

Becoming the Giants of Autonomous Weapons and Drones (GAWDs) of the World and the Implications for India

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Abstract

The last few decades have seen a paradigm shift in war-fighting doctrines around the world where newer theatres of war have emerged leaving the traditional three (Land, Sea, and Air) in a completely different light. The newer two (Space and Cyberspace) when bred with the former three, results in a cross-species that we commonly call disruptive or 'grey-zone' warfare. Nations have begun to employ newer 'un-trackable' and 'zero footprint' technologies to rain havoc on the adversary during conflicts. Their development, modifications, and deployment strategies of Autonomous Weapons and Drones (AWDs) come into use when we categorise them into Type-1, Type-2, and Type-3. Drones being predominantly used in offence, defence, and surveillance role and can also be exploited for the art of distraction. The article puts forward the intelligence point of view where UAVs be tweaked to be used similar to 'migratory birds' behind enemy lines.

Introduction

Conflicts are often fashioned in such a manner that despite the devastation they cause in people's life, they must be portrayed as just and civilised wars. To achieve such representation, nations resort to using soft power more than actual hard power. We see this happening in the ongoing war between Russia and Ukraine where each side uses the means at its disposal to create a

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favourable narrative and perception. Today influencing the 'mass opinion' of the adversary nation is as important as the kinetic effects of war. Mass opinions can be triggered by various methods. One, you use actual weapons and target valuable installations affecting a nation's sentiments. Two, you harass the adversary by showing your capabilities and using technologies which don't particularly have any antidote, such as spywares or hi-tech drones. The latter one, I like to call 'Triggering Tactics' using 'Poke Weapons', which pokes the adversary with a deceptive intent to ascertain the reactive nature of the adversary rather than trigger an offensive action. The ensuing paragraphs attempt to identify trends in weapon technology developments and classify countries into Type-1, Type-2 and Type-3 on the basis of their approach in developing Autonomous Weapons and Drone System (AWDS s). The analysis will try to uncover the potential uses of drone technology and convert a conflict into a 'Poke War'¹ using ancient methodologies like the art of distraction and strategies like Psychological Operations (PSYOPS).

Blending Disruptive Warfare with Psychological Warfare

Blockchain is now being recognised as an asset with a virtual universe also known as Metaverse. Being born on that blockchain, it is near certain that technology penetration will grow manifold and become an intrinsic part of our lives as internet is today. The world is shifting from WEB 2.0 to WEB 3.0 and with new developments being introduced such as the WEB 3.0², the common notion of information consumption and use of technology is changing. WEB 3.0 is a more decentralised platform which runs mostly on the blockchain. "The Emerging Disruptive Technologies (EDTs) such as artificial intelligence (AI), big data, quantum technology, robotics, autonomous systems, new advanced materials, blockchain, hypersonic weapons systems, and biotechnologies are applied to human enhancements which are expected to have a disruptive impact on defence and revolutionise future military capabilities, strategy and operations".³ With Software and Codes like AI, machine learning (ML) and Blockchain in the back-end, when it comes to new-age warfare, the front end is held by Autonomous Weapons Systems (AWS) and Unmanned Technologies. These are the instruments where the software and codes are deployed.

Remotely Piloted Aircrafts (RPAs) are a crucial part of EDTs. With conventional wars being replaced by 'Grey Zone' wars, drones offer a blend of both the worlds. Conventional wars meant physical 'Force on Force' damages, whereas the new-age wars include physical, economic, and psychological damages. The act of using drones to impose constant physical damages to the adversary without attributability is nothing but playing with the leadership's mental state. Such acts, in today's overly connected world, plays with a fragile mass opinion affecting the country's internal well-being and its international relations.

In recent years, not just nations but non-state players have demonstrated their drone capabilities by exploiting drone swarms for attack purposes. The recent attack on Abu Dhabi's new international airport, on 17 Jan 2022, by the Houthi rebels causing significant damage and casualties comes just a little over two years after a similar attack by the same group on Saudi oil fields on 14 Sep 2019. The effects of constant 'poking' is devastating, even more when it is combined with PSYOPS. In geo-political issues, putting/maintaining pressure and handling pressure are the most important tools in the art of disruptive and hybrid warfare. The use of disruptive weapons and psychological weapons can be debilitating when paired with human psychology. As Von Clausewitz opined, '*War is a contest of wills*' which is fought in the minds; disruptive and hybrid warfare targets the minds of the adversary.

