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# Weapons of choice?

## The expanding development, transfer and use of armed UAVs

George Woodhams

UNIDIR RESOURCES

## Acknowledgements

The author is grateful for the comments and feedback provided by John Borrie, Henry Dodd, Renata Dwan, David Hambling, Elizabeth Minor and Abigail Watson. UNIDIR would also like to thank all those who participated in its workshop 'Increasing Armed UAV Transparency, Oversight and Accountability' in April 2018 in Geneva. Support from UNIDIR core funders provides the foundation for all of the Institute's activities. This project is supported by the Government of Germany.

## About the researcher

George Woodhams is a Researcher in UNIDIR's Security and Society Programme and leads UNIDIR's research project on Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles. He previously worked as a Researcher for the UK's All Party Parliamentary Group on Drones, on cybersecurity issues within the National Security Secretariat of the UK Cabinet Office and at Chatham House, the Royal Institute of International Affairs. He holds an MSc from the London School of Economics and Political Science and a BA from the University of Cambridge.

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## List of acronyms and abbreviations

| | |
|---|---|
| IDF | Israel Defense Forces |
| MALE UAVs | Medium-altitude, long-endurance UAVs |
| MTCR | Missile Technology Control Regime |
| PKK | Kurdistan Workers' Party |
| UAVs | Unmanned aerial vehicles |

# Key takeaways

- Increased domestic production, more permissive export policies and the arming of unarmed systems are all likely to contribute to an increase in the number of States with armed unmanned aerial vehicles (UAVs).
- States are deploying these systems in an increasingly diverse range of contexts. Deployments within domestic airspace and in intrastate conflict exacerbate concerns that the use of armed UAVs may undermine the rule of law and international stability.
- The cross-border deployment of armed UAVs has elicited a range of responses from States and their continued spread has the potential to affect interstate relations.
- These trends add urgency to the need for common standards, or at least international understandings, to be developed concerning armed UAVs, with a view to ensuring appropriate levels of accountability, transparency and oversight.

# Introduction

The increasing ubiquity of armed unmanned aerial vehicles (UAVs) is representative of broader changes in the means and methods of warfare in the twenty-first century. As a rapidly increasing number of States acquire these systems, armed UAVs are being deployed in an increasingly diverse range of contexts. Part one of this briefing paper identifies trends in the development and transfer of armed UAVs that raise new questions about the effectiveness of existing mechanisms to track or control their transfer. In part two are identified the ways in which the expanded use of armed UAVs heightens concerns that the features that make them attractive to militaries may also make them susceptible to misuse.[1]

UNIDIR's 2017 study *Increasing Transparency, Oversight and Accountability of Armed UAVs* noted that although not inherently unlawful, the features of armed UAVs risk lowering political thresholds for the use of force.[2] It highlighted that the situations in which they have been deployed have been characterized by a lack of clarity as to how international norms apply—particularly when used for targeted strikes outside of traditional battlefields. The study also noted concerns of various experts that armed UAVs may contribute to an erosion in international norms limiting the use of lethal force, in part due to a lack of transparency surrounding their use.

UNIDIR's study mapped existing mechanisms designed to track and control the transfer of armed UAVs and found that they do not add up to an effective response to these concerns about use. It noted that these mechanisms have varied provisions, membership and degrees of compliance, and that they do not share key terms and concepts. Consequently, UNIDIR recommended that a transparent and inclusive multilateral process—to develop international standards applicable to

[1] These concerns have been raised in previous United Nations studies, including Christof Heyns, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions*, UN document A/68/382, 13 September 2013, http://justsecurity.org/wp-content/uploads/2013/10/UN-Special-Rapporteur-Extrajudicial-Christof-Heyns-Report-Drones.pdf; and United Nations Office for Disarmament Affairs, *Study on Armed Unmanned Aerial Vehicles Prepared on the Recommendation of the Advisory Board on Disarmament Matters*, October 2015, http://www.un.org/disarmament/publications/more/drones-study/drones-study.pdf.

[2] John Borrie, Elena Finckh and Kerstin Vignard, *Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles*, UNIDIR, 2017, http://www.unidir.org/programmes/security-and-society/increasing-uav-transparency-oversight-and-accountability.

armed UAVs aimed at improving transparency, oversight and accountability for both their transfer and use—could help States to address these concerns.

Where are we in 2018? Following the publication of UNIDIR's study, there has been little progress at the international level on the formation of an inclusive multilateral dialogue with a view to establishing common understandings, practices and standards for armed UAVs. Additionally, certain States have rolled back national policies designed to address some of the concerns regarding their use. Other States, including some that have raised concerns about the use of armed UAVs, have themselves acquired unarmed, although weaponizable, systems. This is occurring in a strategic environment characterized by increased interstate tensions and a growing concern that international norms designed to limit the use of lethal force are being eroded. This strategic environment underlines the need for States to focus on the implications of the expanding development, transfer and use of armed UAVs for international peace and security.

Expanding on UNIDIR's 2017 study, this briefing paper looks at how the increased domestic production of armed UAVs may further undermine the effectiveness of existing mechanisms relevant to their transfer. Furthermore, it suggests several drivers which are likely to contribute to increased domestic production of armed UAVs in the future. It also highlights the rapid increase in the transfer of armed UAV systems in a relatively brief period and suggests that these systems will continue to spread as major exporters loosen export controls and the armed UAV market becomes more diverse.

As they have spread, armed UAVs are being deployed in new ways and in an increasingly diverse range of contexts. Following the publication of UNIDIR's study, targeted strikes outside of traditional battlefields have continued to increase and are increasingly being carried out within States' own domestic airspace. Additionally, States have deployed armed UAVs to augment other military capabilities in intrastate conflict. While some of these operations involving armed UAVs may be carried out under the same counter-terrorism paradigm of previous operations, the complexity of these conflicts can raise additional challenges for interstate relations and international stability. This paper indicates how the spread and cross-border deployment of armed UAVs has affected interstate relations in certain cases that should be of concern from the perspective of international peace and security.

