



Unmanned Systems Sentinel

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Please keep in mind that in most instances the below summaries are excerpts from the original article. The full articles can be viewed at the accompanying hyper-links. The inclusion of these links does not represent an endorsement of the organization, service, or product. Immediately below are this edition's highlights with links to the respective articles:

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NAVY/USMC:

Marines Now Training to Battle Drones

WASHINGTON, D.C. — The Marine Corps must train for the environment it expects to face going forward, which means a near-peer adversary with a capable air force, a savvy web presence, the ability to leverage unmanned systems, and cyber and electronic warfare capabilities, the commandant said today.

Gen. Robert Neller said the Marines haven't faced a near-peer fight in recent memory, putting the onus on the training community to challenge Marines to work in a communication-denied environment, or under the watchful eye of enemy drones, or other emerging potential threats.

"We've developed a system of warfighting that is very dependent on the Internet, the network, and space," Neller said at an event co-hosted by the Center for Strategic and International Studies and the U.S. Naval Institute.

"So looking at our potential adversaries, do we think that's going to be there, that network is going to be there, if we were to engage with these folks? I would say, I don't know, I don't think you could assume that."

Meanwhile, the service is buying up as much technology as it can – fielding the new F-35B Lighting II Joint Strike Fighter to collect and disseminate more information than any previous platform, setting up wireless connections so troops in the back of an MV-22 Osprey can get real-time updates, and experimenting with all manner of unmanned vehicles.

We have to leverage the technology we have, it gives us an operational advantage, but at the same time it makes training even harder – you have to work through or be prepared for when it’s not there,” Neller said.

To that end, he said training at places like Marine Corps Air Ground Combat Center Twentynine Palms, Calif. is starting to reflect the high-tech nature of the Marines’ most likely adversary. Opposing forces in the training exercises have recently been given unmanned aerial vehicles to use against the Marine Corps units, Neller said, “so Marines are in a built up area and they’re walking down the street and then they look up in the sky and there’s this small quadcopter UAV, and they’re like, what’s that? They’ve never seen that before – although those who deployed in the Middle East are starting to see that more. ... That’s the same quad-copter you can get on Groupon or go down to Sam’s Club and buy it for \$400.”

<https://www.youtube.com/watch?v=V-Bot5eoPXQ#action=share>

Training also addresses potential challenges such as jammed radios, loss of GPS or the loss of the network. Neller mentioned the chaos that ensued when Delta’s global computer system went down this week, leaving the company without access to its reservations and flight management information. In that case, operations halted – but the Marine Corps would have to find a way to continue on its mission if it lost access to networks or information it is accustomed to leveraging.

The commandant said that even today in the Middle East, potential adversaries are using social media to recruit and to communicate, are using UAVs for a variety of missions, and are conducting asymmetrical warfare operations – all from non-state actors that until very recently were considered low-tech. Those new capabilities, if added to a nation-state with a viable air force and the backing of a government, could pose a serious threat.

“When was the last time an American military force worried about being bombed by enemy air? World War II?” he said.

The Marine Corps is considering this future operating environment and what capabilities it will need to be successful against a future near-peer competitor. Neller told USNI News in a sit-down interview at the Pentagon this week that he has settled on a general path forward for shaping the force – a group of colonels set out to chart an evolutionary path forward and a younger group of captains and majors were to lay out a revolutionary concept for the future force, and rather than pick one Neller ended up merging the two together. With that big picture decision made, Neller is working through the details of how to cram all the new capabilities the service will need into a 182,000-Marine force – which occupational specialties will have to grow, and which will either shrink or be moved into the reserves to make room – and should have a final decision made by early next year.

<https://news.usni.org/2016/08/09/marine-corps-training-beginning-reflect-enemy-drones-loss-comms>

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United States Navy Deploying Newly Designated RQ-20B AeroVironment Puma AE

MONROVIA, Calif.-AeroVironment, Inc.today announced the United States Navy has tested and deployed the RQ-20B Puma™ small unmanned aircraft system (UAS) aboard a Flight I Guided Missile Destroyer (DDG Class). Some of these exercises included the use of AeroVironment's fully autonomous system to recover the aircraft aboard a ship. The US Navy issued a report on August 3 from the Arabian Gulf describing how Puma AE is also being utilized (see "US Ships Utilize Small Eye in the Sky") on Navy Patrol Craft.

Following completion of a Puma AE intelligence, surveillance and reconnaissance mission, the AeroVironment Precision Recovery System provides for the autonomous on-board recovery of the aircraft, without interrupting the ship's operations. Because the Puma AE is also designed to land and float in water, operators can choose to recover it from the ocean, should mission requirements dictate.

The AeroVironment Precision Recovery System occupies a small footprint and can be managed and operated by members of a ship's crew, as opposed to requiring external contractors. It is transported in tactical packaging that can be hand-carried aboard and readily transferred from one ship to another.

"Our Precision Recovery System expands the capability of Puma AE to support maritime operations. This solution also builds on AeroVironment's extensive operational experience with small UAS to provide the Navy with a low-cost, hand-launched capability optimized for contested environments," said Kirk Flittie, vice president and general manager of AeroVironment's Unmanned Aircraft Systems business segment. "Puma AE's ability to operate from a wide variety of surface vessels ensures rapid response reconnaissance capabilities that help our customers operate more safely and effectively and proceed with certainty."

Puma AE can be launched and recovered very quickly. The UAS features a gimbaled payload that delivers high quality electro-optical (EO) and infrared (IR) imagery and AeroVironment's secure Digital Data Link (DDL). These features improve situational awareness for the ship and also for boat crews who carry their own remote video terminal ("Pocket DDL") during approach and assist or other missions.

AeroVironment developed the Puma AE system to compete for, and win, a 2008 United States Special Operations Command (USSOCOM) competitive program of record and subsequently supplied the system to the U.S. Navy Expeditionary Combat Command Coastal Riverine Forces, the US Army for convoy and ground troop support and the US Marine Corps. Most recently, the Navy procured Puma AE systems for use aboard Patrol Craft and also deployed them aboard a US Navy Expeditionary Fast Transport (T-EPF) ship in support of counter illicit trafficking operations in the Caribbean. The Puma AE is also employed by several international partners.

The United States Department of Defense recently established the designation RQ-20B for the block 2 Puma AE small UAS. The block 2 Puma AE system includes a more powerful and lighter propulsion system, lighter and stronger airframe, long endurance battery, precision inertial navigation system and an improved user interface. The new, all environment Mantis i45 gimbal sensor suite for Puma AE

delivers a dramatic leap in small UAS image resolution and ISR capability and will be available for ordering in September.

<http://www.businesswire.com/news/home/20160811005571/en/United-States-Navy-Deploying-Newly-Designated-RQ-20B>

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Marines Test Robotic Vehicle-Mounted Machine Gun

The Marine Corps just wrapped up a round of experiments with new and cutting-edge technology in the California desert, including tests with a gun mounted aboard an unmanned vehicle. This system, the Multi-Utility Tactical Transport Vehicle, or MUTT, from General Dynamics, is designed to take the load off disembarked troops.

According to officials with the Marine Corps Warfighting Lab, the system will allow just one Marine to move a .50-caliber machine gun downrange—a job that typically takes five.

Watch the system in action during testing below.

http://www.dodbuzz.com/2016/08/10/watch-marines-test-robotic-vehicle-mounted-machine-gun/?utm_source=Sailthru&utm_medium=email&utm_campaign=Defense%20EBB%2008-11-16&utm_term=Editorial%20-%20Early%20Bird%20Brief

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U.S. military's robotic unmanned submarine hunter completes first tests at sea

SAN DIEGO, 10 Aug. 2016. The ocean's newest predator, an unmanned robotic ship designed to help the U.S. military hunt enemy submarines, has completed its first tests at sea.

10 Aug. 2016 -- Called the "Sea Hunter," the 132-foot unmanned surface vessel (USV) is still getting its figurative sea legs, but the anti-submarine warfare (ASW) performance tests off the coast of San Diego have steered the project on a course to enter the U.S. Navy's fleet by 2018, according to the Defense Advanced Research Projects Agency (DARPA), the branch of the U.S. Department of Defense responsible for developing new technologies for the military.

The Sea Hunter "surpassed all performance objectives for speed, maneuverability, stability, sea keeping, acceleration/deceleration and fuel consumption," representatives from Leidos, the company developing the Sea Hunter, said in a statement.

It's inevitable that a shrinking U.S. military will require a growing number of unmanned vehicles operating under and on the ocean, on land, in the air, and in space. The Sea Hunter will keep pressure on potentially hostile submarines without using many naval personnel.

<http://www.militaryaerospace.com/articles/pt/2016/08/u-s-military-s-robotic-unmanned-submarine-hunter-completes-first-tests-at-sea.html?cmpid=enl MAE WrapUp 2016-08-12&eid=288641596&bid=1495566>

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Marine Infantry Squads May Get Their Own Drone Operators

The commandant of the Marine Corps is looking at the possibility of creating a new position within Marine infantry squads dedicated to flying unmanned aerial vehicles and managing information.

Gen. Robert Neller told an audience at the Center for Strategic and International Studies in Washington, D.C., this week that the creation of an assistant squad leader position to take on these jobs was under consideration as the Marine Corps looks to reorganize the force for future fights.

Military.com first reported in April that a new assistant squad leader job, designed to build in more leadership at the smallest unit levels, was one of the initiatives being evaluated under a new plan called Force 2025.

Neller has frequently spoken about how he wants to integrate small UAVs — possibly cheap, commercially available quadcopters — into rifle squads to enhance situational awareness and improve unit effectiveness.

He said Tuesday that the Corps' designated experimental infantry unit, 3rd Battalion, 5th Marines, had recently tested out even more squad-level technology during the Rim of the Pacific exercise, which recently concluded in Hawaii and California.

"One of the squad leaders out there, he had a tablet that folded in and out of his battle rig," Neller said. "He had the ability to do messaging, call for fire ... talk to his higher headquarters. There was this 25-year-old guy showing me all this stuff where I would probably break it if I touched it. But to him, it was like, 'I can do this.'"

Neller said he was operating under the assumption that the Corps would have to stay at its current force strength of 182,000 for the next few years.

"What's inside the infantry battalions is going to be a little bit different," he said. "We want to be sure that we maintain capacity and capability ... first, do no harm. But it will be different."

Neller has said he wants to increase the number of Marines in information operations and cyber jobs, scaling back junior infantry numbers if necessary to accommodate this growth.

Meanwhile, the Marine Corps has also made a point of investing in its infantry squad leaders, offering a special professional development program and a new military occupational specialty with bonuses and promotion opportunities to nurture top talent at the squad level.

<http://www.defensetech.org/2016/08/11/marine-infantry-squads-may-get-their-own-drone-operators/>

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Collaboration Marks Key Step for Fuel Cell Usage in U.S. Navy's Undersea Vessels

General Motors (GM), the Office of Naval Research (ONR) and the U.S. Naval Research Laboratory have been undertaking experiments to incorporate automotive hydrogen (H₂) fuel cell systems into the next generation of Navy unmanned undersea vehicles (UUVs).

As part of the project, the Naval Research Laboratory has recently completed the evaluation of a prototype UUV with a GM fuel cell at the heart of the vehicle powertrain, marking a key step in the development of an at-sea prototype.

Frank Herr, head of ONR's Ocean Battlespace Sensing department, signified, "Our in-water experiments with an integrated prototype show that fuel cells can be game changers for autonomous underwater systems. Reliability, high-energy and cost effectiveness – all brought to us via GM's partnering – are particularly important as Navy looks to use UUVs as force multipliers."

With water as the only by-product, the attributes of GM's fuel cells match the goals of the U.S. Navy in developing reliable, affordable fuel systems. They are compact, lightweight and can be recharged in a matter of minutes.

The fuel cell incorporation goes some way to contributing towards ONR's Innovative Naval Prototype program for Large Displacement UUVs, in which energy efficiency is a core element in the Navy's long-term goals.

To Infinity, And Beyond

NASA is another major U.S. organization making the leap towards fuel cell sustainability. America's space agency is currently pursuing a variety of alternative power sources for its aerospace vehicles, focusing on alkaline fuel cell power system developments and operations.

In recent years, both the U.S. Department of Energy (DOE) and private industry investors have made significant advances in the development of proton exchange membrane (PEM) fuel cells using H₂ and air as the fuel and oxidant for its ground-transportation applications.

