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## Unmanned Aerial Vehicles

*Markus Wagner*

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### A. Definition

- 1 An unmanned aerial vehicle ('UAVs') is an aircraft without a human operator on board and is commonly referred to as a 'drone', but also as a remotely piloted vehicle ('RPV'), remotely piloted aircraft ('RPA'), remotely operated aircraft ('ROA') or, in the case of UAVs with specific combat roles, as an unmanned aerial combat vehicle ('UACV') (see also → *Air Warfare*). In contradistinction to conventional aircraft, UAVs are controlled either remotely by human operators or are guided by a computer program with various levels of automation and autonomy (see also → *Autonomous Weapons Systems*). Among UAVs, there is a high degree of differentiation regarding a vehicle's size, function, capabilities and expendability. Some are comparable to manned aircraft, while others can be carried and launched by a single person. The international legal significance of UAVs has been debated vigorously in the context of so-called → *targeted killings* but extends to other areas such as providing intelligence, surveillance, targeting and reconnaissance ('ISTR') as well as civil aviation. UAVs generally form part of a system that has additional components such as a flight control station and an information retrieval and processing station.
- 2 This definition technically encompasses a range of unmanned systems, such as ballistic or semi-ballistic vehicles, cruise missiles, artillery projectiles, torpedoes or mines (→ *Missile Warfare*; → *Land Mines*). However, the common understanding excludes these types of unmanned systems. UAVs would be prohibited if they were classified as cruise missiles under the Intermediate-Range Nuclear Forces Treaty 1987. Similarly, UACVs could violate the Strategic Arms Reduction Treaty if they were classified as a bomber (→ *Strategic Offensive Arms, Treaties on Reduction and Limitation* ['START']). Neither categorization seems apt. In the case of the former treaty, unlike cruise missiles, UAVs are designed to return to base; in the case of the latter treaty, the payload and range

was insufficient to qualify UAVs to fall under this treaty. This latter debate may have to be revisited given the potential for increased payloads in the most recent versions of UACVs. Similarly, satellites are generally not considered to be UAVs (→ *Satellite Broadcasting*).

- 3 The use of UAVs has been increasing since they were first introduced. As of early 2014, more than 50 countries have UAVs in their arsenal; a growing number of countries seek to obtain them in the near future; the number of countries in which UAVs are produced has increased. The number of UAVs in operation has seen a drastic rise, as has the number of military strikes (eg between 2004 and 2007 the US military carried out nine drone strikes, while that number reached 118 strikes in 2010). It can be expected that the number of UAVs that are actively deployed will increase in the future.
- 4 Subsequent generations of UAVs are expected to operate with higher degrees of autonomy. Today's UAVs are predominantly remotely operated and are thus under the direct control of human beings, while other UAVs operate either in an automated or an autonomous fashion. In the former case, a UAV follows a predetermined flight path and/or attacks a target on the basis of information which it received prior to the engagement with that target. In the case of autonomy, the decision over whether to attack and if so under what circumstances would be taken without direct human intervention, but rather on the basis of pre-programmed characteristics. This leaves discretion over the decision of whether to engage a target, and if so how, to the software-based decision-making process of the autonomous UAV.
- 5 Although it should be noted that there is disagreement over the validity of these rationales, arguments typically advanced for the use of unmanned systems compared to traditional aircraft include lower costs (lower acquisition, maintenance and personnel costs), increased capabilities with respect to staying over a particular area for reconnaissance or combat purposes, thus allowing for potentially higher precision in carrying out missions as well as force projection in areas otherwise outside of a country's military reach.

