examined is the MTCR, which was created in 1987 during the Cold War as “a new export policy to prevent the proliferation of nuclear-capable missiles able to strike from a significant distance”.⁸⁶ It is not based on a treaty, but is a voluntary association network that implements guidelines to control the export of missiles, their major components, and related equipment and technology. Currently the MTCR has 35 member states⁸⁷ and works on the basis of two documents: the “MTCR Guidelines”⁸⁸ and the “Equipment, Software and Technology Annex”.⁸⁹ While the Guidelines define the main objectives, working mechanisms and rules of the agreement, the Annex gives more details on implementation, the list of weapons to be covered and how the Guidelines should be applied. Of the three leading drone-producing countries, only the United States is a member of the MTCR.

Country	Membership of the MTCR
Belgium	Member (since 1990)
China	Non-member
France	Member (since 1987)
Germany	Member (since 1987)
Iran	Non-member
Iraq	Non-member
Israel	Non-member
Pakistan	Non-member
South Korea	Member
Turkey	Member
UAE	Non-member
UK	Member (since 1987)
United States	Member (since 1987)

Table 2: MTCR membership of drone-producing and -possessing countries

Source: MTCR website and Arms Control Association

The MTCR covers armed drones in both the Guidelines and Annex, together with ballistic missiles, space-launch vehicles, sounding rockets and cruise missiles.⁹⁰ However, scholars and experts question the actual efficacy of the MTCR in controlling UAV technology, arguing that the organisation's classification of weapons has become outdated in light of recent rapid advances in drone technology. Sartori observes,

In the 1980s, when the regime was initially set up, this classification made sense. At the time, drones were generally designed for one-way missions, as targets for missile practice or to perform short-range surveillance missions and had limited utility. Today, applying the same classification to missiles and UAVs ignores the important technological evolution of the latter.⁹¹

Apart from this shortcoming that made it impossible to keep up with rapid technological advances, the MTCR has further limitations.

Many new features and capabilities of armed drones are not considered in existing MTCR norms. The MTCR divides armed drones into two categories, both of which are insufficient. As Sartori argues,

For instance, category II export models can deliver any payload up to a range of 300 km according to the MTCR Annex. Nonetheless, considering that a small UAV could potentially deliver kilogram quantities of biological agents such systems represent a real danger, and now account for up to 80 percent of all UAVs on the market.⁹²

This example “clearly suggests the existence of a mismatch between MTCR regulations and the latest UAV technological advancements”.⁹³

According to the Clingendael Institute, the MTCR has remained largely unchanged for three decades, and the regime now unavoidably faces serious challenges due to new security threats and technological advances. Clingendael researchers argue that “drone proliferation particularly threatens to undermine the MTCR, mainly since the Regime purports to control drones (traditional parameters such as range and payload apply), but with limited success”.⁹⁴

The next challenge is that the MTCR is not legally binding and only a limited number of states have joined the regime. In contrast to the ATT, the MTCR has its own strengths such as providing detailed guidance for the implementation of export controls, control lists and definitions. However, “these are not legally binding, and are only accepted by a proportion of the world’s States – a proportion unlikely to increase significantly soon”.⁹⁵ Many scholars and experts highlight the fact that major drone-producing countries such as China and Israel are not MTCR member states, indicating that the regime has insufficient cover and therefore insufficient effect. Israel alone, which still remains outside the MTCR, “accounts for more than half of global drone exports”.⁹⁶

The MTCR has had some positive effect on controlling armed drones, but the landscape has changed dramatically in recent years. Initially, the agreement was effective because the main exporters made efforts to comply with MTCR rules. For example, the United States limited the export of armed drones to certain countries and most MTCR signatories have so far refrained from exporting drones to non-MTCR members. However, the situation changed when China and Israel started to dominate the drone market. Non-MTCR members, primarily China and, to a lesser extent, Israel have exported large armed and unarmed near-category I UAVs, and China has recently openly marketed an armed category I system.⁹⁷ Thus, scholars highlight that the accessibility of armed drones produced by non-member states has significantly eroded the MTCR’s capacity to control them.

