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# Unmanned Systems Sentinel Summary / 11 November 2015

Monterey, California: Naval Postgraduate School

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## **Unmanned Systems Sentinel Summary**

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. All opinions expressed are those of the respective author or authors and do not represent the official policy or positions of the Naval Postgraduate School, the United States Navy, or any other government entity. Immediately below are this edition's highlights with links to the respective articles:

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## **NAVY/USMC:**

### **Navy Launches Independent Review of Littoral Combat Ship Remote Mine-hunting System**

The Navy has chartered an independent review of its criticized Remote Mine-hunting System (RMS), a key component of its Littoral Combat Ship mine countermeasures mission package, which may affect the service's decision to move forward with LCS operational testing, a Navy officials told USNI News.

"The Chief of Naval Operations and the Assistant Secretary of the Navy (Research, Development and Acquisition) chartered an independent review of the Remote Mine-hunting System (RMS) capability and reliability on September 25, 2015," Capt. Thurraya Kent said in a Tuesday statement.

"Focus areas of the team's review include validating the requirements and mission concept of operations; assessing the RMS against the requirements; evaluating alternatives; assessing the program's technical risk, schedule and cost; and evaluating the program's management structure."

The team will report back to CNO Adm. John Richardson and acquisition chief Sean Stackley within 60 days.

The RMS – consisting of a Remote Multimission Vehicle (RMMV) towing the AN/AQS-20 sonar – is a workhorse in the LCS MCM mission package but has faced reliability problems since its development. Though Navy officials have said the LCS MCM mission package as a whole has performed well in testing and completes missions faster than legacy Avenger-class MCM ships, the service decided to delay the mission package's operational test period, which had originally been scheduled to take place over the summer to allow for an IOC declaration by the end of September.

“Following a Nunn-McCurdy breach five years ago, the Department [of Defense] certified to Congress that the Remove Minehunting System ... would perform more effectively if the Navy were to invest in a reliability growth program, and Congress funded that effort,” the letter reads.

“The decisions made over the next six months will set the course for our nation’s maritime MCM capabilities for decades to come,” according to the letter.

“Too much is at stake to accept the status quo and permit systems with long documented cost, schedule, performance, and reliability shortfalls to get a free pass into the fleet and further production.”

<http://news.usni.org/2015/10/13/navy-launches-independent-review-of-littoral-combat-shipremote-minehunting-system-new-look-could-cause-more-testing-delays>

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### **TALONS System Mimics a Mast as Tall as a Skyscraper**

DARPA’s Towed Airborne Lift of Naval Systems (TALONS) research effort recently demonstrated a prototype of a low-cost, fully automated parafoil system designed to extend maritime vessels’ long-distance communications and improve their domain awareness.

Towed behind boats or ships, TALONS could carry intelligence, surveillance, reconnaissance and communications payloads of up to 150 pounds between 500 and 1,500 feet in altitude—many times higher than current ships’ masts—and greatly extend the equipment’s range and effectiveness.

In the Chesapeake Bay near Baltimore, the TALONS team improved hand-deployment techniques for smaller boats and sent the system up to 500 feet in altitude, tuning and programming automatic launch-and-recovery and autopilot systems. The Virginia Beach demonstration occurred several miles offshore and used a mast-deployment technique that extended TALONS’ reach to 1,000 feet in altitude to display the system’s utility for larger ships.

TALONS is part of DARPA’s Phase 1 research for Tern, a joint program between DARPA and the U.S. Navy’s Office of Naval Research. Following successful testing, DARPA may transition TALONS technology to the U.S. Navy.

[http://www.uasvision.com/2015/10/09/talons-system-mimics-a-mast-as-tall-as-a-skyscraper/?utm\\_source=Newsletter&utm\\_campaign=a824f9dbc1-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-a824f9dbc1-297560805#sthash.9odvMPOC.dpuf](http://www.uasvision.com/2015/10/09/talons-system-mimics-a-mast-as-tall-as-a-skyscraper/?utm_source=Newsletter&utm_campaign=a824f9dbc1-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-a824f9dbc1-297560805#sthash.9odvMPOC.dpuf)

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### **BAE Systems tests unmanned naval boat**

BAE Systems has introduced a new technology, which will enable naval crews to perform high-speed reconnaissance and remote surveillance using unmanned boat.