## **B. History**

- 6 The use of UAVs in armed conflict dates back to the end of the 19th century when the first aerial → *military reconnaissance* photos were taken in the Spanish-American War. While several systems were tested until World War II by various countries, they were of limited military use. Efforts at adapting UAVs for military purposes continued after World War II when remotely operated UAVs became more common and were used for training, reconnaissance and distraction purposes during the Vietnam War as well as during various conflicts in the Middle East. The latter conflicts showed that UAVs were capable of carrying out missions that were dangerous and could lead to a loss of military pilots over enemy territory, but also showed the potential of emerging technology to be integrated into UAVs such as live video streaming and data-linkage. Combined with long loitering times over enemy territory without risking the lives of human pilots, the development of

UAVs underwent significant progress in the 1990s. However, it was not until after 11 September 2001 that UAVs were used for offensive purposes when an alleged planner of the attack on a US ship in Yemen was killed in an attack carried out by a UAV. While these offensive strikes were initially carried out by units that were designed as surveillance UAVs, subsequent generations of UAVs diversified in their usage, including increased range and speed, longer loitering times and other increases in capabilities. The use of UAVs has increased significantly since their more widespread use in the 1990s, a development that can be expected to continue in the future.

## C. Legal Questions

### 1. *Civilian Uses of UAVs*

- 7 While there are considerable obstacles to the implementation of civilian use of unmanned technology, it appears to be only a matter of time before this development takes place. Current plans include the use of civilian UAVs in a variety of roles: search and rescue missions, disaster response, survey projects, delivery and transportation, agriculture, wildlife protection, weather observation, as well as certain police functions (including surveillance and traffic monitoring). While the majority of these functions are domestic, some have taken place internationally.
- 8 The international legal framework regarding civil aviation does not provide detailed rules on the operation of civilian unmanned aircraft systems ('UAS') in international or domestic → *airspace*. Such systems consist of an unmanned aircraft ('UA'), a remote pilot station and the command, control and communications links that join them, in international or domestic airspace. Art. 8 → *Chicago Convention (1944)* of the → *International Civil Aviation Organization (ICAO)* merely provides that pilotless aircraft shall not be flown over the territory of a contracting state without permission and if such permission is granted that the unmanned vehicle is to be controlled as to obviate danger to civil aircraft. Moreover, UA could only operate if they were capable of complying with the detect-and-avoid rules contained in Annex 2 of the Chicago Convention. At this point, no airborne see-and-avoid system has been certified by civil aviation authorities that would satisfy this requirement. Discussions under the aegis of the International Civil Aviation Organization are currently underway on the challenges that UA pose with respect to operations (rules of the air, collision avoidance, air traffic services, equipment, communications, aerodromes, meteorological services, security, safe transport of dangerous goods by air, aircraft accident and incident investigation, search and rescue and facilitation), aircraft and systems (certification, airworthiness, remote pilot station(s), nationality and registration marks, radio navigation aids and airborne navigation equipment, surveillance systems, aeronautical communications, aeronautical radio frequency spectrum, aeronautical charts, environmental protection) and personnel (crew and air traffic control licensing and training).

- 9 The potential use of UAVs in police operations may raise questions of oversight and accountability, especially as it concerns the right to life in the case of armed UAVs, but also with respect to privacy rights in the case of surveillance (→ *Life, Right to, International Protection*; → *Privacy, Right to, International Protection*).