But it is understood that fuel cells could soon be fueling its aerospace activities as well. Along with evaluating solid oxide fuel cells (SOFCs), NASA is building upon these PEM developments with the aim to dramatically advance fuel cell technologies for reliable, high-energy, renewable power sources for its aerospace applications.

<http://www.gasworld.com/us-navy-powers-undersea-vehicles-with-fuel-cells/2010853.article>

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Crewless Ships in the Navy: Not If, But When

A team of senior Navy officials is examining the future makeup of the U.S. fleet at a time of growing demands and squeezed budgets. One of the expected takeaways is the idea that the Navy can't continue to do business as usual and will have to turn over some jobs to unmanned vessels and submarines.

How to insert autonomous systems into the fleet is indeed one of the subjects of debate, says naval analyst Bryan Clark, of the Center for Strategic and Budgetary Assessments. Clark and other outside experts have participated in a series of "fleet architecture studies" led by the office of the chief of naval operations. Their findings will shape decisions on how to size and organize the future fleet.

Industry insiders see this review as a potential turning point in the modernization of the Navy's fleet. "We have these things now," says a retired Navy officer speaking about autonomous surface ships and underwater vehicles. Prototypes have been developed and tested, but crewless ships are still considered odd novelties, says the retired officer, who spoke on condition that he not be quoted by name. "These are disruptive technologies" that do not fit neatly into current Defense Department funding lines, he says. "We worship at the altar of the big program of record. It's not easy to buy one thing at a time and expect it to realize its full potential. We need an architecture that says 'here's the future mix of manned and unmanned, and let's migrate to that.'"

Technologists and executives in the robotics industry, he says, are optimistic that the fleet studies will "open the door for autonomous systems to become mainstream."

The issue of whether the military should develop its own autonomous systems or buy them from the private sector has been a contentious topic of debate. The retired officer describes it as a "religious argument" within the services: Do you want small underwater vehicles to scum in and out of submarines? If you do, you have to spend a lot of money to make them safe so they do not put submarines at risk. If the mission can be met with vehicles that can be launched from a pier and operate independently, the focus would be less on safety and more on the actual mission. His take: "You probably need a mix of both."

The Defense Advanced Research Projects Agency has offered a glimpse into what might be possible. In April it deployed a 132-foot autonomous trimaran — known as anti-submarine warfare continuous trail unmanned vessel — off the coast of San Diego. "The ball is in the Navy's court," the retired officer says. After the experiments are finished, the next conversation has to be "What missions can it do?"

Executives from the contractor firm that built the ship for DARPA, Leidos, told industry analysts that they are confident that the performance of this prototype will motivate the Navy to buy more ships. The drone ship, dubbed Sea Hunter, can stay deployed for months at a time at a cost of \$15,000 to \$20,000 per day, compared to \$700,000 for a Navy destroyer, estimates defense analyst Byron Callan, of Capital Alpha Partners.

Leidos announced in July it completed initial trials of the vessel. "Sea Hunter is designed to operate for extended periods at sea with no person on board and only sparse supervisory control," the company stated. While initial tests require a pilot on board the ship, later tests are planned to have no human operators. The two-year program is funded by DARPA and the Office of Naval Research. Upcoming tests will dig deeper into the performance of sensors, the vessel's autonomy suite and compliance with maritime collision regulations.

Top defense contractor Boeing is making a huge bet on autonomous naval vehicles. It opened an 8,100 square-foot research facility in St. Charles, Missouri, to showcase innovations. The company struck a partnership with a Silicon Valley firm to develop a commercial maritime surveillance autonomous ship that it is marketing to U.S. and other nations' navies and coast guards.

The SHARC, or sensor hosting autonomous remote craft, collects data and shares it in real time. It has been sold to oil and gas companies and other industries for ocean exploration. Thirteen vehicles are now swimming off the coast of Hawaii, streaming data to command centers ashore. "The vision is to have large numbers of low-cost autonomous systems conducting missions that traditionally have required manned fleets," says Egan Greenstein, senior director of autonomous maritime systems at Boeing Military Aircraft.

The target customers are the U.S. Navy and forces from allies countries that face increased demands for maritime security, he says in an interview. The SHARC will participate in a naval exercise in the United Kingdom this fall. "We want to show can we integrate data and broadcast it to decision makers," Greenstein says.

The day is not far off when navies will start turning over duties to ocean-going robots, he says. "It's really about embracing the path. Technologies will emerge to solve maritime problems." Boeing signed a research agreement with the Naval Research Laboratory for the development of payloads for autonomous vehicles. "We want to see what's possible," says Greenstein. "The services recognize that the path into the future is going to have autonomous systems."

Like other technologies that promise to transform how the military does business, autonomy is not a panacea. "We are on a journey," Greenstein says. There are significant questions out there about the capability and "self-awareness" of autonomous ships. Today, they can self deploy from point to point, swim, compensate for weather, currents, waves and winds. If a cargo ship gets in the way, they go into self-protection mode, moving out of the way and then resuming their mission. Small vehicles like the SHARC can be deployed in large numbers, he adds. "They work as a fleet to maintain positioning, they communicate their position to each other."

Technology is advancing quickly, and the levels of autonomy will increase, Greenstein says. Naval drones soon enough will be smart enough to use tactical information to make decisions about where they swim, for instance. "Today it is more about self protection. How do I get out of the way so I'm not run over? Eventually they will understand where the ships are and react to the tactical situation." Autonomy has progressed from vehicles that just do what they are told and have enough brainpower to stay out of danger, to where they are able to take on more complex missions such as surveillance of enemy waters.

“In the future, instead of telling them where to go, we give them a task, and tell them go do it, and call home when you find something.”

Conceivably, the military could deploy autonomous surface ships, submarines and aircraft and have them work together as a surveillance network. “If you can raise the level of autonomy to command all assets and say, ‘search an area and report back if you find something,’ that is the vision of where all this goes: Large numbers of autonomous systems relieving people from having to monitor in real time, continuously.” In theory, Greenstein explains, one could turn over the task of detection and reporting to the autonomous system and only bring the decision maker when there is a need to act on a piece of information.

The burgeoning debate over the use of autonomous ships illustrates the blessings and curse of technology. The Navy, increasingly overextended and under pressure to do more with less, sees robots as a potential “force multiplier.” In the larger U.S. civilian economy, robots can be double-edged swords that increase productivity but also leave millions of people out of work. In a recent Washington Post editorial, David Ignatius warns that the “automation bomb” could destroy 45 percent of the work activities currently performed in the United States. Currently, only 5 percent of occupations can be entirely automated, but 60 percent of occupations could soon see machines doing 30 percent or more of the work.

<http://www.nationaldefensemagazine.org/blog/Lists/Posts/Post.aspx?ID=2273>

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Navy Aerial Refueling Drone May Save Carriers

Engineering a stealthy unmanned aerial refueling tanker able to take off from a carrier deck and support fighter jets en-route to attack missions is a vital aspect of the Navy plan to meet emerging enemy missile anti-ship missile threats.

The new carrier-launched stealthy tanker, called the MQ-25A Stingray, will be designed to extend the combat range of key carrier air-wing assets such as F/A-18 Super Hornets and F-35C Joint Strike Fighters. Such an ability is deemed vital to the Pentagon’s Anti-Access/Area-Denial phenomenon wherein long-range precision guided anti-ship missiles are increasingly able to target and destroy aircraft carriers at distances as far as 1,000-miles off shore.

The threat, including weapons such as the Chinese-built DF-21D missile referred to as a “carrier-killer” able to destroy targets more than 900 miles away, is sufficient to potentially prevent aircraft carriers from operating in closer proximity to enemy coastlines in order to project power and hold enemy targets at risk.

“MQ-25A Stingray will help to preserve the power projection dominance of the nation's carrier fleet. MQ-25A Stingray is the next step in the Navy's evolutionary integration of unmanned air systems into the carrier strike group's operational environment. As part of our incremental approach this will allow

the Navy to deliver carrier-based unmanned capability to the fleet faster,” Navair Spokeswoman Jamie Cosgrove told Scout Warrior in a written statement.

The range or combat radius of carrier-based fighter jets, therefore, is fundamental to this equation. If an F-35C or F/A-18 can, for instance, only travel roughly 500 or 600 miles to attack an inland enemy target such as air-defenses, installations and infrastructure – how can it effectively project power it threats force it to operate 1,000-miles off shore?

Therein lies the challenge and the requisite need for a stealthy drone tanker able to refuel these carrier-launched aircraft mid-flight, given the endurance sufficient to attack from longer distances.

Advantages Of Stealth

An existing large fuselage tanker, such as the emerging Air Force KC-46A, might have too large a radar signature and therefore be far too vulnerable to enemy attack. This, quite naturally, then creates the need for a stealthy drone able to better elude enemy radar and refuel attack aircraft on their way to a mission.

While there is not much public information available about the MQ-25A Stingray as it is an emerging system very early on in the developmental process, Navy officials did explain the key strategic concepts behind its existence to Scout Warrior.

“Greater endurance” is described by Navy officials as a fundamental impetus for the new platform.

“When fielded, MQ-25A Stingray will deliver a high-endurance organic aerial refueling and ISR capability. Unmanned aerial refueling will extend the performance, efficiency and safety of manned aircraft and impart longer range and greater endurance to enable the execution of missions that otherwise could not be performed,” Cosgrove added.

Aerial Refueling Key To Future Of Carriers

The emergence of the MQ-25A Stingray comes at a key time amidst ongoing discussions about the trajectory or evolution of aircraft carriers as a platform. Some analysts and military experts, for example, believe carriers may soon become obsolete in light of weapons such as the DF-21D and the prospect of hypersonic attack weapons in the future. If carriers are not able to project power as intended, then should they be replaced with faster, more agile or smaller ships able to carry and launch drones and perform other missions?

While the value of carriers is, to be sure, far from being questioned, there is an ongoing study directed at taking up and analyzing these questions. Results from the study are not yet available, however some Navy officials have indicated that one potential solution might be to change the configuration of the new high-tech Ford-class aircraft carriers after the first three are built and deployed.

As a result, an aerial drone able to refuel and extend missions for carrier attack aircraft could address or ameliorate some of these concerns.

Also, despite the emergence of weapons such as the DF-21D, senior Navy leaders and some analysts have questioned the ability of precision-guided long-range missile to actually hit and destroy carriers on the move at 30-knot from 1,000 miles away. Targeting, guidance on the move fire control, ISR and other assets are necessary for these kinds of weapons to function as advertised. GPS, inertial measurement units, advanced sensors and dual-mode seekers are part of a handful of fast-developing technologies able to address some of these challenges, yet it does not seem clear that long-range anti-ship missiles such as the DF-21D will actually be able to destroy carriers on the move at the described distances.

Furthermore, the Navy is rapidly advancing ship-based defensive weapons, electronic warfare applications, lasers and technologies able to identify and destroy approaching anti-ship cruise missile from ranges beyond the horizon. One such example of this includes the now-deployed Naval Integrated Fire Control – Counter Air system, or NIFC-CA. This technology combines ship-based radar and fire control systems with an aerial sensor and dual-mode SM-6 missile to track and destroy approaching threats from beyond-the-horizon. Ship-based laser weapons and rail guns, in addition, could be among lower-cost ship defense weapons as well.

The MQ-25A Stingray is evolving out of a now-cancelled carrier-launched ISR and attack drone program called Unmanned Carrier Launched Airborne Surveillance and Strike system, or UCLASS. A Northrop demonstrator aircraft, called the X-47B, has already performed successful carrier drone take-offs and landings. Accordingly, the ability of the Navy to operate a drone on an aircraft carrier is already progressing.

<http://www.scout.com/military/warrior/story/1696720-navy-aerial-refueling-drone-may-save-carriers>

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ARMY:

Big unmanned ground robots get mixed reviews because of terrain and radio bandwidth

WASHINGTON, 9 Aug. 2016. Big unmanned ground robots are getting mixed reviews from infantry warfighters in the field. The ground bots help haul equipment for the chronically overloaded infantry, and some could even fire a remote-controlled machine gun, but the tracked bots couldn't keep up with foot troops over rough terrain. Breaking Defense reports. Continue reading original article.

9 Aug. 2016 -- In some cases infantry must choose between abandoning a large unmanned ground vehicle (UGV) that can't keep up, or leaving two people behind to guard it. That's manpower a platoon can't spare. Just operating the UGVs can be a big burden on small units.

The Army's tactical radio network also has trouble supporting UGVs. to get the necessary bandwidth, troops have resorted to using cell phone networks to compensate for relatively low-bandwidth Army radios.