The 35 existing MTCR member states and UN disarmament experts should, together, examine the MTCR Guidelines and Annex to assess

- how the organisation can expand its membership and improve its contribution to the regulation of armed drone exports;
- how armed drones can be included in the MTCR Annex to avoid any confusion;
- how to review which guidelines are applicable to armed drones; and
- whether new provisions are necessary to regulate UAS.

There is increased potential and scope to make the MTCR more effective, and existing norms could be adapted. As Gormley observes, the MTCR can remain a good tool in this context:

existing MTCR provisions can be adapted to achieve better controls on cruise missiles and UAVs, [and] the MTCR will remain the best tool available to slow the scope and pace of missile proliferation. In considering the merits of various alternatives to the MTCR, the non-proliferation community should recall the MTCR's many successes in slowing the qualitative spread of ballistic missiles.⁹⁸

However, the MTCR has to change its Western-centric model and should engage actively with Asian and other states, highlighting the interest of joining a group of responsible actors coordinating policies to fight proliferation risks that may threaten their security. This will allow the MTCR to become a worldwide regime to control both the proliferation of nuclear-capable missiles able to strike from a significant distance and potentially destabilising armed drones, instead of a cartel of industrialised nations suspected of attempting to preserve their technological edge and market dominance.

C. The Wassenaar Arrangement

The third document that can be applied to armed drones is the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies. This is an informal export control regime established in 1996 to replace the Cold War NATO-related regime known as the Coordinating Committee for Multilateral Export Controls (or CoCom). It aims to promote transparency and greater responsibility in transfers of conventional arms and to “protect against ‘destabilizing accumulations’ of certain conventional weapons and dual-use technologies”.⁹⁹ The agreement has 42 participating states, which agreed to work together to prevent unauthorised transfers or retransfers of items included in the two Wassenaar Arrangement lists (see below).¹⁰⁰ Every six months participating states exchange information on deliveries of conventional arms to non-Wassenaar-participating states in order to promote responsible exports of weapons and dual-use goods and prevent illegal arms transfers to so-called “states of concern”.¹⁰¹

It is difficult to describe which countries can be regarded a priori in such terms, and, according to the Arms Control Association, “there is no consensus among members on which countries can be considered ‘states of concern’”.¹⁰¹

Does the Wassenaar Arrangement cover armed drones? Theoretically, the answer is yes. It has two lists of weapons: “Dual-use Goods and Technologies” and a “Munitions List”.¹⁰² Both lists contain armed drones, thus ensuring that they fall under the jurisdiction of the Wassenaar Arrangement in both capacities. As Martins and Backhaus argue, “in theory the Wassenaar arrangement is an important control regime for addressing the proliferation of armed drones as it covers both armed and unarmed drones”.¹⁰³ However, it has several limitations. Firstly, similarly to the MTCR, the Wassenaar Arrangement is not legally binding, and, secondly, large arms producers and exporters such as China and Israel are not members. As Martins and Backhaus observe, these two limitations illustrate “the challenges faced by current international non-proliferation regimes in addressing technological developments, together with the pressures felt by those regimes to allow increasing liberalization and thus to generate profits for the industry”.¹⁰⁴

Among the non-members of the Wassenaar Arrangement are not only China and Israel, but also new arms producers and potential exporters such as Iran, Iraq and Pakistan.

Country	Wassenaar Arrangement membership
China	Non-member
France	Member
Germany	Member
India	Member
Iran	Non-member
Iraq	Non-member
Israel	Non-member
Italy	Member
Pakistan	Non-member
South Korea	Member
Turkey	Member
United States	Member

Table 3: Membership of the Wassenaar Arrangement

The main virtue of the Wassenaar Arrangement is that participating states are expected to fully contribute to voluntary information exchanges about conventional arms exports and notifications of denial of exports of dual-use goods. This is because the Wassenaar Arrangement is voluntary and “does not have provisions for enforcement and compliance. It therefore is more of a transparency- and confidence-building measure”.¹⁰⁵

Furthermore, the Wassenaar Arrangement was amended in recent years in order to prevent the illegal production and export of armed drones. The United States initiated the addition of some materials and components that can be used to convert crewed aircraft to uncrewed aerial vehicles, and engines that are specifically designed to modify armed drones to fly above 50,000 feet (15,200 metres).¹⁰⁶ These proposals have been adopted and make it possible to track and stop transfers of items that can convert crewed aircraft into armed drones.