## 2. Military Uses of UAVs

- 10 At the outset it is important to point out that UAVs are not among those weapons that are illegal under international law—such as chemical weapons, laser-blinding weapons or anti-personnel mines (→ *Weapons, Prohibited*). This is true for UAVs that are used as surveillance platforms as well as UAVs that serve as weapons platforms, a result that is shared eg by the 2013 report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions. Whether a certain action carried out through the use of a particular weapon system is illegal under rules of international humanitarian law ('IHL') or international human rights law ('IHRL') is determined by the usage of a weapon or weapon system, bearing in mind the debate about the—potentially concomitant—applicability of either framework and the threshold requirements for the applicability of IHL (→ *Human Rights and Humanitarian Law*).
- 11 The military use of UAVs can be divided into two categories: (i) for surveillance and intelligence purposes and (ii) as weapons platforms. From that initial role and since 1999, the use of UAVs has evolved: first for purposes of target acquisition, using laser markers to designate a target which is then attacked by precision-guided missiles discharged from conventional fixed-wing or rotary-blade aircraft, subsequently as a weapons delivery platform with ever greater operational capabilities. Their use has since been proliferating at a rapid pace and a considerable number of military and covert operations are now carried out with the support of UAVs, ranging in size from miniaturized vehicles to those that are comparable in size to manned aircraft. UAVs have also been tested as transport vehicles and communication relay devices. States have adopted UAVs, inter alia, for reasons including persistence, precision, operational reach, force protection and stealth while not endangering a state's own military personnel. UAV proponents argue that their use reduces the risk of civilian casualties in missile strikes through better intelligence-gathering and greater targeting precision.
- 12 While the debates about UAVs have been most vocal concerning their role in active combat, the large majority of UAVs at this time is not weaponized and serves intelligence, surveillance and reconnaissance purposes. The United Nations has contemplated the use of UAVs in its peacekeeping operations in that role.

### (a) *Ius ad bellum*

- 11 The use of UAVs does not render an operation illegal under rules of *ius ad bellum*. While some authors debate the use of UAVs in the context of combatting terrorist organizations as a matter of *ius ad bellum*, these contributions seem misguided. Whether a breach of a rule of *ius ad bellum* has occurred is a determination that is independent from what type of weapon has been used and

involves an analysis taking into account, inter alia, the following: existence of prior approval by the UN Security Council, → *consent* by the target State or → *self-defence* (see also → *Circumstances Precluding Wrongfulness*).

**(b) Human Rights Law**

- 12 In the absence of an armed conflict, IHRL is the applicable body of law. There remains discussion on the applicability of IHRL during times of armed conflict. If IHRL is applicable, Art. 6 ICCPR (→ *International Covenant on Civil and Political Rights [1966]*) or a largely concomitant rule in → *customary international law* prohibit the arbitrary deprivation of life. Unlike IHL, IHRL does not permit the targeting of an individual because of that person's status. Rather, the use of deadly force is only permissible if such action is unavoidable in the defence of another person from unlawful violence, if it meets the threshold of → *proportionality* under the applicable human rights regime, and if it is planned, prepared and conducted in a fashion that minimizes the use of lethal force, to the extent this is possible. The conclusion to be drawn is that conducting lethal operations through UAVs outside the context of armed conflict would be lawful only in the narrowest of circumstances. Measures involving the use of deadly force by way of, inter alia, drones have led to debates over a number of issues, including the use of targeted killings as opposed to trying to capture a suspected individual as well as the geographical limits of armed conflicts. In either case, IHRL sets stricter limitations to state action compared to IHL.
- 13 As to the former, because of the concomitant applicability of the two bodies of law, arguments have been raised that during an armed conflict lethal strikes would be illegal if the reasonable possibility exists to capture the target. In the latter case, questions have been raised to what extent military actions are justified outside the territory of a state against from whose territory an attack was planned or originated. Depending on the answer to that question, IHRL with its stricter requirements applies rather than IHL. While many of these questions have been raised in the context of strikes carried out by UAVs and their use has become synonymous with them, they are not dependent on the use of drones in these operations.

**(c) International Humanitarian Law**

- 14 Independent from the consideration under the *ius ad bellum* and IHRL, during an international or non-international armed conflict, operations involving UAVs have to comply with the rules of IHL that apply to any weapons or weapon systems: these include the prohibition of superfluous injury or unnecessary suffering, the requirement to take precautions prior to attack, as well as the principles of discrimination and proportionality. These rules are either contained in treaty law or form part of customary international law, although their precise delineation is a matter of contention.
- 15 The prohibition of superfluous injury or unnecessary suffering, while widely debated, is based on the idea that attacks are to be limited to weakening an enemy