Tiny unmanned aerial vehicles (UAVs), however are a different story. today's fighting forces are finding UAVs to be more useful, easier to support, and less burdensome in the field than UGVs.

<http://www.militaryaerospace.com/articles/pt/2016/08/big-unmanned-ground-robots-get-mixed-reviews-because-of-terrain-and-radio-bandwidth.html?cmpid=enl MAE WrapUp 2016-08-12&eid=288641596&bid=1495566>

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Army needs wide-area electro-optical sensors for manned and unmanned aircraft

Army researchers are surveying industry to find companies able to develop airborne sensors for wide-area motion imagery surveillance from manned and unmanned aircraft. Officials of the Army Contracting Command at Fort Belvoir, Va., issued a sources-sought notice last week (W909MY-16-R-A017) for the Wide Area Motion Imagery (WAMI) / Wide Area Aerial Surveillance (WAAS) Payload for Manned and Unmanned Platforms project.

<http://www.intelligent-aerospace.com/articles/2016/08/ia-wami-sensors.html>

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New Breed of Army Robots Must Do More, Cost Less

The U.S. military has been a pioneering user of robots, pouring billions of dollars into the design, development and production of unmanned technology.

Big buyers of battlefield robots like the Army are examining new ways to use these systems but are finding that much of the inventory acquired over the past decade is far from cutting edge. Combat units have complained that the equipment is difficult to operate and maintain. Defense Department buyers also are demanding lower prices for robots, and want “open architectures” instead of hardwired systems that obstruct the insertion of new technology.

These demands have compelled manufacturers to rethink their strategies for the defense market. “We need to make systems differently for the new battlefield,” says Shahar Abuhazira, CEO of Roboteam North America. The company, founded in Israel in 2009, is making inroads into the U.S. military market by producing less costly, multiple-mission robots.

Robots should be more than just niche products, Abuhazira says in an interview. For the past 15 years, most of the robots used by ground forces were for highly specialized missions like bomb detection and disarming. “The user’s requirements are for systems to do more,” he says. The technology can be applied to a broader swath of users, including infantry, special operations forces and engineers.

“We need to make sure systems are simpler to operate,” he says. Whereas explosive ordnance squads are dedicated experts, infantry troops need more user-friendly machines. To do multiple jobs, robots

have to be “plug and play” systems so users can pick and choose sensors and payloads to fit the mission, Abuhazira says. “Today it’s expensive to do changes.”

Lowering the cost of producing and maintaining robots is imperative for manufacturers that want to compete in this market. The small unmanned ground vehicles that the Army bought by the thousands over the past decade cost up to \$200,000 each, depending on the configuration and quantities. “I think we need to cut the price in half,” says Abuhazira. “It’s not just the cost of buying, but also maintenance and service.”

The Army estimates that since 2004, it has built up an inventory of about 7,000 robots, most assigned to explosive ordnance disposal teams. Officials are now eyeing broader applications for robots that could be equipped with a diversity of weapons and cameras.

Many of the existing robots will stay in service for years to come but the Army wants to start replacing the most technologically outdated systems. In a cost-cutting move, it started to develop government-owned software to control UGVs. In the past, each robot developer designed its own proprietary software to operate the platform.

Abuhazira says the Army could avoid a considerable expense by standardizing the software and providing it to vendors. “The government is creating long term programs to allow companies to move to mass production pretty fast.” Roboteam is one of several bidders for the Army’s CRSI, or common robotic system individual. The service plans to acquire up to 4,100 25-pound or lighter robots for use at the squad level.

The company won a U.S. government contract from the Combating Terrorism Technical Support Office in 2013 to produce a micro-tactical ground robot that was later acquired by U.S. special operations forces, homeland security and border security agencies. Key to winning that contract, he says, was offering a backpack-size robot that could be operated more easily by dismounted troops and law enforcement agents. Roboteam’s main competitors in the UGV market are QinetiQ and Endeavor, a spinoff of iRobot.

Abuhazira credits the company’s success to its competitive pricing, but also recognizes it needs deeper access inside the Washington beltway in order to challenge well-established players. Roboteam in July hired former Army Assistant Secretary for Acquisition, Logistics, and Technology Heidi Shyu to serve on its advisory board. Shyu is a known personality in the Pentagon and the industry who has championed the use of unmanned systems.

During her time as the Army's top procurement executive, Shyu was emphatic about the need for a common architecture, open-source software and open standards in robotics programs.

Roboteam executives met Shyu in 2014 following a visit by Pentagon procurement chief Frank Kendall to the company’s research center in Tel Aviv. Kendall was especially impressed by the technology for unmanned subterranean vehicles and asked Shyu to go see it for herself.

Abuhazira says Shyu will help direct strategic planning, “so we better understand the market, and better plan our resources to meet the Army requirements.” The top targets are the CRSI program and the next generation of the Army’s “man-transportable robotics system.” The MTRS will replace the Talon family of robots over the next decade.

Of Roboteam’s 80 employees, about 60 are based in Israel and the rest are at its U.S. headquarters in Gaithersburg, Maryland. Founders Yosi Wolf and Elad Levy served in the Israeli air force. Abuhariza was an infantry company commander in the Israeli army.

“Soon after we opened, within months, we started to get contacted by the U.S. government,” he says. “We are growing fast.” One of the largest wins was a \$25 million Air Force contract in 2015 to supply up to 250 small bomb-disposal robots.

Law enforcement is now seen as a promising market. An unprecedented action by the Dallas police in July — to use a remote controlled robot armed with an explosive device to take down the killer of five officers — created buzz and awareness of the possible applications of robots, says Abuhariza. “The military is still leading the requirements,” he says. “Companies follow military requirements and then create lower cost configurations for law enforcement. We see increasing demand from border patrol units to deal with underground threats.”

More border-patrol units around the world are using unmanned vehicles to investigate suspicious activities in tunnels, he says. “This is where I mostly see a change. Law enforcement units are very busy. They use systems in unique ways. If you know the capabilities of the robots, you can improvise and execute missions.”

<http://www.nationaldefensemagazine.org/blog/Lists/Posts/Post.aspx?ID=2272>

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USAF:

Enlisted drone pilots won't become warrant officers, but they may fly Reapers

The Air Force is not planning on bringing back warrant officers anytime soon, including for enlisted airmen flying remotely piloted aircraft, Secretary of the Air Force Deborah Lee James told Air Force Times Aug. 3.

“When we first looked at this, of course that was reviewed as well, whether or not to have a warrant officer program,” the secretary said during a round-table discussion at the Pentagon. “At the end of the day, the decision was not to have a warrant officer program. The reason for that was the belief that our current enlisted system produces fantastic enlisted airmen for us.”

James said the Air Force thought the costs outweighed the benefits.

“We would have to have career development types of programs in place, and so there just didn’t seem to be enough of an urgency or reason to do it because we have such a great enlisted force as it is,” she said.

However, the secretary left open the possibility that enlisted airmen could become operators for platforms that carry out strikes, such as the MQ-1 Predator and MQ-9 Reaper.

“Whether enlisted pilots could enter into the other types of unmanned aircraft remains to be seen,” James said. “I certainly don’t see any reason why it couldn’t be, but our thought was to start, because this is something brand new, start in a deliberative way.”

Currently, enlisted operators are only authorized for the RQ-4 Global Hawk, a high-altitude intelligence, surveillance, and reconnaissance aircraft. James said the service decided that would be the best place to start with the new program.

“Among the three communities, it is the smallest community. It’s the most stable community,” she said. “The world of the MQ-1 and 9 is highly stressed. ... It’s a larger community, and our thought was ‘let’s start over here, implement and learn our lessons, and then figure out the next steps from there.’”

James said she “wouldn’t take it off the table at all” for enlisted operators to carry out strike missions, but noted that she likely wouldn’t be the one to make the final decision. Unless asked to stay on by the next president, James’ tenure will come to an end in December, along with the rest of the current Obama administration.

While the Air Force could announce that enlisted airmen can start operating the MQ-1 Predator, that RPA is set to be phased out by 2019, so it’s unlikely the service would invest much into training new people for the platform. Enlisted airmen would likely be given the opportunity to fly the MQ-9 Reaper.

The Air Force is taking a close look at RPA operations across the board, James said, in an effort to improve and stabilize a career field that has seen skyrocketing demand for counter-terrorism operations.

“[This] is an enterprise which 15 years ago didn’t exist,” James said. “We have built it out of whole cloth, but we need to continue to build because it’s the number one thing that our combatant commanders are asking for, and we need to provide some relief for our people who are just working, working, working.”

<http://www.airforcetimes.com/story/military/2016/08/08/enlisted-drone-pilots-wont-become-warrant-officers-but-they-may-fly-reapers/88290782/>

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Air Force Favors Big Boost in Retention Bonuses for Pilots - to include UAS/ RPA

The Air Force is seeking to boost by \$10,000 the retention bonuses for remotely piloted aircraft -- or drones -- from \$25,000 to \$35,000 as part of an overall plan to stem the exodus of pilots for better pay with the airlines, Air Force Secretary Deborah Lee James said Wednesday.

James has previously said that she favored increasing the Aviator Retention Pay for manned aircraft pilots to \$48,000 from the \$25,000 cap, which has been in effect since 1999. "We're still working to update the retention bonuses for all," she said.

The Air Force is also looking to hire more contractors to fly unarmed UAV reconnaissance missions to make up for a current shortage of drone pilots, James said.

Both James and new Air Force Chief of Staff Gen. David Goldfein, an F-16 pilot, said the loss of pilots to the airlines was a looming "crisis" for the Air Force. The Air Force is projected to be short about 700 pilots in coming years, Goldfein said.

"Here's the reason I believe it's a crisis: Air superiority is not an American birthright," Goldfein said. "It's actually something you have to fight for and maintain. I'm hoping that if we take a balanced approach, we can get these folks to stay."

The retention bonus increases are subject to approval by Congress in the National Defense Authorization Act for Fiscal Year 2017. Negotiations on final passage will begin next month in a House-Senate conference committee, but there is no guarantee that a deal can be reached in an election year.

At a Pentagon news conference with Goldfein, James said she feared that Congress would be unable to reach agreement on an NDAA for FY17. She said that a six-month or one-year continuing resolution to keep the current NDAA in place was a possibility, which would be disastrous for the Air Force.

"We hope that won't be the case," James said, adding that failure to reach agreement on the NDAA would impact more than 60 acquisition programs and new starts, including upgrades for the B-2 and B-52 bombers, MQ-9 Reaper drones, and C-130 cargo aircraft.

In his first Pentagon news conference since taking command five weeks ago, Goldfein said, "We will be unable to execute the defense strategic guidance" if Congress fails to pass the NDAA, thereby threatening a return to the cost-cutting sequestration process.

<http://www.military.com/daily-news/2016/08/10/air-force-favors-big-boost-in-retention-bonuses-for-pilots.html>

<http://www.govexec.com/pay-benefits/2016/08/air-force-will-offer-drone-pilots-35000-retention-bonuses/130685/?oref=govexec> today nl

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USAF Reapers demonstrate missile tracking capability

Two General Atomics Aeronautical Systems MQ-9 Reaper unmanned air vehicles have demonstrated the system's ability to track missiles, during ballistic defense testing in Hawaii.

The test was carried out in late June, during the Pacific Dragon exercise at the Pacific Missile Range Facility on Kauai: a multilateral ballistic missile defense training event involving the US Navy, the Japan Maritime Self-Defense Force and the South Korean navy.

General Atomics says the specific Reaper element of the testing was carried out under a contract awarded by the US Missile Defense Agency (MDA), and involved the UAVs using their Raytheon Multi-Spectral Targeting System-B electro-optical/infrared turret to detect and track ballistic missile targets.

"The test provided valuable data in our ongoing effort to develop an effective airborne missile defense capability," Linden Blue, the chief-executive of the company, says.

The MDA is exploring the use of UAVs in missile defense as a more flexible and low-cost option for intercepting ballistic weapons.

"By leveraging unmanned aerial vehicles and space assets for pervasive over-the-horizon sensor netting, the engagement zone of current [Raytheon] Standard Missile-3 interceptors can be extended to the pre-apogee portion of a missile's trajectory," the agency says.

"Forward-basing TPY-2 radars come with diplomatic challenges and significant O&S [operation and sustainment] costs, making the use of current overhead persistent infrared and less expensive operations of Predator UAVs an appealing near-term option."