# 1 The proliferation of armed UAVs

This paper utilizes industry reporting, government statements, and reports from research institutes and the media to identify a number of potential trends that States should be aware of when considering the efficacy of existing mechanisms relevant to the transfer of armed UAVs. Conclusive assessments of the spread of armed UAVs are challenging due to the secrecy surrounding national development programmes and because States may overstate the capabilities of undemonstrated platforms for political reasons.[3] Beyond assessing the number of States with armed UAV capabilities,[4] this paper highlights the increasing number of States looking to produce armed medium-altitude, long-endurance (MALE) UAVs[5] domestically. Recognizing the technological and organizational barriers to doing so, it also highlights that many States are likely to look to the increasingly diverse UAV export market to acquire armed UAV systems in the short term. In addition, it suggests that the transfer of certain unarmed UAVs should be taken into consideration, given the possibility that these systems could be armed in the future.

## 1.1 DOMESTIC DEVELOPMENT

Historically, the United States has led the development and deployment of armed UAVs, especially following the 11 September 2001 attacks. In recent years, Israeli and Chinese manufacturers have challenged the United States' dominance of the armed UAV market, which until recently was relatively small.[6] These three pre-eminent manufacturing States have continued to advance their capabilities and export new systems since the publication of UNIDIR's 2017 study.[7] Moreover, the global armed UAV landscape will become more complex as additional States seek to domestically produce armed MALE UAVs in the near future with close to, if not comparable, capabilities to existing Israeli, US and Chinese systems.

Several States have sought to develop domestic capabilities to overcome barriers that they may face to importing armed UAVs from States with divergent security concerns. Pakistan and the Islamic Republic of Iran have both previously demonstrated domestically produced armed MALE-like UAV systems, although questions remain about their true capabilities.[8] Similarly, the United Arab Emirates instigated a national armed UAV development programme following the decision by the

[3] The threat environment, a State's regime type and its level of technological capacity all play a role in determining the likelihood that it will acquire armed UAVs; see Matthew Fuhrmann and Michael C. Horowitz, "Droning On: Explaining the Proliferation of Unmanned Aerial Vehicles", *International Organization*, no. 71, 2017, pp. 397–418.

[4] Studies by civil society suggest that over 20 States now possess armed UAV capabilities and many more are in the process of developing and acquiring systems, see Peter Bergen et al., *World of Drones*, 2017, https://www.newamerica.org/in-depth/world-of-drones/3-who-has-what-countries-armed-drones/; and Joanna Frew, *Drone Wars: The Next Generation: An Overview of New Armed Drones Operators,* 2018, https://dronewarsuk.files.wordpress.com/2018/05/dw-nextgeneration-web.pdf.

[5] MALE UAVs are generally considered to fly at an altitude window of 10,000–30,000 feet [approximately 3,000–9,000m] for extended durations, typically 24 to 48 hours; see Sergio Chiesa et al., "MALE UAV and Its Systems as Basis of Future Definitions", *Aircraft Engineering and Aerospace Technology*, no. 88, 2016, pp. 771–782.

[6] George Nacouzi et al., *Assessment of the Proliferation of Certain Remotely Piloted Aircraft Systems*, RAND Corporation, 2018, https://www.rand.org/pubs/research_reports/RR2369.html, p. 12.

[7] In June 2017, the most advanced variant of the Chinese-made Wing Loong (1D) UAV was unveiled and in July 2018 the latest version of the General Atomics MQ-9 successfully completed a transatlantic flight, having been modified to meet civilian aviation regulations at the request of the UK Royal Air Force; see David Donald, "Chinese UAV Spreads Its Wings", AIN Online, 17 June 2017, https://www.ainonline.com/aviation-news/defense/2017-06-17/chinese-uav-spreads-its-wings; and General Atomics, "GA-ASI SkyGuardian Completes First Trans-Atlantic Flight of a MALE RPA", 11 July 2018, http://www.ga-asi.com/ga-asi-skyguardian-completes-first-trans-atlantic-flight-of-a-male-rpa.

[8] Joanna Frew, *Drone Wars: The Next Generation: An Overview of New Armed Drones Operators,* 2018, https://dronewarsuk.files.wordpress.com/2018/05/dw-nextgeneration-web.pdf, pp. 11–14 and 17.

US Congress to block the sale of the General Atomics Predator UAV in 2002.[9] More recently, Taiwan Province of China announced plans to arm its domestically produced MALE UAV to defend its coastline.[10]

The pursuit of domestic armed UAV capabilities is not limited to those States facing likely barriers to import, however. The long-delayed 'Euro Drone' project of Germany, France, Italy and Spain recently saw progress with the unveiling of the first model of the system in 2018.[11] Originally proposed in 2009, some have seen the project as a test for future European defence integration.[12] It has been designed to integrate with Galileo, the European Union's satellite navigation system, and to meet a requirement to be able to fly in crowded European airspace.[13] The first systems are expected to be delivered in 2025 although it remains to be seen whether this deadline will be met.

Changes in threat perceptions as well as the desire to reap the economic benefits of exports have added an urgency to certain States' efforts to produce armed UAVs domestically. The Russian Federation has made significant efforts to enhance its armed UAV capabilities following its military operations in Georgia,[14] eastern Ukraine and the Syrian Arab Republic.[15] Alongside the development of a number of smaller systems, the Russian military announced plans to arm its Orion-E MALE UAV in 2017.[16] Similarly, the Turkish Air Force received delivery of its first domestically produced armed Anka-S MALE UAV in February 2018[17] and Turkey's political leaders have made clear their intentions to support the development of a domestic UAV industry.[18] Although its endurance capability is

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[9] Currently still in the testing phase, the UAE's United armed UAV boasts formidable capabilities, but it is unclear whether it is close to production; see *Military Factory*, "ADCOM Systems United 40", https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=1197.