- and that human suffering is to be limited to the extent required by → *military necessity*.
- 16 The requirement to take all feasible precautions in order to avoid collateral damage (see eg Art. 57 → *Geneva Conventions Additional Protocol I* [1977] [‘AP I’]) involves the obligation incumbent upon an attacking force to verify the target and use weapons and tactics that are designed to either avoid or, at least, to minimize civilian harm (→ *Civilian Population in Armed Conflict*). In this regard, UAVs are said to increase the ability of commanders to collect information prior to an attack due to the ability to stay airborne for prolonged periods of time and their sensor abilities. This enhancement of surveillance possibilities increases the capabilities to take precautionary measures, but entails a dual risk: (i) disconnecting the operator from the adversary, thereby making targeting easier and abuses more likely and (ii) providing the challenge for operators to process large volumes of data, which may at times be contradictory. This challenge is exacerbated through the development of systems in which one set of operators is responsible for supervising more than one UAV.
  - 17 The principle of distinction, contained in its basic form in Art. 48 AP I mandates that any military action must distinguish between → *combatants* and civilians as well as between military and → *civilian objects*. This distinction between a person and an object that possesses a military character as opposed to a civilian character therefore is of crucial importance. Distinguishing between civilians and those that take a direct part in hostilities has been a challenge in the predominantly asymmetric conflicts of the last years. The presumption in any case must be that of a person having civilian status (International Committee of the Red Cross, Interpretive Guidance on the Notion of Direct Participation in Hostilities Under International Humanitarian Law, 2009), although considerable debate continues as to the standard to be applied in ascertaining such status (*Prosecutor v Galić* [Trial Chamber Judgment] [5 December 2003] paras 50 et seq; → *Galić Case*). UAVs are not as such incapable of providing the means for an operator to adhere to the principle of distinction. Indeed, some have argued that the capabilities that some UAV systems possess—long loitering time and enhanced sensors—augment the ability of operators to observe the principle of distinction. Whether an individual system meets these requirements depends on the system’s capabilities, but it is clear that if a UAV system is not able to meet this threshold it would not meet the distinction requirement. Similarly, the practice of targeting unidentified individuals based merely on conduct, characteristics or connections with other individuals (so-called ‘signature strikes’), are contrary to established targeting rules and contravene the principle of distinction. To be clear, whether a person qualifies as a military target is an assessment that is not purely objective, but contains elements of subjectivity. This does not absolve states to take the necessary precautions and such practice may—depending on the circumstances—amount to the violation of IHL and potentially a war crime (→ *War Crimes*).
  - 18 The principle of proportionality—contained in Art. 51 (5) (b) AP I—requires that beyond the need to minimize civilian damage, an attack is prohibited if the results would be excessive in relation to the anticipated military advantage, judged ex

- ante. It does not appear that UAVs, as such, contravene any of these requirements, although individual operations may run afoul of these rules of IHL. As with the principle of distinction, whether a particular UAV system complies with the requirement of proportionality depends on its particular capabilities.
- 19 In summary, UAVs as such do not pose problems with respect to a legal assessment under international law that are different from other uses. This is partially due—in contradistinction to autonomous weapon systems, where these decisions are made through machine code—to the decision over whether and how to attack remaining with an individual or a group of individuals. The legal assessment differs in cases in which a UAV is used as a platform for weaponry that contravenes the rules just laid out, such as certain biological, chemical or nuclear weapons (→ *Biological Weapons and Warfare*; → *Chemical Weapons and Warfare*; → *Nuclear Weapons and Warfare*). Similarly, the practice of excluding from the proportionality assessment all males that are of fighting age and that happen to be present in a planned area of attack does not comport with IHL requirements. However, the illegality of such action is contingent not on the use of a UAV as a delivery platform, but rather on the concrete weapon deployed.
  - 20 Of further legal significance is the designation of UAV as military aircraft. Only military aircraft have belligerent rights for purposes of international armed conflicts, such as the authority to carry out an attack on → *military objectives*. Under customary law pertaining to military aircraft—a category UAVs fall under—the operation of an aircraft is to be carried out by members of the → *armed forces* within a commissioned unit of a state whose members are subject to the regular armed forces discipline and the UAV must have the military markings of that State (Arts 3 and 14 Hague Rules of Air Warfare; San Remo Manual, para. 13 (j)). Discussion has arisen over the involvement of military contractors operating UAVs in certain phases of deployment (typically take-off and landing) or having the role of pilot (as opposed to payload operator). The very nature of UAVs—being unmanned—allow for a separation of those roles in the former case. As long as the operation is carried out under those circumstances and the UAV is commanded by a member of the armed forces, this does not appear to present a legal problem. This is true even in situations in which military personnel exercising such authority is physically removed from the operators (see eg Manual on International Law Applicable to Air and Missile Warfare [2010] Rule 1 (x), para. 4).