The new unmanned technology will allow the boat to operate autonomously for up to 12 hours at a time.

The vessel can be operated in a pre-planned route or using remote control.

With a capacity to cruise at a speed of more than 38kt, the unmanned boat will offer unique ship-launched maneuverability and better situational awareness, the company stated.

The vessel will be equipped with navigation radar, 360° panoramic infrared camera array and laser range finder, offering a detailed picture within a significant range.

"This gives it the flexibility and sophistication to operate in a number of different tactical roles, whether it's patrolling areas of interest, providing surveillance and reconnaissance ahead of manned missions, or protecting larger ships in the fleet."

<http://www.naval-technology.com/news/newsbae-systems-tests-unmanned-naval-boat-4695693>

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## **Independent Board Reviewing LCS Minehunting System**

WASHINGTON — Reacting to renewed concerns from Congress and a highly critical memo from the Pentagon's top weapons tester, the US Navy has set up an independent review panel to look at the minehunting system in development for the littoral combat ship (LCS). The panel, according to the Navy, will concentrate on the system's reliability issues and explore possible alternatives.

The move is the latest in the long and troubled developmental history of the system, which the Navy has been working on for more than 13 years .

The Remote Minehunting System (RMS) is intended to give the LCS the ability to locate and identify mines without the ship needing to enter the minefield. Central to that capability is the Remote Multi-Mission Vehicle (RMMV), a diesel-powered submersible carrying an AQS-20 sonar that can operate independently of the ship to search and sweep the sea much more quickly than current systems.

Two key decisions are looming: The first, scheduled for this fall, is whether to enter or delay the system's initial operational test and evaluation phase, and a decision scheduled for February is due on whether to award, delay or cancel the low rate initial production (LRIP 2) contract for the RMMV.

Over the summer, the Navy conducted an extensive technical evaluation of the RMS system in the Gulf of Mexico and, while the system has shown it can find and identify mines, reliability remains an issue, particularly with the RMMV. The tech eval ended on Aug. 30, and the Navy has said further testing will be required in fiscal 2016.

The system's reliability problems were listed in detail in an Aug. 3 memo from Michael Gilmore, director, Operational Test and Evaluation (DOT&E), to DoD acquisition chief Frank Kendall. Gilmore, in his memo, claimed Navy reliability scores for the program were overly optimistic, and recommended they not be



reported to Congress until “clear, unambiguous and meaningful reliability goals and tracking metrics” are established.

Kendall, responding on Oct. 8, agreed with the committee’s recommendations and pledged that the program would not move forward until the completion of an operational test readiness review in October and the independent panel’s report in November.

“The proposal that came in,” Guarini said, “shows improved reliability, produceability and maintainability. ... The proposal is a significant improvement going forward.”

Guarini and Moton also pointed to needed improvements in training, documentation and operating procedures

“We have confidence we are addressing the reliability issues as they come up, are fixing them, and that they will lead to addressing that overall reliability,” he added.

<http://www.defensenews.com/story/defense/naval/ships/2015/10/18/lcs-littoral-combat-ship-minehuntine-minesweeping-mine-warfare-remot/74076530/>

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## **Navy Nuclear Power Chief Says Unmanned Systems Are Future of Submarine Warfare**

Unmanned systems will revolutionize undersea warfare much in the manner that nuclear propulsion did, the Navy’s new nuclear reactors chief said Oct. 21.

“I think we have an imperative, now, to transform undersea warfare by exploiting the use of unmanned vehicles, autonomous assets and the supporting systems,” Adm. Frank Caldwell, director of the Naval Nuclear Propulsion Program, said at the Naval Submarine Leagues’ annual symposium outside Washington, D.C. “It’s the right path and I think it’s a path that is compelled out of necessity.”

