Unmanned Aerial Vehicles in Asymmetric Warfare: Maintaining the Advantage of the State Actor

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The 2006 Second Lebanon War represents a turning point in the use of Unmanned Aerial Vehicles (UAVs).[1] This was the first war in history that recorded more unmanned flight hours than manned fighter aircraft flight hours, and that featured sustained UAV use without breaks in situational awareness. Since that war, Israel has continued to develop and absorb additional UAVs, and has used them extensively in operations over the last decade. At the same time, Hezbollah too – which failed in its few attempts to attack Israel with explosives-laden UAVs during the Second Lebanon War – has expanded its UAV fleet in the past ten years.

This article will survey the processes that have taken place in the field of UAVs over the decade since the Second Lebanon War, and recommend particular preparations in this regard for a future potential war pitting Israel against Hezbollah. The main question at hand is whether in a future campaign Israel will retain the UAV advantage over Hezbollah that it enjoyed in 2006.

The UAV in the Second Lebanon War Aerial Campaign
The Second Lebanon War marks a seminal moment in UAV combat and a new role for the UAV in asymmetric warfare. This change was evident with both of the warring parties, yet as in other technological fields, the margin of asymmetry between the sides was maintained.

The overall number of Israel's UAV flight hours during the Second Lebanon War was approximately 16,000.[2] Experts estimate that on average, there

were some 21 UAVs in the air at any given time.[3] This makes the Second Lebanon War the war with the most extensive UAV use by Israel up to that point,[4] and the first war in history that featured sustained UAV use over the combat zone from beginning to end.[5]

During the war the IDF employed a number of UAV models, including the Hermes 450 and Searcher.[6] These UAVs were operated by the Israel Air Force (IAF) as part of their aerial forces, while the Israeli ground forces used tactical drones. The UAVs played a major role in several of the conflict's important aerial missions, including the Launcher Hunt mission, which involved a capability developed by the IAF for destroying from the air mobile targets that can change location with short time frames. This mission included UAVs continuously patrolling the airspace above ground-to-ground missile and rocket launching areas in Lebanon, and made use of diverse types of sensors to discover the missile launchers before or after launch and enable their destruction by precision weaponry. This method of operation led to the destruction of more than ninety mobile launchers and another thirty launch tubes during the war.[7]

Hezbollah also employed UAVs in this conflict; these were shot down by Israeli fighter jets. According to declassified data, Hezbollah launched four UAVs toward Israel, apparently Iranian models designed for both intelligence gathering and attack that were refitted to meet Hezbollah needs. According to reports, these UAVs were loaded with explosives, and the timing of their launch indicates night operation capabilities.[8] To deal with this new threat, the IAF had to make adjustments to its radar capabilities to enable them to identify relatively small aircraft flying slowly at low altitudes.[9]

Advantages of UAVs in Asymmetric Warfare versus a Sub-State Actor

Like other 21st century asymmetric conflicts, the Second Lebanon War demonstrated that combat forces with advanced and optimal technology for facing a conventional enemy may be vulnerable to an asymmetric attack aimed at neutralizing the "stronger" side's technological advantages while miring it in political problems that overshadow its military advantages.[10] A central challenge of a conflict such as the Second Lebanon War (or similarly, the various rounds of fighting between Israel and Hamas in the Gaza Strip, or between the United States and sub-state actors in Iraq and Afghanistan)

is for the state actor to cope with a political situation that makes it difficult for democracies to fight and imposes several constraints, including:

a. Ensuring that every effort is made to reduce harm to civilians and avoid collateral damage.
b. Producing convincing evidence that such efforts are in fact made.
c. Producing evidence as close as possible to real time in order to refute false charges made by the enemy regarding civilian casualties and disproportionate use of force.[11]

In conflicts between democracies and sub-state enemies, clear facts must be established in the field with the objective of undermining the enemy's ability to manipulate and claim achievements, if only the fact that it has not been defeated by the strong side.