Mastering the Art of Distraction using Drones. A drone is a flying object to most people; it is a revolutionary step when it comes to e-commerce, cinematography, etc. But for militaries, drone is an eye, an arms carrier, a gun, a spy and much more. Drones can be prevented from entering military installations using drone radars and jammers but with every encumbrance comes a new antidote. The UAV technology with stealth capabilities and ultra-low radar signature is difficult to counter. Using single drones one at a time, to attack installations of great but not national/international importance will create a feeling of vulnerability in the population, which would eventually pressurise the government, leaving them with limited courses of action. With techniques of disruptive and psychological warfare, the art of distraction plays an important role. Shifting spotlights from one event to another and keeping real intent in the darkness is what is called the art of deception.

Using Drones like a ‘Fire They Can’t Put Out’

With every new virus, comes a new anti-virus; with every new ailment comes an antidote; with every weapon comes a counter weapon, whether it takes months or years to make, but it comes for sure. Similarly, for every new anti-drone technology comes an already available counter-counter measure. India had militarised drones more than a decade back with the induction of IAI Heron/ Searcher and now the Indian Navy has leased two MQ-9 Reaper drones. But when a game of disruptive and psychological warfare is played, these are not the drones we might want to use. Smaller drones which are harder to detect on a radar screen can be like a swiftly erupting fire which, when it lights up, assures that the victim gets pyro-phobic for the rest of his life. Now, we'll analyse the scope of using drones from multiple views, each one giving new options in which these small sized drones can be operationalised, keeping in mind low stakes and high value of return because the chances of winning are highest when the stakes are low.

- **Troops’ Point of View — Drones as an Extra Limb.**

Many countries have operationalised and developed maritime drones, wheeled drones and even human shaped armed bots. The U.S. Marines Corps has recently tested a multi-purpose mini-drone that has been designed to transport diverse payloads and be fired from grenade launchers. The Drone40, developed by Australian firm DefendTex, is less than 5 inches in size with its take-off weight being 300 grams. “The modular bay of the unmanned aerial vehicle (UAV) allows handlers to fit a payload into the tiny aircraft according to the nature of the mission. The UAV can be equipped with munitions including counter-drone hard and soft kill options, flashbangs, and chemical smoke along with kinetic options”.⁴ These highly capable drones paired with operatives during warfare can give them an edge over their counterparts; not only by using the on-board vision but to use those for Kamikaze attacks whenever required [...] and drones are eminently suitable for the Kamikaze roles.

- **Commander’s Point of View — Drone as a Third Eye.**

Operationalisation of drones as surveillance systems and for monitoring real time situation in a warzone has been ongoing

for decades now. The leadership can see what is happening in the warzone from command headquarters, ensuring much better battlefield transparency as well as Battlefield Damage Assessment (BDA). An indigenously made airborne technology, with AI/ML embedded, which can make shoot/no shoot decisions based on pre-fed decision matrix, can relieve the Commander from decision making in an intensive combat environment.

- **Sailor's Point of View — Drones as a Shiver of Sharks.** “At another level, the underwater domain is emerging as an important medium for drone warfare. An underwater drone or a Remotely Operated Underwater Vehicle (ROV) is a submersible platform and can move through underwater currents. The underwater drones are generally fitted with cameras, obstacle avoidance sensors, and powerful lighting to record good quality footage even in dark underwater environments”.⁵ The People's Liberation Army Navy (PLAN) has deployed many underwater drones in the Indian Ocean, which have been found by Indonesian fisherman on the coast of Indonesia on various occasions. The PLA drones called '*Sea Wing gliders*' are a type of Uncrewed Underwater Vehicle (UUV) which can operate and do observations for months on end, with or without human control.

- **Aviator's Point of View — Drones as Wild Pterosaurs.** The name 'Pterosaurs' strikes an image of a flying dinosaur with a long beak, which attacks anything that is airborne. High speed drones with destructive capability can be highly frustrating to the adversary when used in right quantities and with correct operational integration plans. They can pose a serious threat to the adversary if we use high speed drones to home on to Offensive Counter Air (OCA) packages and hit the strike aircraft. Using low cost but high capability drones as decoys can help distract the interceptors and aid our ground attack force along with the respective escorts/fighter sweep. Same can be done to phased-out aircraft of the air force, which is already being done by many countries like China and now India is also looking at similar possibilities with the trials on Kiran Mk-II aircraft (CATS-OMCA), and possible modifications on the phased-out MiG-21 and MiG-27.⁶ These full-sized aircrafts have the same radar signature as a manned aircraft on a radar screen.