Despite this success, analysis has shown that the Wassenaar Arrangement still has a limited capacity to control armed drone exports, primarily for two reasons. Firstly, the agreement has no binding rules and relies more on voluntary information exchanges. Secondly, the Wassenaar Arrangement’s limited membership reduces its scope and coverage. The ideal scenario would be to attempt a comprehensive expansion of the agreement by bringing in new members and making its provisions binding on member states.

V. Conclusions and recommendations

Combined with rapid technological developments and defence industry pressure on governments for its members to remain ahead of their competitors, armed drones are likely to be produced in greater quantities and sold at increasingly affordable prices. Instead of equalising military capacities across the globe, armed drones may rather fuel the arms race, trivialise the use of such weapon systems in armed conflicts and even make it tempting for authoritarian regimes to use them to control domestic disturbances. As in the case of other sophisticated weapons systems, the desire of the defence industry and governments to ensure a return on their investments in drone technology may require aggressive export policies, aggravating the risk of the misuse of such weapons by unscrupulous users.

This is why we wish to join efforts by other civil society organisations, think tanks and researchers to promote the expansion of the regulation of armed drone exports, in particular by:

1. stepping up efforts by ATT states parties, the ATT Secretariat and UN bodies (UNIDIR, regional UNODA centres) to promote the universalisation of the treaty, especially its ratification or accession by the main current or potential producers and exporters of UAS (China, India, Iran, Iraq, Israel, Pakistan and the United States). Regional meetings between current states parties and non-states parties, with the support of experts, may contribute to alleviating non-members' suspicions as to the implications of ATT membership and highlight the benefits of membership such as mutual increased transparency;
2. adopting the proposals for adapting the MTCR's Guidelines and Annex and including specifications that would cover the most lethal armed drones.¹⁰⁷ In order to make the MTCR regime more effective, discussions should be enlarged to potential drone recipients that are not MTCR members. Such proposals could be introduced first into the consultation mechanism of the Hague Code of Conduct against Ballistic Missile Proliferation (HCoC), which with 140 subscribing states has a wider membership than the MTCR.¹⁰⁸ This larger group could then gather more support for extending discussions to HCoC non-members such as China, Iran, Israel and Pakistan;

3. widening membership of export control regimes: most Wassenaar Arrangement participating states are also members of the MTCR. Only Brazil and Iceland, which are members of the MTCR, are not Wassenaar Arrangement members, and should be encouraged to join, while Wassenaar member states that are not currently members of the MTCR (Croatia, Estonia, Latvia, Lithuania, Malta, Mexico, Romania, Slovakia and Slovenia) should become members. Once membership in both organisations is synchronised, these states should engage with key non-members such as China, Iran, Iraq, Israel and Pakistan in order to encourage their membership, or at least to obtain their commitments to apply harmonised guidelines to armed drone exports;
4. promoting the universalisation of non-proliferation regimes: all drone-exporting states, especially leading states such as the United States, should take the initiative and convince other countries to set new norms and standards to regulate the proliferation of armed drones;
5. engaging with China, which has become a no-binding-rule actor: it should be enticed to the negotiation table to join the ATT and other control regimes. If it does so, states will become able to control markets for and illicit sales of armed drones; and
6. using the Joint Declaration signed by 53 states in 2016 as a basis to shape international standards regulating the sale, transfer and subsequent use of military UAVs. The international community should continue these efforts and organise a high-level meeting as a first step towards achieving this purpose.

Annex 1. Overview of the main drone-producing and -possessing states

State*	Indigenous producer of armed drones	Exports armed drones to other countries	Has imported armed drones; no production
China	Yes	Yes	
Egypt	No	No	Yes
France	Yes	No	Yes
Germany	Yes	No	Yes
India	Yes	No	Yes
Iran	Yes	Yes	
Iraq	No	No	Yes
Israel	Yes	Yes	
Italy	No	No	Yes
Nigeria	No	No	Yes

Main facts

Over the last five years China has become one of the major drone producers and exporters. Chinese drones such as the CH-4, CH-5, CH-4B and Rainbow have become popular among states, and China has exported them to at least 10 countries, including Pakistan, Nigeria, Myanmar, Turkmenistan, Egypt, Jordan and Saudi Arabia.