Extensive use of UAVs inter alia enables achievement of military and political goals within the above constraints: UAVs have capabilities that allow for increased situational awareness, which aids in improved command of territory through intelligence superiority; improves the ability to implement a policy distinguishing between combatants and noncombatants; enhances capabilities for precise attacks, thus reducing collateral damage; and provides greater ability to broadcast up-to-date information in real time, including for public relations and media purposes. Overall, UAVs assist in maintaining legitimacy for the state to continue acting against the enemy. In addition, they help reduce physical risk to the party operating them, and help overcome some of the barriers facing operators of manned combat vehicles. Together this represents the added value of UAV use, beyond the crucial tactical roles such vehicles play in combat itself.

Development of UAV Use, 2006-2012

UAVs are just one of a variety of airborne measures used by the IAF, and an air force is just one of the necessary layers for fighting against a sub-state organization. Since the Second Lebanon War, the IAF has equipped itself with a number of advanced UAV models: the Heron (2007),[12] Heron TP (2010),[13] and Hermes 900 (2014).[14] These aircraft enable the execution of unmanned intelligence gathering and tracking missions and at times replace the use of manned aircraft. Furthermore, since the Second Lebanon War, the IAF has amassed extensive combat experience with such aircraft, mainly through the various rounds of fighting in the Gaza Strip.

The growth in development, procurement, and use of UAVs by technologically advanced militaries such as the IDF has been accompanied by a similar (though slower) trend among other parties: the number of countries using UAVs has grown, and at the same time, a revolution is underway in UAV production, which no longer is limited to defense industries. This revolution has led to a state of affairs in which many countries and commercial firms have begun to manufacture and sell UAVs to nearly anyone who wants, including various sub-state actors. These vehicles are generally less sophisticated than the advanced military aircraft, but easier to operate, cheaper, and freely available. Researchers estimate that within less than a decade, any country will be able to purchase and use relatively advanced UAVs with attack capabilities – a capacity available today to only a small number of countries.[15]

This trend affects not only countries; it also enables non-state actors or militaries to acquire and use UAVs. Such actors include commercial firms, sub-state organizations (including terror organizations), and even private individuals.[16] This phenomenon may have an impact on the challenges facing the IDF in future combat against Hezbollah, especially in light of the fact that the organization relies on Iranian military technologies, while likewise operating as a terror organization that purchases simple "shelf technologies" that are refitted for military purposes.

Historically speaking, technology is a prominent example of the power superiority of states over the sub-state organizations they confront. Over the last few decades, technology has helped countries such as Israel and the United States remain one step ahead of their enemies, even though over these years sub-state organizations have assembled technologies more advanced than the daggers and submachine guns that were once their default options. One of the most outstanding expressions of this trend over the last decade is the use of UAVs by such organizations, with Hezbollah the leader in this field. This can be attributed to the fact that Hezbollah is a proxy of a powerful country (Iran) that takes pains to equip it with military technologies, whether Iranian-made or otherwise.[17]

Hezbollah operates an array of some 200 UAVs that were supplied by Iran, and employs them for a range of purposes. While in the Second Lebanon War and the following years the organization used explosives-laden UAVs to attempt to carry out terror attacks against Israel, in 2014 it was revealed that Hezbollah also operates a fleet of UAVs for intelligence

gathering purposes. This capability, for example, enabled the organization to prevent a terror attack by Salifi jihadist elements against Hezbollah targets in Lebanon. Hezbollah also made use of UAVs in assisting the forces of Syrian President Bashar al-Assad in fighting against Syrian rebel organizations.[18]

Unclassified publications do not allow for assessment of whether Iran equipped Hezbollah with attack UAVs, but a video published on the internet shows an attack against al-Qaeda fighters apparently carried out by a UAV, with the operation attributed to Hezbollah.[19] This joins reports of a designated UAV landing pad set up by Hezbollah in territory under its control.[20] All of this clearly indicates the organization's intention, and even perhaps capability, of using military-type UAVs in any future military conflict with Israel.

The commercial UAV industry has become an additional significant element alongside the aircraft produced in defense contexts. Commercial UAVs sell at a broad range of prices, and can be employed for a wide variety of improvised purposes. Their use has become a trend over the last three years in armed sub-state organizations, and thus any attempt to predict future use of commercial UAVs by Hezbollah must first consider the overall trend as expressed in other organizations, such as the Islamic State. In this context, there are reports of the arming of small UAVs, which cost just tens of dollars, by organizations that use them as precise aerial weaponry.[21] These UAVs are armed primarily with explosives, but a situation may arise where they would be armed with chemical substances, becoming a more highly accurate weapon than those that such organizations possessed in the past (although not necessarily weapons with greater durability or survivability).