Meanwhile, General Atomics has been awarded a contract worth \$371 million by the US Department of Defense to provide 30 Reapers under 2014 and 2015 fiscal year funding, with deliveries to occur until May 2019.

The USAF had an inventory of 93 Reapers as of September 2015, the service says. The type has also been acquired or ordered by foreign military customers France, Spain and the UK.

<https://www.flightglobal.com/news/articles/usaf-reapers-demonstrate-missile-tracking-capability-428539/>

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NATIONAL AIR SPACE:

FAA: Half Million Drones Registered by Hobbyists

The FAA has registered more than a half million drones flown by hobbyists in the past eight months, its top administrator said at a White House gathering, but commercial drones haven't been tackled yet.

Michael Huerta, the Federal Aviation Administration head, disclosed the hobbyist number during the first-ever Workshop on Drones and the Future of Aviation sponsored by the White House Office of Science and Technology Policy.

The FAA announced in January that it had begun registration for hobbyists using drones, which involves a Certificate of Aircraft Registration/Proof of Ownership and a unique identification number that has to be marked on the aircraft.

Huerta said in prepared remarks on Tuesday that after developing recommendations with an industry task force, the FAA has had a robust registration response.

“But by working together, we got it done – and we’ve registered more than 500,000 hobbyists in eight months,” Huerta said. “To put that in perspective, we only have 320,000 registered manned aircraft – and it took us 100 years to get there.”

Huerta said the registration has allowed the FAA to link particular drones with their operators when users are not following rules and assists in enforcement of the unmanned vehicles.

“It also gives us a valuable opportunity to educate users about how to fly their unmanned aircraft safely,” Huerta said. “We’re encouraging operators to download our free smartphone app, B4UFLY, which lets you know where it’s safe and legal to fly a drone. It’s available for both Apple and Android devices, and it’s already been downloaded more than 85,000 times.

“... In addition to educating hobbyists, we’re putting a regulatory framework in place to address the commercial use of drones as well,” Huerta added

http://www.uasvision.com/2016/08/04/faa-half-million-drones-registered-by-hobbyists/?utm_source=Newsletter&utm_campaign=5493b95464-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-5493b95464-297560805

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New Federal Drone Regulations Leave Unanswered Questions

The Federal Aviation Administration Extension, Safety, and Security Act of 2016 (“FAA Reauthorization”) was signed into law July 15. The FAA Re-authorization contained at least five sections directed specifically at unmanned aerial systems (“UAS” or “drones”). This follows the June release of the widely anticipated Part 107 by the FAA governing the commercial use of drones, which takes effect this month. While many say the new FAA rules facilitate commercial drone operation, with the exception of the new operator certification, they closely track the existing exceptions available for commercial UAS operation. The new regulation creates very few “new” opportunities. Part 107 mostly teases businesses with the possibility of commercial drone use but still prohibits most of the capabilities necessary to fully enable it in the United States. An FAA summary of the new regulation is available [here](#).

The very existence of the FAA Re-authorization's drone sections implicitly concedes the inadequacy of Part 107, with its inability to offer the commercial drone industry meaningful legislative directives for drone safety, security, and operation. These new sections provide none of the additional regulation, permissions, or guidance lacking in Part 107. To the contrary, the FAA makes it clear that Part 107, as released in June, is only a temporary measure. A summary of the UAS sections of the FAA Re-authorization is provided at the end of this article. A few of the relevant prohibitions of Part 107 are below.

Restrictions and Requirements Under Part 107

Prohibited Operations

As more businesses enter the commercial UAS landscape, it is important to understand what Part 107 permits and what it prohibits, as well as what is likely coming next. The following is a list of some prohibited operations:

Beyond visual line of sight of the operator

Higher than 400 feet above ground level unless within 400 feet of a structure

During nighttime hours

Aircraft over 55 pounds, including payload

A single individual operating multiple UAS

Operation directly over people not involved in operating the UAS

Operation in weather conditions with less than three miles visibility

Controlling a drone while in a moving vehicle or aircraft

Payloads or equipment containing hazardous materials

Careless or reckless operations

Commercial UAS operators may request FAA approval for a waiver of certain of these restrictions.

Reporting Requirements

UAS operators must also report to the FAA within 10 days any mishaps leading to serious injury, loss of consciousness, or property damage of at least \$500. Given that many drones cost more than \$500, mishap reporting may become a regular occurrence for commercial drone operators.

New Generation of Flyers

Perhaps the most significant impact of Part 107 is the elimination of the pilot's license requirement for commercial UAS operation. It was replaced with a new pilot certification called a "Remote Pilot in

Command” (RPIC) certification. A RPIC certification is available for medically qualified individuals over the age of 16 who pass a certification exam. An individual must also be able to read, speak, write, and understand English to receive certification. RPIC certification also requires a background check. An online certification option is available for current pilot license holders. The RPIC certificate allows the commercial operation of a small UAS, which is defined as a drone weighing less than 55 pounds. An individual who lacks an RPIC certificate may operate a UAS if an RPIC-certified individual provides direct supervision.

Beyond the RPIC provision, most of Part 107 simply codifies the typically granted exceptions for commercial uses available under Section 333 of the FAA Modernization and Reform Act of 2012. The new regulation eliminates the formality of applying for the exception. While this change arguably makes it easier for a business to begin drone operations, it highlights several issues not addressed in Part 107.

Privacy

Privacy is undoubtedly a main concern related to drone use. Privacy concerns will only increase as commercial drone use proliferates. The FAA has largely punted on the privacy issue, due at least to the fact the FAA does not regulate data gathering. However, the FAA has instituted a privacy education campaign, which will provide all drone users with recommended privacy guidelines as part of the UAS registration process as well as through the FAA B4UFly mobile app. Additionally, the FAA has emphasized adherence to the privacy “best practices” published by the National Telecommunications and Information Administration in May. The Voluntary Best Practices for UAS Privacy, Transparency, and Accountability can be found [here](#).

These efforts will hardly soothe privacy concerns because there are currently no enforcement mechanisms beyond lawsuits, and in some states, criminal statutes. Further, Part 107 only applies to commercial operation. “Hobbyist” or recreational drones fall under the Special Rule for Model Aircraft (“Special Rule”) and are currently “unregulated.” The FAA publishes guidelines for recreational use [here](#). Neither Part 107, nor the Special Rule, nor the FAA Re-authorization addresses UAS privacy concerns.

In addition to ignoring privacy concerns, Part 107 does not address, much less prohibit, flights over private property. And unless the FAA expects people to only fly over public roads and parks, flight over private property is necessary for nearly any practical commercial drone use. While courts determined (in 1946) that military aircraft flying a mere 83 feet over private property constituted a government taking, no altitude delineated where private property’s vertical extent ended. Instead, the language used was “immediate reaches of the enveloping atmosphere” and “a direct and immediate interference with the enjoyment and use of the land.”

Part 107 sets the altitude ceiling on UAS operation at 400 feet with an exception that flights may be conducted higher than 400 feet if the drone remains within 400 feet of a structure. If 83 feet is low enough to constitute a trespass on private property, and 401 feet is high enough to violate FAA regulations, are flights over private property limited to between approximately 100 and 400 feet? Further, there is no requirement for altimeters or GPS elevation displays for commercial drones, so how would a commercial operator be expected to know the difference between 83 feet and 100 feet, or any

other elevation, by eyesight alone? There is simply no guidance for drone users' operations over private property and there are no prohibitions to protect private property owners. The confusion is somewhat reduced when the drone operator is a federal or state agency, thanks to the Fourth Amendment. Some states have attempted to address the lack of clarity with drone regulations that may ultimately conflict with FAA authority.

Preemption: Safety and Privacy

Some states, including Florida, have enacted their own drone regulations. However, certain subject matter, such as aviation safety, is preempted by federal legislation and the FAA, preventing the states from imposing their own safety regulations. Yet, the FAA declined to preempt any drone subject matter with Part 107, despite the urging of commercial and governmental interests. While drone safety is likely to be considered part of aviation safety, it raises some considerations not typically relevant to manned aviation, such as flying in close proximity to individuals and private property. Further, in many cases proximity and privacy issues overlap, blurring drone safety and privacy concerns. The FAA has expressly avoided articulating any privacy rules, yet aviation safety remains squarely under federal preemption. As to privacy, the FAA simply injected yet more confusion by stating "State law and other legal protections for individual privacy may provide recourse for a person whose privacy may be affected through another person's use of a UAS." While this statement effectively eliminates any notion of federal preemption on drone privacy, it does not clarify whether "state law and other legal protection" may extend to safety issues practically related to privacy concerns, such as flying too close to a private residence. Florida, for example, passed an anti-surveillance statute aimed at drones. However, even if a state's drone privacy statute is not preempted by federal law or regulation, there may be First Amendment implications.

While it is clear there is no FAA preemption for privacy, it is unclear if federal aviation safety preemption extends to drone safety, or even drones in general. This lack of a clear vision regarding safety and privacy enhances the risk that a patchwork regulatory scheme will develop with each state enacting various types of drone laws. This fear has made businesses reluctant to enter the drone industry. The new regulations have not quieted that fear—and may have exacerbated it.

Drone Cybersecurity

Drone issues related to the collection and protection of data, which include hacking and other digital piracy concerns, have not yet begun to evolve in earnest. It is currently unclear how authority for investigating drone hacking would be allocated at the federal level. For now, operators and private citizens must rely on existing state laws to set the privacy boundaries for drone use. Topics such as preemption and First Amendment defenses to privacy laws present philosophical and political questions that will only surface when someone finally takes legal action that reaches a high court of appeal, or even the U.S. Supreme Court. There are, however, topics within the new regulation that have much more practical application.

Heads Up – Line of Sight Limitations and Considerations

The new regulation includes a “line of sight” (LOS) restriction, which was included in most Section 333 exceptions as well as the Special Rule guidelines. This means drone operators must be in visual contact with their drone. Many in the UAS industry were closely watching how the new regulation might address an operational mode commonly known as first-person view (FPV) flying. An FPV operational mode involves controlling the flight of a UAS-based on a video feed instead of through the operator’s direct visual contact. FPV flying has generally been disallowed under existing exceptions and many observers were concerned that FPV flying would be banned under Part 107. Instead, Part 107 allows FPV flying as long as the “see and avoid” safety requirement “is satisfied in other ways.” The “other ways” language almost seems to suggest “see and avoid” systems may include traffic collision avoidance system and airborne collision avoidance system capabilities. Further, portions of the FAA reauthorization that direct the development of a UAS traffic management system support this view.

However, to reliably employ such traffic systems on UAS, some degree of autonomy and FPV capability is likely a practical necessity. The new regulation expressly prohibits autonomous operation, but does not define “autonomous operation.” The FAA re-authorization is silent on any aspects of autonomous capabilities.

These are impactful restrictions, because for commercial drone use to become practical and widespread, which was the entire point of Part 107’s release, permitted operational ranges beyond LOS distances will be necessary. For example, using a drone to inspect power lines provides no benefit if the drone operators must drive within visual distance of the lines being inspected. To enable operational ranges further than a LOS distance, reliable autonomous systems (such as return to base fail safes), reliable long range data connections, and reliable FPV operational modes will be required. However, Part 107 regulations prohibit beyond line of sight (BLOS) operations and most of the capabilities necessary to perform them. Significantly, this very concept was addressed in the FAA Re-authorization, which creates a specific exception permitting BLOS operation for activities related to “critical infrastructure” or responding to natural disasters and emergencies.

The FAA itself is aware of the practical limitations and has initiated programs to evaluate larger operating ranges for commercial drones, such as the Pathfinder Initiative, a collaborative research and development effort between the FAA and industry to enable UAS/drone operation outside of the current restrictions. In particular, Pathfinder Focus Area Two, in partnership with private vendors, is focused on understanding the factors affecting safety in Extended Visual Line of Sight operations (EVLOS). EVLOS is defined as flight of a UAS or drone outside the visual range of the pilot in command (PIC), but still within visual range of the pilot to ensure cognizance of the area of operation and encroaching aircraft. The Pathfinder results are expected to have a direct and near-term impact on the FAA’s regulatory stance toward UAS operation in the United States. The FAA Re-authorization seems to suggest that regulatory stance will soon broaden the permitted operational aspects. Importantly, these capabilities are essential for large-scale commercial drone projects, such as Amazon Prime Air.