## **D. Miscellaneous**

### ***1. Accountability and Transparency***

- 21 Accountability and transparency have generated considerable discussion in the context of targeted killings carried out by UAVs. This includes debates about the extent to which IHRL and IHL mandate that states hold accountable those that have acted in contravention of the applicable legal framework(s). Beyond that, there has been strong debate about the need to provide greater transparency in



what criteria are used for targeting and which institutions are responsible for making determinations over whom to target. Opponents of releasing such information argue that potential targets could alter their behavior to evade detection. Proponents point to the difficulty in assessing claims of precision targeting objectively and to the problem of leaving victims little opportunity to seek redress. Moreover, higher degrees of transparency are said to promote an increase in compliance with the requirements of IHL and IHRL laid out above. To that end, the Special Rapporteur on the Promotion and Protection of Human Rights and Fundamental Freedoms while Countering Terrorism has conducted an independent strike analysis in 2013 and concluded that states ‘are under a present and continuing obligation to make public, in as much detail as possible, and subject only to such redactions as are strictly necessary to meet legitimate national security concerns, the results of any fact-finding investigations that have been conducted into ... incidents’ that were scrutinized under his mandate (→ *Terrorism*).

## **2. Connection with Targeted Killings**

- 22 The debate over UAVs has oftentimes been synonymous with the debate over targeted killing, a practice through which an individual is killed who does not at the time pose an immediate threat to the life or well-being of another person or who is executed without criminal proceedings. While the term does not carry legal significance, it is now widely used in documents such as the decision of the Supreme Court of Israel in *The Public Committee against Torture in Israel v The Government of Israel* (13 December 2006) and the 2010 report of the United Nation’s Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions. While UAVs have been used widely in carrying out targeted killing operations, especially in the aftermath of the attacks on September 11, 2001, the legal questions surrounding this practice are not to be conflated with the separate legal questions surrounding the use of UAVs, as laid out above.

## **E. Evaluation**

- 23 UAVs—as such—are not inherently illegal, as their operation does not make it impossible to observe the requisite rules of IHRL and IHL. Violations of both bodies of law have nevertheless occurred and must be avoided (UNGA Res 68/178 ‘Protection of Human Rights and Fundamental Freedoms while Countering Terrorism’ para. 6 (s)). There are considerable arguments over whether UAVs may lead to an increase in military operations that would not have been carried out in the absence of drone capabilities and advantages such as not endangering members of one’s own forces. This debate is less one of law but of policy. Unlike autonomous weapon systems (see Wagner), there is no qualitative difference in the use of UAVs in armed conflict in this regard, as mankind has for a long time sought technology that distances one’s own forces from those of the enemy and thus depersonalizes armed conflict to the extent possible (see Boothby 593). The larger challenge may lie in the political attraction of projecting force

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without risk to the life or well-being of one's own soldiers. Coupled with the secrecy with which current armed conflicts are at times carried out, this raises and will continue to raise both legal and political challenges.

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