Syrian rebel organizations use drones that cost approximately $1000 in order to gather intelligence from the air.[22] The image broadcast by such drones is transmitted to a control terminal (console) that operates the aircraft, or to a cell phone or other smart device, enabling ground forces to plan an attack in the best possible way. Although such aircraft have low intelligence gathering capabilities and reliability in comparison with micro-tactical UAVs produced by defense industries, they nonetheless add air power to organizations that in the past had no such intelligence gathering capabilities whatsoever. In early 2016, in the wake of remarks by the leaders of Great Britain and the United States, there was growing awareness of the possibility that sub-state organizations may use drones in order to spread radioactive materials above a Western city, as in a "dirty bomb."[23]

UAVs as a Challenge for Israel in a Future War with Hezbollah

Global events of the last decade indicate that asymmetric warfare will continue to challenge the most powerful military powers. These powers currently possess military technologies that include advanced capabilities regarding precision, diversity of use, prolonged operating time, and most important, reduction of risk to combat forces. UAVs will be one of the prominent weapons assisting military powers in coping with the asymmetric challenge. In essence, it is hard to imagine how one can fight sub-state actors – who think nothing of civilian casualties (on either side of the conflict) – without relying on UAV platforms. This form of combat becomes especially complex against the backdrop of the unprecedented rise of humanitarian discourse in the West. With media that report and broadcast in real time, the public is exposed immediately to the ravages of war. From this perspective, the continual technological development in Israel will serve it well in any future war against Hezbollah, as it has also served it well, relatively speaking, in the various rounds of combat with Hamas in the Gaza Strip over the last decade.

To a certain extent the technological asymmetry between Israel and Hezbollah has been maintained since 2006. Nevertheless, Hezbollah is becoming more and more of a military organization that is equipped with advanced weapon systems such as both military and commercial UAVs, as well as other modern innovations such as missiles with advanced navigation systems. However, the main asymmetry between Israel and Hezbollah stems from the manner of fighting, and from "the asymmetry of norms, rules, and morality, which one side abides by and the other side does not, while firing exclusively at civilians without consideration as to military necessity, proportionality, or distinction between combatants and non-combatants."[24] This working assumption must also be considered in reference to Hezbollah's acquisition of systems that may seem amateur, but with certain modes of operation may create a significant effect – both physical and psychological.

The IAF has made adjustments in its detection systems to be able – with air defense systems and aircraft – to identify and intercept UAVs.[25] The question is whether the IAF will continue to be able to meet a greater quantitative threat of this nature when it is used simultaneously with extensive rocket fire. A separate question relates to the capability of dealing with the various missions that Hezbollah can carry out using UAVs. In such cases, even relatively simple use of UAVs, if not disrupted, can assist the organization in improving the precision of its fire – by using UAVs to transmit information

to other weapon systems. Moreover, presumably the IAF air defense systems and fighter planes would be ineffective modes of A2/AD (anti-access/area denial) for small drones or commercial UAVs. Such UAVs and drones would need to be dealt with using suitable measures, with the assistance of ground or naval forces.

It appears that even if Hezbollah's UAV threat continues to grow and eventually gives it capabilities that it did not have in the past, this would not be a threat that cannot be coped with. Nevertheless, such a threat is a challenge that must be understood in order to better prepare the various forces fighting the challenge. Good preparation may significantly reduce the success of the other side, and even its motivation to use such measures.

Modes of Response
Aerial Responses
The challenges facing the IDF regarding UAVs should be divided into two groups. The first group includes challenges through cyber attacks, including hacking, manipulating, jamming, or blocking through electronic and other means that may be directed against the IDF's UAVs. There are, for example, reports of British and American hacking and spying against Israeli UAVs.[26] Similarly, Israel must take into account the lessons learned by Hezbollah in its ongoing learning process, grounded in its own experiences and in lessons learned by other sub-state actors that must deal with UAV warfare, such as al-Qaeda.