On Your Doorstep – External Loads

Proponents of drone delivery are one segment of the UAS industry with a particular interest in FPV, BLOS, and autonomous flying. While these flight operations are not currently authorized under Part 107, the new rules permit “external load operations” if the object is securely attached and does not adversely affect flight characteristics. Somewhat surprisingly, UAS transportation for hire is also permitted, provided the operational requirements are met and the operation does not cross state lines. While most of these capabilities will remain dormant until the restrictions are modified, it is likely at least some businesses may attempt to get a head start and provide delivery or transport options within the existing Part 107 restrictions, or through a small scale waiver. These pioneers, both in drone delivery and other commercial exploits, are likely to face another hot industry topic, which was not addressed in the new regulation, or the FAA Re-authorization: insurance.

Insurance

As with any aerospace operation, insurance is an integral part of risk management and essential for legitimate largescale commercial operations. While the regulatory situation continues to evolve, the subject of insurance is increasingly important within the UAS industry. While neither Part 107 nor the FAA Re-authorization mentioned insurance requirements, any commercial UAV operator should assume that their customers and partners will eventually require them to certify they are insured, and many commercial drone operators may want to purchase insurance for legal liability, and to protect their assets. Further, minimum insurance requirements may eventually come from state laws or regulations. Insurance may also be advised, or even required, in the future when a drone is operated on a Part 107 waiver, or operated with capabilities within the gray areas of FAA regulation, such as semi-autonomous flying.

Conclusion

Even after Part 107 takes effect this month, there will be considerable confusion about “how” and “when” you can fly drones for commercial purposes, and how drones can be used in various industries. As such, it will be essential for businesses to stay updated on the evolution of drone regulations, and consult with counsel.

Summary of FAA Re-authorization UAS Sections.

Sec. 2002. Identification Standards. This section mandates the development of what amounts to a UAS tracking system and database. This database will be used to identify operators and other information of specific UAS.

Sec. 2203. Safety Statements. This section requires manufacturers of small UAS to provide to their customers a safety statement with information about the laws and regulations applicable to small UAS. Failure to provide the safety statement is punishable by penalties of up to \$27,500 per violation.

Sec. 2205. Interference with wildfire suppression, law enforcement, or emergency response effort by operation of unmanned aircraft. This section imposes a fine of up to \$20,000 for a UAS operator that

“knowingly or recklessly interferes with a wildfire suppression, law enforcement, or emergency response.”

Sec. 2207. Emergency exemption process. This section requires FAA to create an expedited process for approving exceptions and certificates of authorizations (COAs) in response to catastrophes, disasters, or other emergencies. This includes exemptions or COAs for BLOS or nighttime operations.

Sec. 2208. Unmanned aircraft systems traffic management. This section requires the joint development by FAA and NASA of a UAS traffic management system within six months of enactment. This UAS traffic management system will be integrated with the manned air traffic control system.

Sec. 2209. Applications for designation. This section requires creation of an application process for the designation of UAS restricted facilities. The process will field requests for such a designation to “prohibit or restrict the operation of an unmanned aircraft in close proximity” to a critical infrastructure facility. Current requirements mandate that UAS operators comply with Notices to Airmen (NOTAMs) which protect the airspace over and near some of these types of facilities.

<http://www.jdsupra.com/legalnews/new-federal-drone-regulations-leave-63376/>

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PUBLIC SAFETY:

UMMS study examines use of drones to aid emergency responders in mass casualty events

In the wake of a disaster, a difficult challenge for emergency response crews is to quickly assess damage and identify victims. Researchers at UMass Medical School are conducting a study to determine how unmanned aerial vehicles (UAVs), also known as drones, could play a key role in such mass casualty incidents.

https://www.youtube.com/watch?v=tU_atydfcmA#action=share

Edward Boyer, MD, PhD, professor of emergency medicine, said drones could be used to identify individuals who may be buried under rubble and find them faster so that first responders can intervene and provide medical attention. Dr. Boyer and colleagues Peter Chai, MD, assistant professor of emergency medicine, John Broach, assistant professor in emergency medicine, and Alex Hart, resident in emergency medicine, are conducting the study.

With funding from Massachusetts Central Homeland Security Advisory Council and Worcester Emergency Management, researchers are working to establish that the technology could work in real-time and provide significant help in assessing an emergency situation. They are determining whether drones could lead to better analysis of the situation and care of patients. If so, they hope to train first responders how to use the technology in the field.

The team has plans to test the technology at a disaster training drill in Worcester in September.

<http://www.umassmed.edu/news/news-archives/2016/08/umms-study-examines-use-of-drones-to-aid-emergency-responders-in-mass-casualty-events/>

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Era Launches Unmanned Aerial Solutions Operations and Announces Collaboration With Total Safety

Era Group Inc. (NYSE: ERA) ("Era"), a leading helicopter transport operator, announced today the launch of its Unmanned Aerial Solutions (UAS) service offering and an exclusive agreement with Total Safety.

Era's UAS offering utilizes unmanned aerial and related sensory technologies for multiple applications such as inspections, surveys, mapping, imagery, and construction and engineering to service numerous industries. These solutions provide significant benefits over traditionally-delivered services, including increased safety and enhanced efficiencies through reduced manpower needs.

Era has executed an alliance and collaboration agreement with Total Safety, the world's premier provider of industrial inspection and integrated safety solutions. Pursuant to the agreement, Era serves as Total Safety's exclusive provider of UAS services, and Total Safety serves as the exclusive inspection service provider in support of Era's UAS offering. This collaboration combines world class rotary wing experience and safety services leadership to provide an unparalleled offering to a diverse customer base.

"Era's Unmanned Aerial Solutions offering results from our continuing commitment to develop innovative and efficient technologies to better serve our partners," said Paul White, Senior Vice President, Commercial of Era. "The adoption of these technologies is growing rapidly, and its application presents nearly limitless use cases due to numerous available flight platforms and sensory applications. We are excited to partner with Total Safety, a leading company in the safety services industry, and believe that the collaboration will provide unique benefits to our collective customer bases."

http://www.einnews.com/pr_news/338962919/era-launches-unmanned-aerial-solutions-operations-and-announces-collaboration-with-total-safety

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Bergen County shows off drone program

With the whirring of tiny rotors and snap of a flying selfie, Bergen County staff showcased their budding aerial drone program to U.S. Sen. Cory Booker on Monday at their public safety training center in Mahwah.

The county now has a total of five drones, accumulated since receiving its first drone in early 2015, a donation from the company Eagle Eye Systems valued at an estimated \$25,000.

Operators said that the drones have been deployed more than a dozen times in emergency and law-enforcement situations since last year, and pilots train at least twice weekly with the equipment. County Executive James Tedesco said he wants to expand the program with trained volunteer pilots at local emergency response units flying the drones when needed.

Booker (D-N.J.) has pushed for loosening regulations that would allow for more use of drones at a local level.

“We invented flight — we were the first in flight,” he said. “We’re trying to create an environment of innovation while also remaining safe.”

The senator applauded Bergen County for being the first in the state to gain approval to use drones for emergency response.

Tedesco told media at the scheduled event that the county had created protocols to ensure that drones would be used in situations involving first responders, such as a missing person, structure fires, active shooter scenarios or suspect searches and not for surveillance that would violate privacy protections for residents.

All requests for drones are routed through the county’s Office of Emergency Management, Tedesco said.

The drones have flight logs that record where they were deployed as another backstop for any potential misuse of the devices, said Officer Kyle Ferreria, with the Wyckoff Police Department.

Ferreria is one of three drone pilots with the county. He also is a certified fixed-wing aircraft pilot through the Federal Aviation Administration. Current FAA regulations require that an FAA-certified pilot supervise drone flights.

Lt. Matthew Tiedemann of the county Sheriff’s Department, described a handful of incidents in which the county deployed drones:

- A 2015 Search for a homicide suspect in Midland Park.
- A 2015 PSE&G Electrical Substation fire in Waldwick.
- Aerial photographs of a section of Saddle River in Rochelle Park in October 2015 to evaluate erosion as part of a grant request that would help mitigate damage to the river.
- Active shooter training exercise at Westfield Garden State Plaza.
- Locating a berm breach in March 2016 in Little Ferry that had caused flooding in the borough.
- Aerial photos of a church building fire in Englewood on March 23 that helped determine the source and cause of the fire for arson investigators.

The drone pilots also have come up with more novel uses for the devices: Tiedemann purchased a portable radiological sensor, which he then attached to a drone and was able to use to detect radiological substances from more than 100 yards away at a height of 20 feet.

The pilots also assisted Saddle River in a study of the area's deer population, using infrared camera to spot deer in denser forest area, a technology similar to that used to searching for missing persons, Tiedemann said.

<http://www.northjersey.com/news/bergen-county-shows-off-drone-program-video-1.1641904>

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Public agencies put drones to work

ALEXANDRIA, La. (AP) - Drones are being put to good use by public agencies in Central Louisiana, and their usage is expected to increase.

Unmanned aerial vehicles, commonly called drones, are being used by agencies to help them do their jobs more efficiently, and they can even help in potential life-or-death situations.

The Rapides Parish Sheriff's Office uses its drone for "search and rescue on land-based operations," according to Lt. Tommy Carnline.

The drone has been deployed to help the Sheriff's Office cover more ground in searches.

"It aided in the location of a man who was lost over on the levee in Rigolette," Carnline said.

The Sheriff's Office drone, equipped with a video camera, flew over a large field, about a mile by two miles wide, in the search for the man, he said. Deputies were able to quickly learn the man was not in the field.

"We didn't have to concentrate time in looking in that field, and we moved on, and we found the subject a little while later," Carnline said.

As far as he knows, the Sheriff's Office hasn't used the drone to search for marijuana-growing operations, he said, but it could be used for that purpose.

Grant Parish Sheriff Steven McCain said his office has had its drone for several months, and it already proved very useful during recent flooding.

The flooding limited deputies' movements, "so we put it up in the air and were able to get video and photos in live time. We were concerned about people getting trapped. We could see houses and make sure nobody was on the rooftop and needing help," McCain said.

The drone was donated to the Grant Sheriff's Office earlier this year for search-and-rescue purposes by the family of J.W. "Jim" Delaney of Pollock, who went missing in 2012. Delaney was never found despite a massive search effort.

Delaney's family donated the drone, nicknamed "Jim," as a way to thank those who searched for him.

Randy Price, an assistant professor for the LSU AgCenter office based in Alexandria, works with eight battery-powered drones used in the Central Louisiana area for agricultural purposes.

"Mainly what they get used for is to look straight down at the crops. We'll fly fields, like farmers' fields or research fields - a lot of research fields - where we take imagery that's straight down, and we'll put that back together (on a computer), and that shows us where good and bad growing areas are in the fields," Price said.

He said cameras with special filters can highlight areas where crops are growing well and those where crop conditions are poor.

The AgCenter's UAVs, as Price refers to them, adhere to the FAA's commercial rules, including the 400-foot ceiling.

Often used are Phantom 3 drones that weigh about 3 pounds each, have about a mile radius and fly for about 20 minutes per battery charge.

"They've got some pretty darn good qualities. We can cover 75 to 100 acres per battery taking imagery straight down. And they have some pretty good apps" that allow for programming automatic flight courses, Price said.

"If you get in trouble and can't tell which way they're going or something, you just let go of the sticks (controls), and it'll actually just coast to a stop and park itself."

You can then figure out where the drone is via a map system, and you can remotely have it take off again and return to you.

While the Phantom "looks like a spider," the AgCenter also has Styrofoam, airplane-shaped UAVs with flight times of about an hour.

The drones can be controlled through computer tablets and can also be pre-programmed to fly a specific flight pattern guided by Global Positioning System (GPS).

Price said the AgCenter demonstrates UAVs for farmers to help them determine if owning one would help their operations, but he notes the software needed for crop diagnosis is complicated.

A farmer using a drone would have to have Section 333 approval from the FAA.

Fort Polk uses surveillance drones in training missions, but the unmanned aerial vehicles have not been used for searches or monitoring emergencies so far, a spokesperson said. It is possible they could be used for that "with permission and proper authorizations."

The state Department of Transportation and Development is not using drones - yet.

“DOTD is investigating the use of drones, but we do not currently have or use drones,” a department spokesman said.

<http://www.washingtontimes.com/news/2016/aug/11/public-agencies-put-drones-to-work/>

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Drones Launch Flaming Balls to Start Controlled Fires

It's a warm, sunny morning at the Homestead National Monument of America in southeastern Nebraska. A burn crew dressed in yellow and green flame-resistant clothing is about to set a patch of tall-grass prairie on fire — on purpose. These kind of burns aren't unusual. But today's burn is; a team from the University of Nebraska is testing a fire-starting drone.