Egypt acquired the Chinese Wing Loong drones before 2016. There is no exact data on how many were acquired, but it was more than 10.

France has started several drone-development programmes jointly with the UK, Germany and Italy. No drones have been produced thus far, but projects are ongoing.

Germany has started several development programmes that are still under way.

India has purchased armed drones from Israel and negotiated deals with the US. India started its own development programme in 2007 and is likely to have two types of armed drones by 2020.

Iran started drone-development programmes in the 1980s and recently started arming older locally produced unarmed drones. In 2018 the Iranian Defence Ministry announced that the prototype Mojaher-6 would enter mass production. Iran has exported drones to Syria, Sudan and Yemen, and has also transferred them to non-state actors such as Hezbollah and Hamas.

Iraq possesses Chinese drones and also produces its own drones. In 2015 Iraq demonstrated them at a press event and released video materials showing weapons being fired from drones.

Israel is one of the world's leading drone-producing country. It started its development programme in the 1970s and is now one of the largest exporters of drones.

In 2015 Italy purchased six ISR Reaper drones from the US, but national development programmes are under way.

Nigeria has purchased CH-3A UAVs from China and has used them against Boko Haram. Nigeria has also acquired drones for surveillance from Israel.

** Other states that reportedly purchased smaller numbers of drones have not been included because data is limited and has yet to be verified.*

Sources: SIPRI reports, Drone Wars UK, RAND Corporation and UK Parliament Briefing Papers

Annex 1. Overview of the main drone-producing and -possessing states (Cont.)

State*	Indigenous producer of armed drones	Exports armed drones to other countries	Has imported armed drones; no production
Pakistan	Yes	No	Yes
Russia	Yes	No	No
Saudi Arabia	No	No	Yes
South Korea	Yes	No	No
Spain	Yes	No	Yes
Turkey	Yes	No	Yes
UAE	Yes	No	Yes
UK	Yes	No	Yes
Ukraine	Yes	No	No
United States	Yes	Yes	Yes

Main facts

Pakistan started its development programme in 2013 and produced the Burraq drone. A total of 35 armed drones were reportedly under production and are similar to Chinese drones. Pakistan has purchased 22 Chinese armed drones since 2016.

Russia has developed and produced Skat, Voron, Altius, and Dozor 600 drones. Defence Minister Shoigu declared that Russia intends to purchase 4,000 UAVs for its armed forces by 2020.

Saudi Arabia has bought two types of armed drones from China and is planning to open a local manufacturing plant to produce Chinese drones.

South Korea is developing a strike-capable drone known as the KUS-FS MALE UAV, which is similar to the US Reaper. This drone is currently under production.

Germany, France, Italy and Spain have launched a project to develop drones, including military ones. The first drones are to be delivered by 2025.

Turkey has bought armed drones from Israel. Later Turkey's request to buy the US Reaper armed drone was rejected by the US Congress. This pushed Turkey to start its own development programme in 2016, which has produced two locally made drones – the Bayraktar TB-2 and Anka-S. Both are operational.

The UAE's request to purchase US drones was rejected, and it started its own development programme. The Yabhon United Block-40 drone was produced, but is still being tested. The UAE purchased armed drones from China in 2017.

The UK is the largest importer of drones in the world, having reportedly purchased about 500 drones, including 10 Reaper drones that can fire missiles. The UK has launched its own drone-development programme known as Protector. The UK is also jointly funding a study to explore UAS options with France. The UK is a party to all three control regimes – the ATT, MTCR and Wassenaar Arrangement.

In 2017 Ukraine unveiled its first armed drone, known as the Gorlytsa, and revealed work in progress on better-armed and strategic drones.

The US is one of the world's largest drone producers. Its drones are sophisticated and expensive, and it spends US\$6 billion annually on research, design and development of UAS. The US was the second-largest exporter after Israel until China joined the market.

** Other states that reportedly purchased smaller numbers of drones have not been included because data is limited and has yet to be verified.*

Sources: SIPRI reports, Drone Wars UK, RAND Corporation and UK Parliament Briefing Papers

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