It can be assumed that in future warfare with Hezbollah, the organization will attempt (as it did in previous rounds of fighting) to camouflage its actions and hide as much as possible, and to significantly reduce the use of cellular devices and other electronic components that may reveal location and allow for collection of intelligence regarding the organization and its plans for attack. Moreover, it is reasonable to presume that Hezbollah will continue using civilians as human shields, and perhaps even increase their use in this manner, which would require more data collection hours and more "surgical" attacks. Also the possibility that the IAF may need to operate in Lebanon without absolute air superiority – in light of a concern that Hezbollah and other elements are equipped with advanced air defense systems[27] – may require Israel to make more extensive use of UAVs.

Air Defense

The second set of challenges has prompted the IAF to make adjustments in the radars of its various air defense systems to enable the early detection and interception of UAVs. Notwithstanding the success thus far in this field, the enemy may use various technological means to attempt to fool these systems. In the balance of power between Israeli and Hezbollah forces, a single success by Hezbollah in this area may hold major significance as far as psychological impact on Israeli citizens, even if its actual combat significance is miniscule.

Also to be taken seriously are Hezbollah's threats of attacking strategic targets, such as the ammonia storage facilities in Haifa or gas drilling rigs at sea.[28] Any strike of these targets by a UAV armed with explosives may be catastrophic, and thus special attention must be directed at defending them. Such defense may require special input from the IAF. In addition, the IAF, with the weapons at its disposal and despite its responsibility to defend Israel's airspace, may have a hard time coping with some of the UAVs, particularly those that are especially small, such as commercial drones, which cannot be expected to be shot down by fighter planes. These small drones are a threat requiring a response from ground or naval forces. Moreover, the low signature of such aircraft does not allow for detection by standard radar, and their low flight altitudes do not allow for interception by missiles.

Ground and Naval Challenges

The use of small drones or other small aircraft gives sub-state organizations air capabilities (even if primitive relative to those of a regular military with an air force), which expand their spectrum of combat methods. This is due in part to the ability to gather intelligence in real time and transmit it to trailing forces, which until just a few years ago was a capability held only by advanced countries. Thus, for example, a combination of drones and 3G phones may be a challenge that ground forces should anticipate.

Despite the fact that this new threat is perceived by some as an amateur threat that can apparently be dealt with through simple means, it still demands comprehensive preparation employing a variety of measures: early warning measures, cyber warfare, and employment of kinetic measures such as smokescreens or anti-aircraft fire. It seems that as civilian use of UAVs and drones increases, so do the solutions allowing their more precise identification and interception. Therefore, equipping ground and naval forces with solutions

of this type should be considered.[29] In light of its technological superiority over Hezbollah, Israel would presumably be capable of seeking solutions that are not necessarily kinetic to deal with the challenge of small drones. A technological solution allowing for remote commandeering of a hostile drone and a controlled landing is to be preferred for regions where there are civilians or even soldiers, for that matter.

Regarding the threat to naval vessels,[30] attention should be paid to a growing trend of various militaries that are outfitting its vessels and forces, both naval and ground, with systems for identifying and shooting down UAVs to prevent UAV attacks (especially suicide UAV attacks). American aircraft carriers that are now armed with laser cannons for this purpose are a prominent example.[31] Regarding the Israeli military, IAF readiness should be examined, as well as the readiness of the naval vessels themselves for defending against Hezbollah UAVs that may come from land or sea in order to gather information regarding the vessel or to attack it.

Conclusion

The Second Lebanon War was a turning point in the use of UAVs in asymmetric warfare between state and sub-state actors. IDF UAVs were in continuous, sustained flight over the combat theater, and assisted in missions of intelligence gathering, hunting of ground-to-ground missiles/rockets and launching teams, targeting of valuable Hezbollah targets, and assistance to ground forces with intelligence and "road clearing."

Since the Second Lebanon War, the IDF has continued to develop its capabilities in this realm and use them in combat situations, especially against Hamas in the Gaza Strip. The IDF developed advanced methods of controlling territory from the air through employment of improved intelligence capabilities. In large part, these capabilities are based on UAV platforms that enable prolonged flight time over enemy territory, and specifically over Hezbollah launching zones. Hezbollah, too, has greatly developed its UAV capabilities, and as a state-supported sub-state organization enjoys the best of both worlds: the use of military-grade UAVs as well as commercial UAVs that can be purchased at low cost in the free market.