Small drones have become a favorite high-tech tool, or toy, for all kinds of people. But researchers hope this new firefighting drone they are designing can save lives.

Dropping the balls

First, firefighters light the edge of the prairie using big gas cans called drip torches. As the waist-high flames start to turn the grass black, computer science professor Sebastian Elbaum gets the drone ready to launch.

“Once they build this horseshoe shape of black area, then we're going to have our drones fly across this field and drop some of these balls that will ignite into a flame,” Elbaum explains.

The drone is about the size of a kid's helmet, with horizontal propellers on all sides. A clear tube extends from the top, into which Elbaum is loading pink and white ping pong balls. Then, standing on the side of the field, the team sends the drone up and over the flames, into the unburned area.

Once it's airborne, the team directs the drone to inject the balls with glycol just before dropping them one by one to the ground. The glycol mixes with a powder, igniting into flames and burning the grass.

Casey McCoy with the Nebraska Forest Service says even small, controlled fires like this one can quickly turn deadly.

“We've had a fairly challenging track record here in Nebraska,” McCoy says. “In the last five to six years we've had a number of fatalities associated with prescribed fires.”

The danger of aerial firefighting

Federal land agencies fight massive wildfires every year, using fire as a tool to keep active wildfires from spreading. Often, they light those fires from the air, dropping those same ping pong balls from helicopters.

Brad Koeckeritz, head of the unmanned aircraft systems division at the U.S. Department of Interior, says those flights can be risky.

“The nature of the mission is very dangerous because the helicopter’s very low speed, very close to the ground, and if anything goes wrong there’s very limited options for the pilot to put the aircraft down safely,” he says.

In fact, 41 wildland firefighters died in airplane or helicopter crashes in the last decade. Koeckeritz says aerial firefighting is both dangerous and expensive.

“[It costs] anywhere from \$2,000 to \$5,000 a day to have the aircraft on site, and then for each hour you fly it you’re somewhere around that \$2,000 to \$3,000 mark,” he says.

Federal agencies are already using drones for video, mapping and reconnaissance. But Koeckeritz says employing them like this could eventually be a cheaper way to start fires and keep firefighters safer.

A firefighting toolkit

As the smoke clears from the now-charred prairie, Sebastian Elbaum surveys the site and says his team will use what they learned to make this technology even better. There are questions about how the drone might work under certain circumstances, or the skills needed to fly it.

Elbaum says they eventually want it to become just another piece of the firefighting toolkit.

“Today the firefighters have, you know, maybe a shovel, gloves, their helmets,” he says. “But you can imagine them having this on their backpack, pulling it out when they get to the field, and telling the vehicle, ‘Hey, go scout out there. Check whether it’s hot, check whether it’s safe. Start an ignition over there.’”

A high-tech drone like that would not only be able to help control fires, but could also save lives.

http://www.uasvision.com/2016/08/09/drones-launch-flaming-balls-to-start-controlled-fires/?utm_source=Newsletter&utm_campaign=c319f1d70f-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-c319f1d70f-297560805

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SENSORS/APPLICATIONS:

3D Maps in Real Time from Drone Footage

Hydra Fusion Tools is Lockheed Martin’s answer to big data. Operation of an unmanned system is no longer a stand-alone activity. There are an assortment of maps, images, video and intelligence which are being broadcast to the operators and this needs to be fused into a common operational picture.

Hydra Fusion Tools creates this picture, in an accurate, three dimensional world presentation, that can be fully manipulated by your finger tips. In situations with multiple unmanned systems Hydra Fusion Tools truly shines, showing all systems in a single homogeneous display, optimized for the user.

Hydra Fusion Tools stand out feature is its ability to simultaneously localize and map incoming imagery feeds from manned or unmanned systems. These images are geometrically stitched together into an immersive three dimensional world view, showcasing buildings, trees, vehicles, and terrain. Combined with 3D models, Hydra Fusion Tools creates a real-world model of any site – be it a tactical situation, industrial plant, or farmer’s field. Hydra Fusion Tools turns big data in to actionable intelligence.

FEATURES

- Real-time structure from motion: the ability to generate 3D point clouds and 3D imagery in real time as a vehicle flies
- Site mapping: the ability to compare architectural drawings to actual 3D imagery to gather daily progress updates
- Agriculture: the ability to map fields or forests for the analysis of plant health and cataloging
- Infrastructure Inspection: ability to automate the inspection of large critical infrastructure
- Surveying: the ability to produce wide area maps of terrain
- Tactical: the ability to covertly generate maps of evolving situations in real time

Hydra Fusion Tools runs on commercial computers leveraging state-of-the-art graphical processing units to render the entire evolving scene in real time.

http://www.uasvision.com/2016/08/04/nato-ags-global-hawk-flight/?utm_source=Newsletter&utm_campaign=5493b95464-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-5493b95464-297560805

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Eversource tests drones to inspect power lines

HOOKSETT, N.H. —Eversource crews are testing out the use of drones to inspect power lines

Officials with the utility company said the use of drones, or unmanned aerial vehicles, could help them find the smallest problems.

"We are able to get into environments like a helicopter may not be able to get into," said Franz Loew of JBI Helicopter Services.

Eversource officials said drones could help repairs go more quickly.

"You can see things a lot clearer," said Carol Burke of Eversource. "You don't have to worry about hovering with a helicopter. which is disruptive to some of the land owners."

Eversource said it will still use helicopters for inspections, but the company hopes the drones will complement that work.

"With the UAV, we can actually get up close and find any infrastructure that might be a lot smaller," Burke said. "An insulator that's broken, hardware that's rusting, smaller items that would need to be replaced."

JBI, which flies the helicopters and drones, said that the devices have been used to inspect bridges, wind turbines and solar powers. Two crew members are required to operate them, one to fly and the other to control the camera.

Eversource officials said its sister companies in Connecticut and Massachusetts have already had success with using drones and are excited about the possibilities.

<http://www.wmur.com/news/eversource-tests-drones-to-inspect-power-lines/41106460>

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New app for on-demand drone insurance launches in Nevada, other states

Verify, the first on-demand drone insurance company, on Monday launched a new app in a market that is ripe for innovation and competition — both in Nevada and nationally.

"You open the app, it draws a quarter-mile circle around you, and that's the coverage area," said Verify co-founder Jay Bregman. "It calculates the risks in that coverage area, and also environmental risks like wind. It gives you an instant quoted price starting at \$10 an hour, and you put in a credit card. Then, in two taps, you bought a million-dollar insurance policy."

So far, the majority of drone insurance policies in the state — and the country — are typically offered as an annual policy with a premium paid up front.

Rajat Jain, the property and casualty section chief at the Nevada Division of Insurance, said while more insurance companies are trying to offer drone insurance, they are taking a cautious approach.

“We are still not seeing fully fledged coverage for all the risk that the drones may represent,” Jain said. “The insurance industry is assessing the risk and trying to figure out, as more information becomes available and the technology changes, how to assess that risk and how to accept the risk.”

New York-based Verify has an office in Ireland filled with geospatial specialists who build and enhance models of drone-specific hazards across the United States, using public and private data to price the risks instantly inside the app.

“With Verify, the risk is really sharply delineated because it’s only covering a quarter of a mile of an area for an hour where the risks are known,” Bregman said.

This type of service offered by Verify is the “key” to the drone insurance industry, said Chris Walach, director of operations for unmanned aviation and the director of operations for the FAA-designated Nevada unmanned aircraft system test site.

“It’s got to be simple, it’s got to be accessible, and — most of all — it has to be economical for the operator and very usable,” Walach said. “Those that can move to the top of making it easier, making it more economical and making it more usable to the operator would move ahead to the pack in the insurance industry from a regulatory perspective.”

Given that Nevada is working to become the global location of choice for the drone industry, and that Nevada has taken the lead on regulations around autonomous vehicles, it’s just a matter of time before local companies race to compete in the drone insurance industry.

“Any kind of technology that comes in is something that Nevada would like to take the lead in,” Jain said, adding that the insurance industry is very competitive and he expects to see companies “jump in and offer products right away.”

Verify launched in Nevada and 39 other states.

<http://www.reviewjournal.com/news/las-vegas/new-app-demand-drone-insurance-launches-nevada-other-states>

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Spanish Researchers use UAS to Study Raptor Nests

A team from Doñana Biological Station (CSIC) has used an Unmanned Aircraft System (UAS) to test whether nest decorations increased nest-site visibility to conspecifics in black kites (*Milvus migrans*) in Doñana National Park (Southwestern Spain).

Avian nests are frequently concealed or camouflaged, but some species, such as the black kite, build noticeable nests or use conspicuous materials for nest decoration, that may serve as extended phenotypic signaling of nest-site occupancy and social status to potential intruders. The latter may benefit both signaler and receiver by minimizing the risk of aggressive interactions.

The researchers used a small multicopter to take pictures of black kite nests, with and without an experimentally placed decoration, from different altitudes and distances simulating the perspective of a flying and approaching, prospecting intruder. Decorated nests were consistently detected by human volunteers at a higher frequency and a lower latency, compared to undecorated versions of the same nests.

The results confirm that nest decoration in this species act as a signaling medium that enhances nest visibility for aerial receivers, even at large distances. This finding complements previous work on this communication system, which showed that nest decoration was a threat informing trespassing conspecifics on the social dominance, territory quality and fighting capabilities of the signaler.

http://www.uasvision.com/2016/08/10/spanish-researchers-use-uas-to-study-raptor-nests/?utm_source=Newsletter&utm_campaign=ed7f4c0732-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-ed7f4c0732-297560805

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NASA Licenses New Auto-Tracking Mobile Antenna Platform – UAS

NASA has designed an innovative antenna-mounting platform that meets the needs of the unmanned aircraft market by providing a low-cost, low-power mobile auto-tracking antenna. The patent-pending platform offers continuous rotation of nearly 60 pounds of antennas, transmitters, and receivers along with customized software to automatically track a target such as an unmanned aerial vehicle, or UAV, which can be any size aircraft.

"This technology is the perfect example of a NASA engineer thinking outside of the box to create a solution to a problem that benefits not only NASA, but industry as well," said Laura Fobel, chief of Armstrong's technology transfer office. "We are looking forward to working with Mobile Antenna Platform Systems Inc. to commercialize this technology." Center Director David McBride for NASA's Armstrong Flight Research Center in Edwards, California, recently signed a license agreement for the NASA antenna platform with Director of Business Strategy Jason Pottinger of Mobile Antenna Platform Systems Inc. in Tampa, Florida. "Our team is excited to launch Mobile Antenna Platform Systems Inc. with the support of Academic Technology Ventures Inc.," said Pottinger. "We believe that NASA's antenna-mounting platform will help to expand the use and applications of UAVs by providing a more mobile and economic solution for UAV tracking."

The portable antenna platform is lightweight and uses inexpensive means to track an object or UAV. Ground-based tracking uses information from a ground-tracking asset such as a radar, which is incredibly expensive. Satellite-based tracking like this mobile antenna platform uses a Global Positioning System. The unique and simple to set-up design of the platform eliminates the need for additional load balancing hardware, which allows for more space to add additional antennas and equipment. No counterweights means less mass, which enables the use of smaller, cheaper, and lighter motors to turn all the antennas. The mobile platform also makes it easier for one person to carry it. Another benefit is

the use of a one-slip ring assembly, an electromechanical device to transmit power and electrical signals, which are much less expensive than radio frequency rotary joints that now exist on current high-power tracking systems. The slip ring assembly passes power and data, not RF, so any frequency radios can be used with this tracking antenna platform without changing any platform hardware.

The auto tracking software uses the target's GPS, location to coordinate and maintain a line-of-sight link with the object being tracked. The maximum tracking distance to the object is as great as what the telemetry system, radios and antennas, can support as long as the object does not disappear below the horizon. A much smaller version of this platform may be flown on a plane, which would greatly extend the telemetry link range without requiring more power from the aircraft. Besides tracking UAVs, this platform offers many other applications for Earths' atmospheric and university research, marine communication and satellite tracking that transmit multiple frequencies as well as weather balloon tracking.

<http://www.directionsmag.com/pressreleases/nasa-licenses-new-auto-tracking-mobile-antenna-platform/473648>

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COUNTER UAS:

Pentagon Eyes US Iron Dome to Defend Forward-Based Forces – UAS

TEL AVIV — Israel's state-owned Rafael Advanced Defense Systems and Raytheon, its US partner for Iron Dome production, are working to transform the combat-proven Israeli interceptor into a fully American system in defense of forward-deployed US forces.