Potential challenges from adversaries in undersea warfare, the hiatus in submarine building taken in the 1990s and an anticipated dip in force structure in the 2020s have all created the requirement for submarines with longer strike ranges and varied mission capabilities, Caldwell said. The possibility of deploying subs to monitor or protect subsurface infrastructure, which is an emerging mission, would require subs to launch and recover submersible unmanned vehicles, he said.

Caldwell said the subsurface Navy’s adoption of unmanned systems is a “fork in the road” where the service must make the decision to pursue game-changing technologies, as it did when it developed nuclear propulsion and launched ballistic missile subs.

One of those programs, which was recently transferred from the Office of Naval Research to the Navy’s Unmanned Warfare Division, is the large diameter unmanned undersea vehicle (LDUUV). It is basically a huge unmanned sub that will be either tethered or untethered – it has not been settled – to a mother submarine. Increment one will be used for several missions including subsurface reconnaissance and

surveillance while future increments could roll in above-surface reconnaissance and the ability to deploy its own payloads, said Rear Adm. Robert Girrier, director of the Navy's N99 Unmanned Warfare Division.

The Navy's only other unmanned systems programs Girrier oversees are the surface Navy's unmanned carrier-launched airborne surveillance and strike (UCLASS), development of a common control system that will be used to operate any unmanned system regardless of where or how it operates and an effort to establish a standard baseline software for autonomous capabilities.

The MQ-4C Triton high-altitude, long-endurance surveillance unmanned aircraft – the Navy's version of the Air Force's Global Hawk spy drone – falls under the auspices of Naval Air Systems Command.

<http://www.defensedaily.com/navy-nuclear-power-chief-says-unmanned-systems-are-future-of-submarine-warfare/>

<http://www.navytimes.com/story/military/2015/10/21/navy-unmanned-systems-naval-reactors-frank-caldwell/74341710/>

<http://www.seapowermagazine.org/stories/20151022-unmanned.html>

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### **Naval Air: Reapers Go To Sea - UAS**

The American firm that makes the 1.1 ton Predator and 4.7 ton Reaper UAVs is developing a maritime patrol kit for the Reaper. It takes about 12 hours to install the maritime patrol kit which includes maritime search radar, sonobuoys and the ability to transmit data collected by the sonobuoy sonar back to land or airborne analysts for further processing. Also carried are Hellfire missiles that can be used against surfaced submarines or small warships. The maritime reaper would be able to fly to a spot more than 3,000 kilometers off shore, patrol the area for up to ten hours and then return. This new maritime patrol kit was developed in an effort to get a contract with the British Royal Navy to provide maritime patrol UAVs the British are seeking. The Reaper already has some experience with maritime reconnaissance. In 2009 several MQ-9s were sent to the Seychelles (a group of 115 islands 1,500 kilometers from the east African coast) to aid in the anti-piracy patrol. This apparently was successful enough to encourage further work in this area. At the same time Israel was using a Predator size UAVs (the Heron) equipped with a synthetic aperture radar and on-board software to provide automatic detection, classification and tracking of what is down there on the waters off the Israeli coast. Human operators ashore, or on a ship or in an aircraft, are alerted if they want to double check something the software was programmed to consider suspicious. Operators used video cameras on the Heron to determine exactly what was down there. Also carried are sensors that track the sea state (how choppy it is). Israel still uses this version and has sold some to India. Meanwhile the U.S. Navy has five of the 13 ton RQ-4B Triton UAVs in service since 2012. These are modified RQ-4B (Global Hawk) UAVs that began operational testing in 2010. The Triton was assigned to operating with a carrier task force at sea. Circling above the task force at 22,500 meters (70,000 feet), Triton monitored sea traffic off the Iranian coast and the Straits of Hormuz. Anything suspicious was checked out by carrier or land based aircraft, or

nearby warships. The Triton aircraft can fly a 24 hour sortie every three days. The first production Triton was delivered in late 2012. In 2009, the first year of Triton testing consisted of 60 flights and over 1,000 hours in the air.