In light of the current state of affairs, the IDF should bear in mind two major issues: first, Hezbollah is aware that UAV operation is one of Israel's advantages, and thus will make efforts to disrupt their use or limit their success; second, Hezbollah has equipped itself with a large number of UAVs

and may use them in a variety of ways for various purposes in future combat against Israel, whether independently or with the sponsorship of Iran.

Israel must recognize the threat, especially its less obvious aspects such as the threat posed by use of small commercial UAVs, and analyze and prepare for potential extreme scenarios, using its air, ground, and naval forces. The goal is to reduce as much as possible the chances of Hezbollah attaining a significant achievement, even if only psychological, with such aircraft. A psychological achievement can be meaningful for Hezbollah, which has in the past manipulated the concept of victory. Beside such preparation, it is recommended that IDF technological personnel study the capabilities latent in cheap, civilian UAVs, and identify the vulnerabilities that will enable coping with such aircraft through employment of Israel's technological superiority. The continued development, manufacture, and use of advanced UAVs, as well as preparations for dealing with the enemy UAV threat, will be the best possible expression of Israeli technological superiority in this field, and help maintain its relative advantage over Hezbollah, as well as over other enemies in the region.

Notes

1   UAV is the common abbreviation for "unmanned aerial vehicle," sometimes also called UAS – "unmanned aircraft system."
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3   Ibid., p. 124.
4   Benjamin S**.** Lambeth, *Air Operations in Israel's War against Hezbollah: Learning from Lebanon and Getting it Right in Gaza* (Santa Monica, CA: RAND Corporation, 2011), p. 113, http://www.rand.org/pubs/monographs/MG835.html.
5   Isaac Ben-Israel, "The First Missile War," a position paper of the School of Government and Policy, Tel Aviv University, May 2007, p. 46.
6   Cordesman, Sullivan, and Sullivan, "Lessons of the 2006 Israeli-Hezbollah War," p. 124.
7   Ben-Israel, p. 46.
8   Cordesman, Sullivan, and Sullivan, "Lessons of the 2006 Israeli-Hezbollah War," p. 105.
9   Ibid., p. 106.
10   Ibid., p. 2.
11   Ibid., p. 48.

12 Amos Harel, "The IAF Adopts the UAV 'Heron' – the Largest in the World," *Haaretz*, March, 7, 2007, http://www.haaretz.co.il/misc/1.1392326 .

13 Doron Suslik, "UAV 'Eitan' (Heron TP) Adopted by IAF," Israel Aerospace Industries, February 22, 2010, http://www.iai.co.il/2013/35805-42252-he/IAI.aspx.

14 Nadav Berger, "'Star in the Sky' Hermes 900 Combat Ready," Israeli Air Force website, July 29, 2014, http://www.iaf.org.il/4410-42217-he/IAF.aspx.

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18 "Hizbullah Fleet of 200 Iran Drones Said Monitoring Syria Border," *WorldTribune.com*, November 27, 2013, http://www.worldtribune.com/archives/hizbullah-fleet-of-200-iran-drones-said-monitoring-syria-border/.

19 "Hezbollah Uses UAV to Attack Al-Qaeda Backed Rebels," *Ynetnews.com*, September 21, 2014, http://www.ynetnews.com/articles/0,7340,L-4573625,00.html.

20 Gili Cohen, "Satellite Reveals: Hezbollah Built New UAV Base in Lebanon Valley Region," *Haaretz*, April 24, 2015, http://www.haaretz.co.il/news/politics/1.2621112.

21 David Hambling, "ISIS Is Reportedly Packing Drones with Explosives Now," *Popular Mechanics.com*, December 16, 2015, http://www.popularmechanics.com/military/weapons/a18577/isis-packing-drones-with-explosives/ .

22 "Drone" is a common name for a small UAV (SUAV) that can hover in the air through use of a number of rotors. This type of aircraft is also called a "multi-rotor."

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30 In the event of a conflict with Hezbollah, most of Israel's naval forces will presumably operate near the coast, at a distance that should enable the IAF to provide them with air defense.

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