[10] *Asia Times*, "Taiwan to Form Drone Fleet to Patrol its Coastline", 3 September 2018, http://www.atimes.com/article/taiwan-to-form-drone-fleet-to-patrol-its-coastline/.

[11] Sebastian Sprenger, "Companies Unveil 'Eurodrone' Model at Berlin Air Show", 26 April 2018, *Defense News*, https://www.defensenews.com/industry/techwatch/2018/04/26/companies-unveil-eurodrone-model-at-berlin-air-show/.

[12] *Reuters*, "Italy, France, Germany Sign European Drone Project", 18 May 2015, https://www.reuters.com/article/us-japan-defence-britain/japanese-carrier-drills-with-british-warship-heading-to-contested-south-china-sea-idUSKCN1M7003?feedType=RSS&feedName=topNews.

[13] Tom Kington, "New Eurodrone will Rely on Galileo Satellite Navigation, but have GPS Just in Case", *C4ISRNET*, 12 May 2018, https://www.c4isrnet.com/unmanned/2018/05/11/new-eurodrone-will-rely-on-galileo-satellite-navigation-but-have-gps-just-in-case/.

[14] Nicholas Clayton, "How Russia and Georgia's 'Little War' started a drone arms race", *Agence France-Presse*, 23 October 2012,,https://www.pri.org/stories/2012-10-23/how-russia-and-georgias-little-war-started-drone-arms-race.

[15] Samuel Bendett, "Red Robots Rising: Behind the Rapid Development of Russian Unmanned Military Systems", *Strategy Bridge*. 12 December 2017, https://thestrategybridge.org/the-bridge/2017/12/12/red-robots-rising-behind-the-rapid-development-of-russian-unmanned-military-systems.

[16] MIA Russia Today, "The Next Model of Russian UAV 'Orion-E' Will be Armed", 19 July 2017, https://ria.ru/arms/20170719/1498770141.html; and Nikolai Novichkov, "Kronshtadt Weaponises Orion-E UAV, Outlines HALE UAV Development", *Jane's International Defense Review*, 26 September 2018, https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development.

[17] *Air Force Technology*, "Anka-S Unmanned Aerial Vehicle", https://www.airforce-technology.com/projects/anka-s-unmanned-aerial-vehicle/.

[18] Burak Ege Bekdil, "Unmanned Tech Ambitions Shape Turkey's Future Military", Defence News, 8 March 2018, https://www.defensenews.com/unmanned/2018/03/06/unmanned-tech-ambitions-shape-turkeys-future-military/; and Can Kasapoğlu and Barış Kırdemir, *The Rising Drone Power: Turkey on The Eve of Its Military Breakthrough*, Centre for Economic and Foreign Policy Studies (EDAM), 2018, http://edam.org.tr/en/the-rising-drone-power-turkey-on-the-eve-of-its-military-breakthrough/.

significantly lower than a MALE system, the Belarus-made Burevestnik-MB also emerged as the first European-made medium altitude armed UAV in 2018.[19]

The MALE UAVs described above offer a range of capabilities and they should not be viewed as a homogeneous group. Nevertheless, the domestic pursuit of systems with similar, if not comparable, endurance capabilities and flight ceilings, presents a significant departure from five years ago when only a small group of States domestically produced large armed UAVs with these capabilities. When looking to the future, it is important to take into consideration the factors that have been driving these developments. Changes in the international security environment and a desire to reap the economic benefits of exporting these systems are likely to continue to be factors in encouraging States to pursue domestic production in the future. An additional driver is that producing States may tailor their development programmes to privilege their own national requirements and bypass the challenges of integration and interoperability often encountered when acquiring foreign-built systems.[20]

Some have suggested that the technical barriers to developing armed MALE UAVs and the infrastructure and organizational arrangements required to operate them will continue to limit the number of States producing these systems.[21] While the design, development and manufacturing of these systems requires relatively advanced technological capabilities, the above discussion suggests that States with the requisite industrial base are looking to overcome these challenges, which are unlikely to be insurmountable, even if this requires the development of additional infrastructure [22] or the development of new organizational arrangements.

Paper two in this series will consider whether the relative affordability and technical feasibility of developing small armed UAVs will facilitate a democratization in air power in that a broader range of actors can acquire strike capabilities. If these smaller systems do indeed prove more readily acquirable, States are likely to be driven by similar factors as those which encourage them to pursue the development of MALE UAVs domestically.

## 1.2 INCREASING ARMED UAV TRANSFERS

The military UAV market is estimated to be valued at US$ 12.2 billion[23] and predicted to grow to US$ 13 billion over the next six years.[24] Alongside signs of increased efforts at domestic production, there has been a rapid increase in the number of States acquiring armed UAV capabilities through import and leasing arrangements. China has exported armed UAVs to at least nine States, including to a number of States that have had their requests for US-made systems blocked previously by the

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[19] Nikolai Novichkov, "Belarus Unveils New UAVs and UCAVs", *Jane's International Defense Review*, 6 July 2018, http://www.janes.com/article/81586/belarus-unveils-new-uavs-and-ucavs.

[20] The French Senate's Committee on Foreign Affairs, Defense and the Armed Forces has previously raised concerns regarding the MQ-9 Predator's reliance on US infrastructure, support operations and intelligence payloads; see *Drones d'observation et drones armés: un enjeu de souveraineté*, no. 559 (2016–2017), 23 May 2017, https://www.senat.fr/notice-rapport/2016/r16-559-notice.html.

[21] Andrea Gilli and Mauro Gilli, "The Diffusion of Drone Warfare? Industrial, Organizational, and Infrastructural Constraints", *Security Studies*, vol. 25, no. 1, 2016, pp. 50–84.

[22] It was recently reported that India's latest advanced military communications satellite has been specifically designed to support UAV operations; see Rajat Pandit, "Satellite Control Set to Give Drones More String", *Times of India,* 22 September 2018, https://timesofindia.indiatimes.com/india/satellite-control-set-to-give-drones-more-sting/articleshow/65907159.cms.