Americanized versions of the Iron Dome's Tamir interceptors are being offered under the Raytheon-trademarked SkyHunter brand for a US Army program aimed at defending against a spectrum of threats, from cruise missiles and UAVs to rockets, artillery and mortars.

In an April IFPC program test at the Army's White Sands Missile Range in New Mexico, the MML-launched Tamir scored its first intercept on US soil against a target drone.

Israeli government and industry sources say half of US production funds funneled into Israel's Iron Dome program in recent years is already going to Raytheon, which produces major components for the Rafael-designed Tamir interceptor in multiple facilities throughout the US.

If selected for the US Army's IFPC Inc 2-I program, the Tamir would be upgraded to US standards, produced in the United States and rendered "100 percent Raytheon," said Yosi Druker, head of Rafael's Air Superiority Systems division.

"The minute that the US decides to procure Iron Dome, we will transfer all the knowledge and production file to Raytheon," Druker said.

He noted that a Rafael-Raytheon teaming agreement governing prospective sales to the Pentagon calls for Rafael to become subcontractor to its US partner. "Under our agreement, we will produce 40 percent to Raytheon's 60 percent, but the capabilities will be 100 percent Raytheon."

And while the Tamir/SkyHunter is just one of three interceptors under evaluation by the US Army, Druker said the low cost and proven track record of Iron Dome should give it a competitive leg up on other options still in development.

"It's clear that according to price and capability and maturity of the system, Iron Dome has advantages," the Israeli executive said.

The firm has not yet publicized the planned SkyHunter, although the it has formally registered the system's name and logo as its trademark. According to Raytheon's description of the trademark, SkyHunter is "a ground-based missile interceptor system consisting of a guided missile with electro-optic sensors and adjustable steering fins for tracking and destroying incoming enemy rockets, missiles, artillery and mortars."

A May 26 report from the service's Army Test and Evaluation Command, published on the US Army's website, said the fast-tracked IFPC Inc 2-I program is based around the service's developmental MML and existing mission command and control, sensors and interceptors. It said the Army's open network architecture aims to integrate "any sensor, best shooter and optimal interceptor" capabilities to address a variety of targets.

"Developmental programs tend to require several years to reach a point where they can begin engineering demonstrations similar to what the IFPC Inc 2-I program accomplished in less than one year," the report noted.

<http://www.defensenews.com/story/defense/international/americas/2016/08/08/skyhunter-tamir-iron-dome-raytheon-rafael-us/88290824/>

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COMMENTARY:

Why Drones Actually Can't Deliver Packages to Homes

The new FAA rules that allow commercial use of drones still won't allow Amazon's package delivery plans. The FAA is not the real problem. The laws of physics are. Here's why.

On June 21, the FAA finalized rules for commercial UAVs, or drones. While commercial applications for drones vary from aerial photography to package delivery, especially exciting is Amazon's Prime Air, promising to deliver a five-pound package to your doorstep (or back yard) in 30 minutes or less.

The new FAA regulations currently prevent this application, citing a requirement for line-of-sight control (the operator has to be able to see the drone first-hand throughout the entire flight path). This is a

safety requirement created to prevent collisions with airplanes, power lines, or people and property on the ground. In my opinion, this restriction will eventually be lifted as detect-and-avoid, GPS navigation, and remote-control technologies continue to improve to the point we will trust them, just like we have learned to trust auto-pilots and auto-landing systems, and will soon be comfortable with self-driving cars.

However, Amazon's Prime Air drone delivery plan of flying a five-pound package within 30 minutes to your house violates other laws: the laws of physics. Here is what nobody ever talks about.

I've been a drone hobbyist for three decades now, and served in the U.S. Air Force Civil Air Patrol Auxiliary as a transport mission pilot and aerospace education officer. Last year, I applied for (and received) a grant from the Air Force Association to start a UAV/drone program in our squadron. I purchased the drone, and started teaching cadets about it. The drone's specifications indicated that it was good for up to 20 minutes of total flight time. Other drones were rated with shorter flight times. While racing drones can reach speeds of 80 mph (but for only about 2-3 minutes before the batteries die), "payload" drones will rarely reach speeds faster than 40 mph, and even less when they are carrying a payload (such as a package).

My first investigation was aimed at understanding why the drone flight time was limited to 20 minutes. Being an engineer, I developed the math for it. It is based on a few known characteristics of the current state of technology. Most drones use electric motors and batteries. In my research, I found that a battery typically holds a capacity of 65Wh (Watt-Hour) for every 1 pound of battery weight. The "hover" or cruise speed power requirement for a drone is 100W for every 1 pound of overall weight (drone + batteries + payload), while it requires 200 W/lb to climb or fly at speed. Finally, the power system (motor + speed controller) delivers 1,000W for every 1 pound of drone weight (not including batteries or payload). I checked the performance specifications for many different sizes and manufacturers of electric motors and batteries, and found that the numbers above were very consistent.

I don't want to bore you with the math, so I'll skip right to the conclusion. When you do the calculations, you find that it results in the following:

For a 30-minute flight, a drone's overall weight (drone + batteries + package) must be 20 times that of the package alone. The batteries' weight accounts for most of that.

For a five-minute flight, the overall weight has to be only 1.5 times that of the package.

The drone will not be able to fly more than 32 minutes, and at that time, it will not be able to carry any package whatsoever.

So when Amazon tells you they will be able to deliver a five-pound package to you in 30 minutes, they really mean that they will not be able to fly the drone for more than 15 minutes to you, and 15 minutes back (including takeoff and landing time), at speeds of no more than 40 mph, and not until they have a drone that weighs 20 times what the package weighs. Delivering a five-pound package will require a

100-pound drone. The FAA restricts drone weight to 55 pounds, which means one that can fly 15 minutes to you and 15 minutes back with only a 2.75-pound package.

Furthermore, 15 minutes (assuming no time was spent on takeoff or landing) at 40 mph means that the Amazon warehouse location has to be within 10 miles of your home. Currently, Amazon has nine fulfillment centers in California, covering 163,696 square miles. To cover 100 percent of California with centers that are within a 10 miles radius of the customer, they need 521 centers, and 855 centers to cover Texas's 268,597 square miles, up from their current six. Of course, Amazon may decide that the service is available only to much smaller coverage areas, and not to everyone.

You get the point. Delivering a five-pound package to your home based on current drone technologies is not yet anywhere close to becoming a reality. At least not until electric motor efficiency and battery capacity technologies make significant leaps. Unfortunately, they have not made dramatic improvements over the past few decades.

<http://www.inc.com/yoram-solomon/why-drones-actually-cant-deliver-packages-to-homes.html>

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US Releases Redacted Drone Strike 'Playbook'

The U.S. government has released a once-secret policy document dubbed "the playbook" that shows how officials select drone targets in areas outside war zones and the key role the president has in the process.

The 18-page Presidential Policy Guidance (PPG), published Saturday by the American Civil Liberties Union, provides more details than the government had previously revealed on how drone strikes are approved.

"Actions, including lethal action against designated terrorist targets, shall be as discriminating and precise as reasonably possible," the PPG states.

President Barack Obama typically must personally sign off on plans to strike terror suspects who are located outside war zones in which America is officially fighting. Such zones include Pakistan, Libya, Somalia and Yemen.

Strikes in combat theaters such as Iraq, Syria and Afghanistan are controlled by the military.

Each case for action is subjected to legal review before it goes to the National Security Council and then the president.

The policy document says that "absent extraordinary circumstances," a drone strike on a high-value target will only be taken if there is "near certainty" no civilians will be killed, and says the United States should respect another nation's sovereignty in weighing drone strikes.

The partially redacted document was released as a result of a lawsuit brought by the ACLU, which has long sparred with the government over America's secretive drone program.

"The PPG provides crucial information about policies that have resulted in the deaths of thousands of people, including hundreds of non-combatants, and about the bureaucracy that the Obama administration has constructed to oversee and implement those policies," ACLU Deputy Legal Director Jameel Jaffer said in a statement.

"The release of the PPG and related documents is also a timely reminder of the breadth of the powers that will soon be in the hands of another president," he added.

Justice Department lawyers turned the document over to the ACLU late Friday, and the rights group released it publicly on Saturday.

Officials claimed anywhere from 64 to 116 civilians were killed in the strikes, and up to 2,581 combatants -- but critics have constantly said the government underestimates civilian deaths.

National Security Council spokesman Ned Price stressed that the PPG offers protections to civilians that "exceed the requirements of the law of armed conflict."

He added that "near certainty" that the target is present, and that non-combatants will not be killed, was the "highest standard we can set."

"The president has emphasized that the U.S. government should be as transparent as possible with the American people about our counter-terrorism operations, the manner in which they are conducted, and their results," Price said in a statement.

"Our counter-terrorism actions are effective and legal, and their legitimacy is best demonstrated by making public more information about these actions as well as setting clear standards for other nations to follow."

The PPG also outlines what should be done in the event a suspect is captured, stressing that in "no event" will a detainee brought to Guantanamo Bay -- the U.S. military prison Obama has so far failed to close.

http://www.military.com/daily-news/2016/08/07/us-releases-redacted-drone-strike-playbook.html?utm_source=Sailthru&utm_medium=email&utm_campaign=Defense%20EBB%2008-08-16&utm_term=Editorial%20-%20Early%20Bird%20Brief

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The Drone Overreach is Nigh

Proactively "From the Sea"; an agent of change leveraging the littoral best practices for a paradigm breaking six-sigma best business case to synergize a consistent design in the global commons, rightsizing the core values supporting our mission statement via the 5-vector model through cultural diversity.

This technology, only a POM away, is the answer to all our problems. If we only invest a bit more and trust this one braintrust, the future will be ours to dominate with fewer units, fewer personnel, less bloodshed, with more power and flexibility. All we need to do is to close our minds and trust our seers of the future who know. They just know, dontchaknow.

What we need to do is to throw away all that oldthink, embrace the Tommorowland of Our Betters, ignore the reality of the conflict and operational reality all around us and focus on the vignette. Focus on the presentation. Focus on our pristine, exquisite, transformational vision of what will be.

We just need to recapitalize, redirect funds, retire oldthink platforms early and hold out hands together is the only way smart, visionary, right thinking, and - ahem - promotable people think. The post-retirement jobs are all going to be here for those who, well, you know. We don't need to get in to specifics about that right now, now do we?

We have seen this movie before. An experienced and slightly world weary matron is once again seduced by the handsome flatterer who tells a story clear to all but the matron that is is little more than the usual over-promise and under-deliver sweet talk that she has fallen for in the past. What follows is a roller coaster of great expectations followed by excuse laden disappointment that in the end leads only to painful recriminations and prenury.

Unmanned systems will continue to provide incremental additional utility if we are smart with our money, humble with our ambitions, and harsh in our evaluations. But no, that is not good enough. Once again we are seeing slick aspirational ideas that we are all supposed to embrace - in spite of the reality of what we see around us tells us what is actually needed, regardless of what the last few conflicts have tried to teach us - indeed, what centuries of solid military experience has taught us.

Like the push for the A-12 prevented us from having a viable and much needed replacement for the capabilities of the A-6, this snake-oil pushing may lead us to miss what unmanned systems have to really offer us by mid-century.

The industry overreach never ends, they never stop. There is always a new group of thinkers who think they have, like those cute teenagers who think they have discovered s3x, discovered something that no one else ever has. They have an insight in to a new way that no one else. They have an idea, a technology, a concept that they are sure - if only everyone trusted them and showed the same enthusiasm they had - will transform, offset, or generation jump their way in to the future where enemies fall away before their dominance while everyone is quickly victorious and makes it home for supper.

Sorry, it never works that way. In spite of a few thousand years of people trying to convince their leaders it really will this time - after all, they are smarter and more insightful than previous generations. It. Never. Works. That. Way.

And so it is for drones, Unmanned Aerial Vehicle (UAV), Unmanned Aircraft System (UAS), Unmanned Combat Air Vehicle (UCAV) Remotely Piloted Aircraft (RPA) - or whatever we are calling it this FY.

Drones have been with us for decades and technology holds the promise of their greater utility in the future. The key is "promise." We should continue to build a little, test a little, learn a lot - but that isn't good enough for some. Those "some" need to be challenged at every step or they will put us right where we are now; the A-6 to A-12 debacle; the loss of organic tanking; the myopic victory of the Light Attack Mafia that left our multi-billion dollar CVN with decks full of short ranged strike fighters and little more; the LCS who seems to only be able to combat the effort to build a functional fleet; and the white elephant DDG-1000 who, I am willing to bet, has only begun to build on its record of transformationalist under-performance.