- **Intelligence Point of View — Drones as Migratory Birds.** Drones are made in every size imaginable; some drones, today, are as small as a few centimetres to being full sized aircrafts. The US. has been working on self-sufficient drones which can use solar power and use pre-planned routes for operations. Why don't we think a few steps ahead and create technologies suiting our geographical conditions? Like migratory birds change habitats and still manage to remain self-sufficient and adapt to changing geography, migratory drones can be developed which use solar energy to power themselves, can remain at rest/in hibernation for long period of times in remote areas, tree tops and when needed, can move to do whatever required, be it surveillance or strike, much like sleeper cells. The Remotely Piloted Aircrafts (RPAs) must be highly autonomous and rely on pre-fed offline maps/terrain data, TERCOM, on-board vision and AI/ML based environment detection, navigation and target acquisition. Such systems would necessarily require satellite based encrypted communication for data dump and strike authorisation.

Cutting Edge Technology Usage

However, just being 'Sleeper Cells' is not good enough. The RPA must have on-board optical seeker/sensor technology not only for navigation and terrain recognition but for comprehending emotional states of subjects of the hostile territory. AI and ML have already been incorporated in small sized cameras for surveillance and espionage. The technology not just understands how someone is feeling at the moment, but predicts their future behaviour and decodes their personality. Thousands of firms across the world are researching and developing psychology-decoding technologies with intent that one day computers can fully understand human psyche by just looking at their facial expressions.

While the drone is in hostile territory, its operators must make sure that the equipment is safe, sustainable, and fully operational. The drone's operational capabilities have already been addressed in the former paragraphs. Another factor of self-sufficiency is the communication and navigation. Catering to Murphy's Law, the developers must assume a situation when the connection to the RPA is lost and the whole objective of the mission is at stake. Making it self-sufficient in this sphere is also vital. The same can

be done by introducing the drone to a Plan-B and, if required, a Plan-C procedure, where loss of connectivity means it has to switch to offline maps and terrain data in order to carry out the objective or return back to the friendly side of IB. The most crucial and game-changing innovation which can be done to the espionage drones is the development and incorporation of Autonomous Drone's Nesting Technology (ADNT) which will be tasked with effective camouflaging of the drone according to the terrain, using suitable methods.

Innovations in Drone Developments and Action Plans

When it comes to developing technology for military use, there are two types of nations. Type One, which dive in the depths of innovation to make their technology a cut above the rest. Their aim is not to create a technology for export or generating profits, but to design a weapon that not only fulfils their own needs but turns out to be something which is truly fearsome for the adversary. Type Two are countries which reverse-engineer technology and manufacture machines with little tweaks and changes to suit their own needs. But this leads to compromises in the capabilities of the system and whenever a new innovation in technology emerges, their systems become outdated. Then the Type Two countries start work on similar technology with a long gestation period of many years. Thus, they are constantly lagging behind the innovation cycle. When their technology finally becomes successful, a new innovation is brought out by the Type One countries. Last, but not the least, are the Type Three countries; the ones who don't participate in the above race at all.

Israel has mastered the art of using software algorithms and hardware to create the most beautiful but lethal drones and not just to make them and showcase to the world, but to manufacture them in huge quantities and utilise them in effective action plans. They understood much earlier that putting a human life up in the air for warfare is likely to be out of fashion in the decades to come. Today, the cutting-edge drone technology breeds in the labs of Israel. "Sitting on the front lines of how wars are fought in the 21st century, Israel has developed in its arms trade, new weapons, and retrofitted old ones so they remain effective, relevant, and deadly in a constantly-changing battlefield. Israel is, in effect, a laboratory for the rest of the world. The ground-breaking US

Predator was designed by Abraham Karem, who built drones for the Israeli Air Force before moving to the US in the 1970s".⁷ One of the biggest advantages of the drone tech and its application in warfare is that it is unavoidable, un-foreseeable, and highly capable. Militant organisations around the world have operationalised drones for signalling and posturing to monitor military establishments, transport arms, bomb targets of national and international importance. Other military technologies often require vast human and financial capital to operate efficiently. Drones can be maintained and operated by just one person, anywhere, and without any infrastructure with hefty operating costs.

"Over the last few years, Israel has exported \$4.6 billion worth of unmanned aerial vehicles according to a study by the business consulting firm Frost & Sullivan. UAVs, or drones, constitute nearly 10 percent of Israel's total military exports. Israel is considered a powerhouse in the field of unmanned aircraft, primarily due to the Israel Air Forces' impressive squadrons of UAVs".⁸ In addition, "Israeli state-owned defence contractor, Israel Aerospace Industries (IAI), has unveiled a remote-controlled armed robot which, it says, can patrol battle zones, track infiltrators and open fire [...] this is the latest addition to the world of drone technology, which is rapidly reshaping the modern battlefield".⁹

The Defence Research and Development Organisation (DRDO) has developed an Anti-Drone detection and neutralisation system which was in the news after the Jammu airfield attack in June 2021. The equipment has an operational radius of 3 kilometres. "This DRDO-developed anti-drone system had earlier been deployed for VVIP protection on Independence Day 2020, former US President Donald Trump's visit to Motera stadium in Ahmedabad, and Republic Day 2021".¹⁰ The technology has been used in selective events of global importance and wasn't used in operational service with the military till recently.