[23] Strategic Defence Intelligence, *Global Military UAV Market 2018–2028*, 2018, https://www.researchandmarkets.com/research/32rr49/global_military?w=4.

[24] Global Market Insights, "Military Drone Market worth over $13bn by 2024", 6 April 2018, https://www.gminsights.com/pressrelease/military-drone-uav-market.

US Congress.[25] In addition to the United Arab Emirates, Egypt, Iraq, Jordan, Nigeria and Pakistan have all deployed Chinese-made systems and, in 2017, Saudi Arabia announced a US$ 65 billion agreement to begin in-country production of the CH-4 armed UAV; China having previously made similar arrangements with Myanmar and Pakistan.[26]

Chinese systems are generally cheaper up front than their US counterparts, and it has been reported that these have been exported under less restrictive export controls.[27] In April 2018, the United States published a new export policy for unmanned aerial systems with the objective of increasing trade opportunities for US companies and to "avoid ceding export opportunities to competitors where such self-imposed restrictions are unwarranted".[28] Those armed UAVs capable of carrying a payload of 500kg for more than 300km are still covered by a 'presumption of denial' principle under the Missile Technology Control Regime (MTCR) but the United States has proposed amending the MTCR's UAV classification so that it is more permissive.[29]

Changes in US export policies and the continued growth in Chinese armed UAV production are likely to result in an increase in armed UAV transfers in the future. The continued competition between these leading exporters should not only be seen in economic terms but also in terms of competing security priorities. Where one State may refuse an export licence due to national security concerns, another may step in. Given that such developments may be a loss in economic terms, these exporters may undertake efforts to encourage allied States to import their systems and to review the national security criteria of their own export controls. As more States domestically produce armed UAVs, the dynamics of this UAV market will become increasingly complex and those States looking to import systems will have an increasing number of sources of supply.

## 1.3 ARMING THE UNARMED

Before concluding this discussion of armed UAV proliferation, it is important also to consider transfers in weapons-capable UAVs—even if currently unarmed—given the technical feasibility of arming these systems. The Netherlands[30] and Belgium[31] both recently announced plans to acquire derivatives of the US-made MQ-9. In June 2018, the German Bundestag approved a €1 billion spending agreement to lease five Israeli Heron TP UAVs.[32] The German agreement also includes

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[25] George Nacouzi et al., *Assessment of the Proliferation of Certain Remotely Piloted Aircraft Systems*, RAND Corporation, 2018, https://www.rand.org/pubs/research_reports/RR2369.html, pp. 15–16 and 38.
[26] Minnie Chan, "Chinese Drone Factory in Saudi Arabia First in Middle East", *South China Morning Post*, 26 March 2017, https://www.scmp.com/news/china/diplomacy-defence/article/2081869/chinese-drone-factory-saudi-arabia-first-middle-east.
[27] Sharon Weinberger, "China Has Already Won the Drone Wars", *Foreign Policy*, 10 May 2018, https://foreignpolicy.com/2018/05/10/china-trump-middle-east-drone-wars/.
[28] US Department of State, *U.S. Policy on the Export of Unmanned Aerial Systems*, 9 April 2018, https://www.state.gov/r/pa/prs/ps/2018/04/280619.htm.
[29] The US State Department Deputy Director for Regional Security and Arms Transfers recently stated, "We are looking to try to reinvigorate the MTCR with respect to UAVs, and have proposed something to our partners, that we are working to try to gain acceptance that we hope will open up some market space for the producers of [unmanned aerial systems] here in the United States and also abroad"; Center for Strategic and International Studies, "U.S. Arms Transfer Policy. Shaping the Way Ahead", 8 August 2018, https://www.csis.org/events/us-arms-transfer-policy.
[30] Dutch Ministry of Defence, *Investing in Our People, Capabilities and Visibility*, white paper, 2018, https://english.defensie.nl/binaries/defence/documents/policy-notes/2018/03/26/defence-white-paper/Defence+White+Paper+2018.pdf.
[31] Huw William, "Belgium Eyes Predator B Derivative for MALE UAS Requirement", *Jane's 360*, 31 January 2018, http://www.janes.com/article/77484/belgium-eyes-predator-b-derivative-for-male-uas-requirement.
[32] *The Economist*, "Germany Becomes the Last Big Western Power to Buy Killer Robots", 23 June 2018, https://www.economist.com/europe/2018/06/23/germany-becomes-the-last-big-western-power-to-buy-killer-robots.

infrastructure support and training, and it is believed that the decision to provide the operational contract to Airbus will contribute to the company's efforts to develop the aforementioned Eurodrone.[33]

While these States have no current plans to arm these UAV systems, they have been described as both "armable" and "weaponizable".[34] Their acquisition in unarmed form occurs in the context of significant domestic political opposition to armed UAVs in these States.[35] Purchasing Governments have presumably allowed for the possibility of arming these systems in the future, if domestic circumstances were to become more favourable to doing so. The United Kingdom, France and Italy all originally acquired unarmed UAVs, before arming them at a later date (although it is unclear whether the Italian military has done so).[36] As some commentators have suggested following Germany's Heron acquisition, it is highly likely that its military will seek to arm these systems in the future, given the significant investment required to procure them.[37]

[33] Airbus, "Airbus Signs Contract for HERON TP Drones with the German Armed Forces", 14 June 2018, https://www.airbus.com/newsroom/press-releases/en/2018/06/Airbus-signs-contract-for-HERON-TP-drones-with-the-German-Armed-Forces.html.

[34] EFAD, "Belgium to Acquire 'armable' Reapers Drones", 26 February 2018, https://www.efadrones.org/belgium-to-acquire-armable-reapers-drones/; and *The Economist*, "Germany Becomes the Last Big Western Power to Buy Killer Robots", 23 June 2018, https://www.economist.com/europe/2018/06/23/germany-becomes-the-last-big-western-power-to-buy-killer-robots.