Where there are solid, sane, and defensible developments in the drone world, such as the decision to focus the Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) program on Carrier-Based Aerial-Refueling System (CBARS) - that doesn't keep the drone good idea fairy from pushing. They will always push as their product is the push.

We're going to unpack something, and it is going to be painful - at least for me. From the 11 July Defense News, retired Air Force Generals John Loh and Ronald Yates ask, "What Next for Drone Warfare?" The executive summary is, "Not this." - but what fun would that be? Let's pull apart the juicy center, a mini-Fisk if you will;

There is no shortage of scenarios well suited to this next generation of combat RPAs. Obviously, their current effectiveness can be improved with all-weather stealth technology, longer endurance, better sensors, larger payloads and connectivity to the global "info-sphere". With these improvements, they can cover targets in other regions where terrorists congregate, such as North Africa, Yemen, Somalia and Southwest Asia. Further, with an optimized vehicle, RPAs can be incorporated into war plans against aggressive nation-state adversaries.

Next-generation RPAs can also be the foundation for enforcing international truces and treaties. They can provide continuous, high-resolution surveillance of important facilities to detect activity that could violate agreements, and immediately strike targets.

Establishing no-fly zones over contested areas is a viable alternative to nation-building. The continuous no-fly zones over Iraq for twelve years after the First Gulf War in 1991 demonstrated their effectiveness as a deterrent to further warfare. No-fly, no-drive zones patrolled with RPAs and manned aircraft can detect and strike any air or ground target, obviate the need for "boots on the ground", and maintain air dominance over the area.

In the same vein, new, optimized RPAs would be the best choice for tracking activity and exerting U.S. influence in hot spots such as the Ukraine, Taiwan Straits, North Korea, Spratley Islands and Central America.

A new fleet does not require new infrastructure. Today's RPAs have capable ground-based flight and mission-control facilities, and robust, jam-resistant data links. Fortunately, programs are already underway to upgrade them such that fielding a new force of RPAs would require little, if any, additional

capabilities. And, the global info-sphere of space-borne, networked communications already exists to link RPAs in any region of the world.

Goodness. What a start;

There is no shortage of scenarios well suited to this next generation of combat RPAs.

Of course, if you carefully design your vignette to remove the enemy's vote, assume your dominance of the electromagnetic spectrum and low-Earth orbit, and you can keep the JAG/LEGAD hogtied and ball-gagged in some fan room with two MA's securing the door. No problem.

Obviously, their current effectiveness can be improved with all-weather stealth technology, longer endurance, better sensors, larger payloads and connectivity to the global "info-sphere".

There, in a nutshell, is how we got ACS, A-12, LCS, DDG-1000, FCS etc etc etc - we just assume all challenges away and all good things to happen as a result of just saying so. Additionally, on the back of a cocktail napkin, I think the drone in the above paragraph will need to be something between a G4 and a 737. Good luck hiding that from anyone. It would also help having a vertically challenged contractor in the back room spinning hay in to gold.

With these improvements, they can cover targets in other regions where terrorists congregate, such as North Africa, Yemen, Somalia and Southwest Asia. Further, with an optimized vehicle, RPAs can be incorporated into war plans against aggressive nation-state adversaries.

How many years lost to "making do with what legacy systems we have left after we retire others to capture the cost" will that take? What opportunity cost for those hundreds of millions? What of the conflicts we will be in that - as history tells us - this brave new world capability will be useless in? I assume "optimized" means that whatever you have is covered with fairy dust and will even cure the Heartbreak of Psoriasis?

Next-generation RPAs can also be the foundation for enforcing international truces and treaties. They can provide continuous, high-resolution surveillance of important facilities to detect activity that could violate agreements, and immediately strike targets.

Will someone check the fan room? I am sure I heard the JAG screaming through the ball gag. Also, we are pretty much already doing that, minus the AI implied "immediately." But, yeah.

Establishing no-fly zones over contested areas is a viable alternative to nation-building. The continuous no-fly zones over Iraq for twelve years after the First Gulf War in 1991 demonstrated their effectiveness as a deterrent to further warfare. No-fly, no-drive zones patrolled with RPAs and manned aircraft can detect and strike any air or ground target, obviate the need for "boots on the ground", and maintain air dominance over the area.

Wait, did someone just come out of a coma? I'm sorry, but I don't think the Shia or the Kurds agree all that much and - in the end analysis - that the NFZ in Iraq prevented any conflict. Sure, prevented one

unknown possible conflict, but conflict came anyway. Any air or ground target? No need for "boots on the ground?" My Buddha, it is almost as if nothing has happened in the last decade.

In the same vein, new, optimized RPAs would be the best choice for tracking activity and exerting U.S. influence in hot spots such as the Ukraine, Taiwan Straits, North Korea, Spratley Islands and Central America.

"Best choice" under what terms? Define how you exert U.S. influence via something that no one sees, interacts with, or knows what it is doing? That is ISR, not presence of influence operations. Oh, and if they can see or interact with it - then you won't have that asset any more to do your subliminal influencing - or what ever this means.

A new fleet does not require new infrastructure. Today's RPAs have capable ground-based flight and mission-control facilities, and robust, jam-resistant data links. Fortunately, programs are already underway to upgrade them such that fielding a new force of RPAs would require little, if any, additional capabilities.

So, no new hangars? No new facility to support troops and contractors? No new simulators or repair facilities? No new bandwidth requirements?

And, the global info-sphere of space-borne, networked communications already exists to link RPAs in any region of the world.

"Info-sphere" - is that a new term I need to add to BS-Bingo? Will we see that more? Again, I assume that all the bandwidth we are using right now is fully under military control, robust against jamming, can avoid hacking or ASAT, and can operate against a hostile EW environment against peer and near-peer operators? Scaleable and secure? Redundant with ready spares?

Really?

Read it all. It all sounds so clear, easy, and doable - and of course it does. This is the classic problem of choosing the "all assumptions are green" nested best case scenario thinking that has set us back time and time again. This needs to be challenged at every step of the way or we will once again find ourselves passing up "good" evolutionary products that were doable for ethereal "generation jumping" ideas that just never wind up making a shadow, or are produced in such small numbers that they have little use.

<http://cdrsalamander.blogspot.com/2016/08/the-drone-overreach-is-nigh.html?m=1>

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The Political Role of Drone Strikes in U.S. Grand Strategy

How do you feel about drone strikes? Chances are you have an opinion – or at least a gut reaction.

Years of debate on the issue show that many Americans have reservations. People are concerned that drone strikes devalue non-American lives, dangerously expand executive power, and drive terrorism and anti-Americanism.

Yet do we actually know much about drone strikes' political effects? No.

Here's what we can say: There are two publicly known classified programs that operate drones and fire weapons from them, military and CIA, but research into the strikes' effects is constrained by government secrecy and limited access to areas where the strikes occur. Even the number of civilians killed is contested. The White House estimates 116 deaths since the beginning of the Obama administration while independent reporters suggest it is as high as 800.

We can also say drones offer some obvious advantages. Strikes can achieve short-term goals like killing leaders of terrorist groups such as al-Qaida in the Arabian Peninsular leader Jalal Baleedi in Yemen. They provide more accurate targeting than crewed armed flights and sea-based weaponry, although they are certainly not perfect. They are often less expensive than manned tools like planes and ships.

But there is profound disagreement over the strikes' political – that is, strategic – effects.

Whether drone strikes reduce or increase terrorism is murky. The fog is unlikely to clear soon.

Even in this uncertain environment and without hard data, we can draw some conclusions. For example, drone strikes are similar to Special Forces in their direct targeting ability in remote locations, but are less likely to create domestic opposition to the use of force because they don't put U.S. lives directly at risk. They also evoke less nationalistic backlash because they do not require putting U.S. forces in another state's territory.

As a political scientist studying the political uses of force, I suggest it's possible to better understand drone strikes by analyzing them within the context of grand strategy – or how a state thinks about assuring its own security. By doing that, we can begin to determine if these strikes support U.S. goals, or not, and how they compare to other means of attaining the same ends.

Thinking Big About Strategy

There are several different ways of thinking about U.S. grand strategy. For our purposes, it makes the most sense to consider two types – restraint and selective engagement.

These approaches share a cautious attitude toward the use of force. Both agree that the wealth and resources of the European and Asian landmass make it the center of U.S. political and economic interactions and the location where any truly dangerous security threat to the United States would arise.

Where the two approaches differ is on the role of international opinion and nonstate actors in U.S. security. These are key points in the drones debate.

Practicing 'Restraint'

President Obama is often characterized as a proponent of restraint: He recognizes that the use of force may have higher costs than benefits and that its downstream effects can be incalculable. This recognition is behind his reluctance to intervene directly in internal conflicts such as Syria.

In a world where the U.S. is implementing policies derived from a grand strategy of restraint, military force is a potentially high-cost tool. Drone strikes give the United States a smaller overseas military profile than do land-based conventional forces. This is a political gain. As MIT's Barry R. Posen argues, "a high and martial profile helps to generate antipathy to the United States, which may create a more supportive environment for violent and determined enemies."

Drone strikes' greater accuracy and lower profile give them the edge when policymakers are concerned about popular opinion and the potential costs of the use of force. Drone strikes can also reduce perceptions of the United States as a bully whose military behavior may increase radicalization.

Yet drone strikes against sovereign states underline U.S. unilateralism and the country's fearsome power-projection capabilities. This is likely to contribute to other states' fear of the United States as the most powerful state in the world, one unconstrained by others' interests and wishes. Concern about U.S. strikes can drain liberal partners' goodwill, potentially affecting U.S. interests in other areas. Germany, for example, has in the past limited intelligence sharing with the United States because of legal and ethical concerns about drone strikes outside battlefields.

Drone strikes of the type I discuss here apparently occur only in four states: Yemen, Somalia, Pakistan and Libya – though Libya's frail government requested U.S. help against the Islamic State, or IS, before the most recent round of strikes and Pakistan is widely believed to privately support the strikes.

Despite the big controversy, these strikes' political advantages are small because of limited U.S. interests outside the Eurasian continent and the limited overseas terrorism threat to U.S. interests.

Under 'Selective Engagement'

What kind of worldview would push the U.S. away from the use of drones?

Drone strikes have an even more limited role in a grand strategy of selective engagement. This approach emphasizes the role of states in U.S. security rather than nonstate actors and popular opinion. It focuses on conventional U.S. military power as an instrument enabling state cooperation, so drones' smaller footprint becomes a political drawback.

In a grand strategy of selective engagement there is little need to attack terrorists overseas because their limited capabilities pose little threat. The major counterterrorism goal is preventing attacks on the homeland, particularly any using weapons of mass destruction. The primary counterterrorism tools are shared police work and intelligence, argues Brandeis University's Robert J. Art.

The most controversial drone strikes target groups and individuals in states without a public U.S. military presence and without that state's public permission. Within hot war zones, drone strikes are another standoff weapon for achieving tactical effects.

What's To Come

How are the drone programs likely to change under a new president? How will our new leadership see our place in the world?

Clinton supported the Iraq War and sees an activist global leadership role for the U.S., including its military. Her views lead one to expect more U.S. uses of force in more places based on the belief that military force easily translates into the power to achieve political goals. Drone strikes could increase, given their appealingly lower profile, lower cost and greater accuracy. But they could easily be eclipsed by more overt military intervention into internal conflicts that Clinton believes threaten U.S. values and interests, such as Syria and Libya.

Donald Trump's views on how to assure U.S. security are unclear at best, contradictory at worst. Some predict Trump's grounding of drones based on his isolationist comments. Others foresee an expanded role for U.S. air power potentially including drones against IS in a Trump presidency.

Turning from high politics to popular views, it's clear that Americans are concerned about these kinds of drone attacks – apparently unilateral, apparently violating the 350-year-old norm of state sovereignty and conducted without a formal justice process. This reflects well on a public wondering what the U.S. role in the world should be.

But assessing the value of drone strikes requires looking beyond the attacks themselves to first identify and prioritize U.S. interests and threats. Only in that context is it possible to decide whether one supports or opposes drone strikes for what they may gain the United States politically.

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<http://theconversation.com/the-political-role-of-drone-strikes-in-us-grand-strategy-62529>

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