"On 21 October, the Russian military claimed it had shot down nine Bayraktar TB-2 UAVs flying in the vicinity of Gyumri. The reports stated that the IL269's sister system, KRET's IRL257 Krasukha-4, was the platform used for the attacks".¹¹ Russia's Krasukha is a mobile Electronic Warfare (EW) system mounted onto a BAZ-6910-022 8x8 truck system. The Krasukha-4 is intended to neutralise Low-Earth Orbit (LEO) spy satellites, ground-based

radars, airborne radars (AWACS), and UAVs at ranges between 150 to 300 kilometres.

With an engagement distance of 3 km (as in the case of DRDO's novel Anti-drone system) and low response time, panic shooting is something very hard to avoid. Today, most military-grade large drones can achieve an average speed of about 200 miles per hours or 321 kmph. With that speed, distance of 3 kilometres can be covered in 33 seconds. If not a military drone, other publicly available quad-copters used by various militant groups can achieve speeds up to 50 mph i.e., 80 kmph which will cover the said distance in 2 min 15 secs, which is unlikely to give a wide enough window to tackle them.

Conclusion

This article made an attempt to examine the trends in the development and implementation of EDTs blended with techniques of PSYOPS. It focused towards unfolding the capabilities of more relevant aspects of EDTs today, which include UAVs, Remotely Operated Underwater Vehicles (ROVs), and Anti-Offensive Counter Air (Anti-OCA) systems. The novel ideas that the article offers were discussed on the basis of operationalisation of such technologies through five different points of view namely, Troops', Commander's, Sailor's, Aviator's, and Intelligence. Today, weapon wizards such as Israel are thinking beyond the present as far as the drone technology is concerned. Various softwares, codes, algorithms, and technologies are combined to sculpt intricate and lethal weapons. Taking into consideration the diversity of terrain that the Indian military operates in, the Research and Development (R&D) should be focused on production of such systems which will suit the Indian needs and aid our forces in smooth conduct of sensitive operations while not becoming a liability if lost or captured by the adversary.

Endnotes

¹ "Poke War" is a slang originating from Pokeman games/books and used on Facebook to signify jousting till one participant finally gives in, signifying defeat.

² WEB 3.0 is essentially a user-friendly, more secure, more private and better connected internet.

³ Portuguese MOD, High-level conference discussed impact of emerging disruptive technologies on defense, 20 April 2021, European Defense Agency. Accessed on 6 January 2022.

⁴ Inder Singh Bisht, US Marines Test Grenade Launcher-Fired Mini-Drones, July 14 2021 on The Defence Post , <https://www.thedefensepost.com/2021/07/14/us-marines-mini-drones/> accessed on 6 January 2022

⁵ Dr Vijay Sakhuja, Underwater Drones: New Challenges, ol 15 Issue 3 Jul – Aug 2021, August 5, 2021. Defstrat.com

⁶ How India is converting the Kiran MK-II into an unmanned combat, aircraft <https://www.wionews.com/photos/how-india-is-converting-the-kiran-mk-ii-into-an-unmanned-combat-aircraft-430699#kiran-mk-ii-converted-into-cats-omca-430680> accessed 17 Jan 22

⁷ David Hambling, Israel's Combat-Proven Drone Swarm May Be Start Of A New Kind Of Warfare, Forbes, July 21, 2021. <https://www.forbes.com/sites/davidhambling/2021/07/21/israels-combat-proven-drone-swarm-is-more-than-just-a-drone-swarm/?sh=415b66bd1425> accessed on 28 September 2021

⁸ Gili Cohen, comments on "Israel Is World's Largest Exporter of Drones, Study Finds". Haaretz.com, posted on May 19, 2013. Accessed on 29 september 2021

⁹ Israeli firm introduces armed combat drone to patrol borders, Al-Jazeera, 13 September 2021, <https://www.aljazeera.com/economy/2021/9/13/israeli-firm-introduces-armed-combat-drone-to-patrol-borders> accessed on 02 October 2021

¹⁰ DRDO's anti-drone technology can detect and neutralize aerial threats – All you need to know, timesnownews.com , Updated on June 30, 2021. Accessed on 03 October 2021

¹¹ Dr. Thomas Withington, The Drone that fell to Earth, Armada International, November 4 2020, accessed on 8 January 2022 from The Drone that fell to Earth - Armada International