[35] Germany's efforts were previously blocked by political opposition, and civil society studies have identified significant political opposition to the Netherland's acquisition of armed UAVs; see Gili Cohen, "German Lawmakers Block Israeli Drone Deal After Discovering They're Armed", *Haaretz*, 29 June 2017, https://www.haaretz.com/israel-news/german-lawmakers-block-israeli-drone-deal-after-discovering-they-re-armed-1.5490185; and Foeke Postma and Wim Zwijnenburg, *Dutch Drone Dilemmas*, 2017, https://www.paxforpeace.nl/publications/all-publications/dutch-drone-dilemmas-executive-summary.

[36] Pierre Tran, "France to Arm Military Surveillance Drone", *Defense News*, 5 September 2017, https://www.defensenews.com/air/2017/09/05/france-to-arm-military-surveillance-drones/; and Andrea Shalal, "U.S. Government Approves Italy's Request to Arm Its Drones", *Reuters*, 4 November 2015, https://www.reuters.com/article/us-italy-usa-drones/u-s-government-approves-italys-request-to-arm-its-drones-idUSKCN0ST1VI20151104.

[37] *The Economist*, "Germany Becomes the Last Big Western Power to Buy Killer Robots", 23 June 2018, https://www.economist.com/europe/2018/06/23/germany-becomes-the-last-big-western-power-to-buy-killer-robots.

# 2 The expanding use of armed UAVs

As armed UAVs have spread, so too has their deployment against non-State armed groups, particularly in remote or difficult to access areas. One notable recent development was the French announcement to deploy armed UAVs for counter-terrorism operations in the Sahel.[38] As an expanding number of States acquire armed UAVs, operations are being carried out in an increasingly diverse range of contexts. As noted in UNIDIR's 2017 study, there may be ambiguity concerning which bodies of law apply depending on the context. Establishing the facts and the assessing the legality of the use of force has been challenging to due to the limited transparency surrounding these operations.[39]

Few States have the necessary support infrastructure or intelligence apparatus to carry out armed UAV operations at the rate, scale and reach of the United States (see Box 1). It remains to be seen whether other States will overcome the significant barriers to developing this capacity in the future, or indeed whether they will replicate the doctrine and legal interpretations that the United States employs.[40] Of particular concern to some civil society groups is whether other States will replicate the legal interpretations that the United States has employed for armed UAVs outside of traditional battlefields. Some view this as inevitable.[41] It is already apparent that the use of armed UAVs by other States is raising similar legal concerns.[42]

## 2.1 TARGETED STRIKES WITHIN DOMESTIC AIRSPACE

As armed UAVs have proliferated, an emergent practice has been their deployment for targeted strikes within a State's domestic airspace. Egypt, Iraq, Nigeria, Pakistan and Turkey have all conducted strikes within their own airspace and Israel has conducted strikes in the occupied Palestinian territories.[43] The Turkish military has hailed armed UAVs as a particularly useful tool in its military operations against the Kurdistan Workers' Party (PKK) in south-eastern Turkey[44] despite receiving criticism from human rights groups and opposition parties following claims of civilian casualties during a strike in 2017.[45] Similarly, the Nigerian government has published video

[38] *Reuters*, "France Turns to Armed Drones in Fight against Sahel Militants", 5 September 2017, https://www.reuters.com/article/us-france-drones/france-turns-to-armed-drones-in-fight-against-sahel-militants-idUSKCN1BG2K2.

[39] John Borrie, Elena Finckh and Kerstin Vignard, *Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles*, UNIDIR, 2017, http://www.unidir.org/programmes/security-and-society/increasing-uav-transparency-oversight-and-accountability, pp. 19–25.

[40] Shashank Joshi and Aaron Stein, "Emerging Drone Nations", *Survival*, vol. 55, no. 5, 2013, pp. 53–78.

[41] Elisa Catalano Ewers et al., *Drone Proliferation: Policy Choices for the Trump Administration*, Center for the New American Security, 2017, http://drones.cnas.org/reports/drone-proliferation/, p. 8.

[42] UK Joint Committee on Human Rights, *The Government's Policy on the Use of Drones for Targeted Killing*, 27 April 2016, https://www.parliament.uk/business/committees/committees-a-z/joint-select/human-rights-committee/inquiries/parliament-2015/uk-drone-policy-15-16/.

[43] Peter Bergen et al., *World of Drones*, 2017, https://www.newamerica.org/in-depth/world-of-drones/3-who-has-what-countries-armed-drones/.

[44] *Andolu Agency*, "Turkish Army UAV Neutralizes PKK Terrorists in E Turkey", 9 April 2018, https://www.aa.com.tr/en/turkey/turkish-army-uav-neutralizes-pkk-terrorists-in-e-turkey/1112936; and Ekrem Payan, "Turkish Military Says 19 PKK Terrorists have been 'Neutralized' in Sirnak Province since Friday", *Anadolu Agency*, 11 June 2018, https://www.aa.com.tr/en/turkey/5-more-pkk-terrorists-neutralized-in-se-turkey-/1171222.

[45] *Turkish Minute*, "Turkish Bar Associations: Disproportionate Force Used in Civilian Area", 15 September 2017, https://www.turkishminute.com/2017/09/15/turkish-bar-associations-disproportionate-force-used-in-civilian-area/.

## Box 1: The continued expansion of US counter-terrorism UAV operations

The current US Administration has significantly increased the frequency and expanded the geographical scope of its use of armed UAVs for global counter-terrorism operations.[46] At the same time, US armed UAV operations have allegedly become less transparent, and some experts contend that the current Administration has reduced the oversight of strike decisions and rolled back safeguards introduced by the previous Administration to try to limit civilian harm.[47]

The Obama Administration significantly increased the use of armed UAVs for counter-terrorism operations.[48] The dismantling of Obama-era safeguards on armed UAVs coincides with President Trump's decision to expand them even further. The Trump Administration designated parts of Somalia as "areas of active hostilities" for the first time in 2017 and it has been suggested that a more permissive set of "Principles, Standards, and Procedures" for UAV targeting may have contributed to an increase in UAV operations in the country.[49] At the same time, the Administration has reportedly given greater authority for the Central Intelligence Agency to conduct armed UAV operations.[50] This expansion in armed UAV operations has been matched by an expansion in military infrastructure, most notably with the development of a new airbase in Niger.[51] The United States has also forged new partnerships with international allies for new basing arrangements, for instance with Poland and Greece.[52]

footage of strikes against Boko Haram in the north of the country.[53] The Iraqi Government claimed a near 100 per cent successful strike rate in over 200 strikes against Daesh in northern Iraq as of February 2018.[54] While these States have released certain details of these operations to the media,

[46] The current US Administration has resumed strikes in Pakistan and expanded the use of armed UAV operations in West Africa; see Dan de Luce and Sean D Naylor, "The Drones are Back", *Foreign Policy*, 26 March 2018, https://foreignpolicy.com/2018/03/26/the-drones-are-back/; Daniel R. DePetris, "Trump's Expanded Drone Wars", *National Interest*, 28 September 2017, https://nationalinterest.org/feature/trumps-expanded-drone-wars-22524.

[47] Rachel Stohl, *An Action Plan on US Drone Policy: Recommendations for the Trump Administration*, Stimson Centre, 2018, p. 15.

[48] Jessica Purkiss and Jack Serle, "Obama's Covert Drone War in Numbers: Ten Times More Strikes than Bush", *Bureau of Investigative Journalism*, 17 January 2017, https://www.thebureauinvestigates.com/stories/2017-01-17/obamas-covert-drone-war-in-numbers-ten-times-more-strikes-than-bush.

[49] Christina Goldbaum, "A Trumpian War on Terror That Just Keeps Getting Bigger", *The Atlantic*, 11 September 2018, https://www.theatlantic.com/international/archive/2018/09/drone-somalia-al-shabaab-al-qaeda-terrorist-africa-trump/569680/.

[50] Joe Penney et al., "C.I.A. Drone Mission, Curtailed by Obama, Is Expanded in Africa Under Trump", *New York Times*, 9 September 2018, https://www.nytimes.com/2018/09/09/world/africa/cia-drones-africa-military.html.

[51] Eric Schmitt, "A Shadowy War's Newest Front: A Drone Base Rising From Saharan Dust", *New York Times*, 22 April 2018, https://www.nytimes.com/2018/04/22/us/politics/drone-base-niger.html; and Carley Petesch, "US Confirms Drones in Niger have Striking Capabilities", *Associated Press*, 29 July 2018, https://apnews.com/d83d15161e19441ba3c89fabed4d6311.

[52] US Air Forces in Europe, "MQ-9s Begin Operations out of Poland", 21 May 2018, https://www.usafe.af.mil/News/Press-Releases/Article/1526513/mq-9s-begin-operations-out-of-poland/; and Tasos Kokkinidis, "US Drones 'Based in Greece' for First Time", *Greek Reporter,* 24 May 2018, http://greece.greekreporter.com/2018/05/24/us-drones-based-in-greece-for-first-time/.

[53] *Premium Times*, "Nigeria Air Force Drone Destroys Boko Haram's Logistics Base", 3 February 2016, https://www.premiumtimesng.com/news/top-news/197897-video-nigeria-air-force-drone-destroys-boko-harams-logistics-base.html.

[54] Arnaud Delalande, "Iraq's Chinese-Made Killer Drones Are Actually Pretty Good", *War is Boring*, 21 February 2018, https://warisboring.com/iraqs-chinese-made-killer-drones-are-actually-pretty-good/.

they have not been uniformly transparent and questions remain regarding the ways in which relevant legal regimes are being applied.[55]

## 2.2 COMPLEX INTRASTATE CONFLICTS

Armed UAVs are increasingly being deployed in intrastate conflicts involving a multitude of belligerents. These strike operations are often carried out in support of allied ground forces, including non-state armed groups. Unlike in previous counter-terrorism UAV operations, these contexts may include multiple actors with armed UAV capabilities. Additionally, the regional characteristics of some of these conflicts have seen armed UAVs operate across neighbouring States.

Several parties to the conflict in Yemen have deployed armed UAVs. Members of the Houthi insurgency claimed to have successfully attacked a number of strategic Saudi and Emirati civilian assets with armed UAVs[56] and some commentators have noted that the United Arab Emirate's targeting of leaders of the group has had a significant influence on the dynamics of the conflict.[57] In Libya, the United States has significantly expanded its armed UAV operations against Al-Qaida, having previously focused solely on targeting Daesh in the north of the country.[58] It is the conflict in the Syrian Arab Republic however where the proliferation of armed UAVs has perhaps been most apparent. In addition to the increasing use of weaponized commercial UAVs by Daesh and other non-state armed groups,[59] the Islamic Republic of Iran, United Kingdom, United States and Turkey have all deployed armed UAVs during the conflict.

In June 2017, the United States announced that it had shot down an Iranian-made Shahed 129 UAV that it believed to be armed and within firing range of US coalition forces.[60] Moreover, in February 2018 a US armed UAV destroyed a Russian-made T-72 tank during an air assault against pro-Syrian government forces.[61] Turkey has conducted a significant number of UAV strikes during Operation Olive Branch.[62] The United Kingdom significantly increased armed UAV strikes in the Syrian Arab Republic as it wound down operations in Iraq during 2017.[63] As will be discussed in paper two of

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[55] For more, see John Borrie, Elena Finckh and Kerstin Vignard, *Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles*, UNIDIR, 2017, http://www.unidir.org/programmes/security-and-society/increasing-uav-transparency-oversight-and-accountability.

[56] *Reuters*, "Yemen's Houthis Say They Attacked Aramco Refinery in Riyadh with Drone", 18 July 2018, https://www.reuters.com/article/us-yemen-security-aramco/yemens-houthis-say-they-attacked-aramco-refinery-in-riyadh-with-drone-idUSKBN1K8262.

[57] Rawan Shaif and Jack Watling, "How the UAE's Chinese-Made Drone is Changing the War in Yemen", *Foreign Policy*, 27 April 2018, https://foreignpolicy.com/2018/04/27/drone-wars-how-the-uaes-chinese-made-drone-is-changing-the-war-in-yemen/.

[58] Declan Walsh and Eric Schmitt, "U.S. Strikes Qaeda Target in Southern Libya, Expanding Shadow War There", *New York Times*, 25 March 2018, https://www.nytimes.com/2018/03/25/world/middleeast/us-bombs-qaeda-libya.html.

[59] Don Rassler, *The Islamic State and Drones: Supply, Scale, and Future Threats*, Combatting Terrorism Centre at West Point, 11 July 2018, https://ctc.usma.edu/islamic-state-drones-supply-scale-future-threats.

[60] Ryan Browne and Barbara Starr, "US Shoots Down Another Pro-regime Drone in Syria", *CNN*, 20 June 2017, https://edition.cnn.com/2017/06/20/politics/us-syria-shoots-down-pro-regime-drone/index.html.

[61] Phil Stewart, "U.S. Drone Destroys Russian-made Tank in Syria", *Reuters*, 13 February 2018, https://www.reuters.com/article/us-mideast-crisis-usa-syria-tank/u-s-drone-destroys-russian-made-tank-in-syria-idUSKCN1FX2SJ.

[62] *Daily Shabah*, "Turkey's Bayraktar TB2 Drones Enable Swift, Precise Victory against YPG/PKK in Syria's Afrin", 19 April 2018, https://www.dailysabah.com/war-on-terror/2018/04/19/turkeys-bayraktar-tb2-drones-enable-swift-precise-victory-against-ypgpkk-in-syrias-afrin; and Christoph Koettl et al., 'How a Drone Hunted Three Kurdish Fighters in Syria", *New York Times*, 3 March 2018, https://www.nytimes.com/video/world/middleeast/100000005738262/turkey-drone-attack-kurds-syria.html.

[63] Drone Wars UK, "UK Drone Strike Stats", https://dronewars.net/uk-drone-strike-list-2/.

this series, the Russian Federation has defended its airbases against several attempted armed UAV attacks in the north-east of the Syrian Arab Republic[64] and it is believed to have deployed an array of counter-UAV jamming technologies.[65]

## 2.3 CROSS-BORDER DEPLOYMENTS AND INTERSTATE TENSIONS

Existing armed UAV systems are of limited tactical utility in interstate conflict due to their vulnerability to air defence systems. Disruptive technological developments may enable future systems to operate far more effectively in contested airspace.[66] Nevertheless, it is already evident that the presence—whether actual or suspected—of armed UAVs is a factor contributing to tension in several already tense strategic environments. Examples since UNIDIR's 2017 study was published include:

### 2.3.1 The Korean Peninsula

Given the risks of conducting manned flights on the Korean Peninsula, it has been suggested that the use of UAVs "should become the rule rather than the exception" there.[67] Although details are scarce, the army of the Republic of Korea announced in December 2017 plans to develop an armed UAV unit and has identified swarming technology as a potential "game changer in warfare" on the Korean Peninsula.[68] Meanwhile, the Democratic People's Republic of Korea's official news agency responded to news that the United States planned to move 12 MQ-1C armed UAVs to an airbase in the Republic of Korea in 2018 by claiming that the "persistent introduction of new war equipment [by the United States] is aimed to spoil the atmosphere for improvement of the north–south relations and extremely aggravate the situation on the Korean peninsula".[69]

### 2.3.2 The China–India Border

Also in December 2017, Chinese Government officials said that India had "invaded Chinese airspace" after an Indian surveillance UAV crashed at the border separating India's Sikkim state and China's Tibet region. The Indian Army claimed that the UAV was on a regular training exercise and accidentally crossed the Line of Actual Control after losing contact with its ground operators.[70] More recently, Pakistan has expressed concern over India's plans to acquire armed UAV capabilities. In a statement to the media, Pakistan's Foreign Office suggested that the "use of armed drones can lower the threshold for conflict, since it can encourage military misadventures, especially in the

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[64] David Hambling. *Change in the Air: Disruptive Developments in Armed UAV Technology*, UNIDIR, forthcoming.
[65] Joseph Tevithick, "The Russians Are Jamming US Drones in Syria Because They Have Every Reason To Be", *The Drive*, 10 April 2018, http://www.thedrive.com/the-war-zone/20034/the-russians-are-jamming-us-drones-in-syria-because-they-have-every-reason-to-be.
[66] David Hambling. *Change in the Air: Disruptive Developments in Armed UAV Technology*, UNIDIR, forthcoming.
[67] Sukjoon Yoon, *A Perspective on South Korea in Proliferated Drones*, Center for New American Security, 2015, http://drones.cnas.org/reports/a-perspective-on-south-korea/.
[68] Nicola Smith, "South Korea to Build Unit of Swarming Drones to Counter Nuclear-armed North", *The Telegraph*, 7 December 2017, https://www.telegraph.co.uk/news/2017/12/06/south-korea-build-unit-swarming-drones-counter-nuclear-armed/.
[69] Tom O'Connor, "North Korea Blasts U.S. Plan to Deploy Drones that Could Kill Kim Jong Un", *Newsweek*, 22 February 2018, https://www.newsweek.com/north-korea-blasts-us-plan-deploy-drones-could-kill-kim-jong-un-816771.
[70] "China Claims Indian Drone 'Invaded Airspace in Crash'", *BBC News*, 7 December 2017, https://www.bbc.com/news/world-asia-china-42261725.

backdrop of irresponsible discourse about limited military operations below the strategic threshold".[71]

### 2.3.3 Pakistan

For its part, Pakistan has deployed armed UAVs within Waziristan and responded to a number of UAV incursions along its border with the Islamic Republic of Iran. In July 2018, the Pakistani Air Force said it had shot down an Iranian Shahed 129 UAV 4km within its airspace, although it is unclear whether it was armed.[72] Middle East Institute analyst Zubair Iqbal observed that the incident "will only increase the mistrust which already exists between Pakistan and [the Islamic Republic of] Iran".[73]

### 2.3.4 Israel

The Israel Defense Forces (IDF) have responded to a number of armed and unarmed UAV incursions into Israeli airspace with retaliatory strikes. In February 2018, IDF Apache helicopters shot down an Iranian-made RQ-170 UAV (believed to be armed) near the northern Israeli town of Beit She'an. Subsequent retaliatory airstrikes against Iranian assets which Israel thought had launched the UAV from within the Syrian Arab Republic represented a significant escalation in Israel's involvement in that conflict. During these strikes, Israel suffered the first loss of an aircraft since 1979, when an F-16 fighter jet was apparently hit by a Syrian anti-aircraft missile. Eight days after the incident, Israeli Prime Minister Benjamin Netanyahu presented a fragment of the downed Iranian UAV at the Munich Security Conference, warning that the Islamic Republic of Iran should "not test Israel's resolve".[74] The IDF also responded with retaliatory strikes against Syrian Arab Armed Forces after a Syrian UAV entered Israeli airspace after passing over Jordan. Although it was ultimately determined to be unarmed, Israel scrambled four fighter jets and two helicopters in order to identify the aircraft, before targeting it with a Patriot missile.[75]

In some cases the deployment of armed UAVs has had seemingly minimal consequences for interstate relations beyond an immediate defensive response. However, other instances have led to increases in strategic tension and, in the case of Israel, direct military retaliation. In addition, it is also apparent that the development and acquisition of armed UAVs has the potential to effect States' strategic assessment of interstate relations. As paper three in this series will suggest, States should consider the destabilizing potential of armed UAVs across a range of contexts and whether common standards and principles could be introduced to reduce these risks of escalation.

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[71] "Pakistan Opposes Supply of US Armed Drones to India", *Economic Times of India*, 13 July 2018, https://m.economictimes.com/news/defence/pakistan-opposes-supply-of-us-armed-drones-to-india/amp_articleshow/61276347.cms.

[72] Joanna Frew, *Drone Wars: The Next Generation: An Overview of New Armed Drones Operators,* 2018, https://dronewarsuk.files.wordpress.com/2018/05/dw-nextgeneration-web.pdf, p. 17.

[73] Madeeha Anwar and Mehdi Jedinia, "Will Downing of Tehran Drone Hurt Pakistan-Iran Relations Further?", *Voice of America*, 24 June 2017, https://www.voanews.com/a/will-downing-tehran-drone-hurt-pakistan-iran-relations-further/3914553.html.

[74] Samuel Osborne, "Benjamin Netanyahu Waves 'Drone Debris' above His Head as He Warns Iran not to 'Test Israel's Resolve", *The Independent*, 18 February 2018, https://www.independent.co.uk/news/world/middle-east/israel-iran-benjamin-netanyahu-test-resolve-drone-nuclear-deal-munich-a8216366.html.

[75] Judah Ari Gross, "IAF Strikes Syrian Army Posts near Border in Response to Drone Infiltration", *Times of Israel*, 12 July 2018, https://www.timesofisrael.com/reports-of-israeli-strike-in-syria-hours-after-regime-drone-penetrates-airspace/.

# Conclusion

The expansion in the development, transfer and use of armed UAVs should concern States and underlines the need for common understandings and principles for their transfer and use. As an increasing number of States seek to domestically produce these systems, the limitations of existing arms control mechanisms discussed in UNIDIR's 2017 study will only become more pronounced. Furthermore, changes in national export policies and increased competition among exporting States is likely to enable yet more transfers of these systems despite the absence of clear standards and understandings. It is also noteworthy that several States have the technical possibility of arming their unarmed systems in the future.

As UAVs have spread, an increasing number of States have deployed armed UAVs for targeted strikes, which UNIDIR's 2017 study showed raises a number of challenges in terms of ensuring transparency, accountability and oversight, and for implementing relevant international legal rules such as the law of armed conflict and international human rights law. Although having received far less international attention, the emergent practice of deploying armed UAVs for targeted strikes within domestic airspace may raise analogous concerns.

As the case of the Syrian Arab Republic indicates, the use of armed UAVs within complex, contested conflict environments presents new variables which are unhelpful for managing interstate tensions and crisis escalation. Given the diverse ways that States have responded to the spread and cross-border deployment of armed UAVs to date, this would be one obvious place to begin developing common standards or understandings of responsible use.

As reiterated in the Secretary-General's 2018 Agenda for Disarmament, common standards for transparency, accountability and oversight could ensure that armed UAVs are used in compliance with the rule of law and in ways which contribute to international peace and security.[76] UNIDIR's 2017 study suggested a number of ways forward in this regard, proposing the United Nations as a possible forum. The developments discussed in this paper add urgency to such proposals, before the continued expansion in the development, transfer and use of armed UAVs create more severe concerns for international peace and security.

[76] United Nations Secretary-General, *Securing Our Common Future: An Agenda for Disarmament*, 2018. p. 40, https://www.un.org/disarmament/sg-agenda/.

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# Weapons of choice?

## The expanding development, transfer and use of armed UAVs

The Future of Armed UAVs Briefing Series supplements UNIDIR's 2017 study into Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles (UAVs) to support States in considering whether there is a need to develop common understandings and principles for their transfer and use. This first paper in the series identifies trends which may raise new questions about the effectiveness of existing mechanisms and standards relevant to the transfer and use of armed UAVs. The second paper will identify disruptive developments in armed UAV technology and the third will consider what implications these developments may have for international security and stability in the future.

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