The Navy is buying the Tritons for over \$60 million each. This version is larger (wingspan is 5 meters/15 feet larger, at 42.2 meters/131 feet, and it's nine percent longer at 15.5 meters/48 feet) than the A model and can carry more equipment. To support that, there's a new generator that produces 150 percent more electrical power. The RQ-4 has a range of over 22,000 kilometers and a cruising speed of 650 kilometers an hour.

The first three RQ-4Bs entered service in 2006. At 13 tons the Global Hawk is the size of a commuter airliner (like the Embraer ERJ 145) but costs nearly twice as much. Global Hawk can be equipped with much more powerful and expensive sensors, which more than double the cost of the aircraft. These "spy satellite quality" sensors (especially AESA radar) are usually worth the expense because they enable the UAV, flying at over 20,000 meters (62,000 feet), to get a sharp picture of all the territory it can see from that altitude. The B version is a lot more reliable. Early A models tended to fail and crash at the rate of once every thousand flight hours.

<http://www.strategypage.com/htmw/htnavai/20151025.aspx>

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### **Navy Funds Rutgers to Develop Drone Equally Adept at Flying and Swimming**

The Office of Naval Research has awarded Rutgers University a grant to develop a drone – equally adept at flying through the air and navigating underwater – that could speed search-and-rescue operations, monitor the spread of oil spills and even help the Navy rapidly defuse threats from underwater mines.

Javier Diez, a professor in the Department of Mechanical and Aerospace Engineering, had been dabbling with the concept for years with the help of his graduate and undergraduate students. But when he demonstrated it to Navy research officials earlier this year, they almost immediately funded his work on new versions of the air-and-water craft.

Diez predicts many potential applications. For search and rescue, for instance, the vehicle could scan the water from above to locate missing swimmers and sailors, and upon spotting shipwreck debris could dip underwater to further examine the scene. At an oil spill site, it could map the spread of a spill and see how deep the plume reaches.

An air-and-water drone could also help engineers inspect underwater structures, such as bridge and dock piers, ship hulls and oil drilling platforms.

But what specifically makes the concept attractive to the funding agency – the R&D arm of the United States Navy – which awarded the \$618,000 grant?

And in naval warfare, a fleet of drones could be stationed out of sight in an underwater base or on a submarine. The drones could emerge quickly from the depths, get a quick glimpse of enemy ship deployments, and then hide again.

“By next summer, we plan to demonstrate a vehicle that can swim in a seawater environment and do complex maneuvers,” he said. “At that point, we’ll start to outfit it with whatever sensors the Navy wants to have, such as cameras and sonar detectors.”

<http://news.rutgers.edu/research-news/navy-funds-rutgers-develop-drone-equally-adept-flying-and-swimming/20151022#.VizWBivzdnI>

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### **Expert: Navy might need two unmanned carrier jets**

The Navy is still deciding what it needs from its first operational unmanned carrier jet — surveillance or strike weapons, or a mix of each.

The name of the program suggests a hybrid strike-surveillance aircraft, but one expert says they'd be better served with two carrier-launched airframes.

The Unmanned Carrier-Launched Aerial Strike and Surveillance program proposes one jet to do both jobs, but ongoing argument between the Navy and Congress has delayed its request for proposals: Some lawmakers want Naval Air Systems Command to focus on strike capabilities, but the Navy wants to maintain an emphasis on a long-range surveillance platform.

NAVAIR has written three requests for proposal, but they haven't been released, retired Vice Adm. Dave Dunaway, the former NAVAIR boss, said in early September.

"The number one thing passed down to me when I came into the job [in 2012]: This RFP for UCLASS, we've got to get it out," he said, weeks before ending his tour and retiring with no approved request for proposals. "There's a political battle going on with what kind of capability we need coming off the carrier."

But with a potential long-range strike and surveillance aircraft about a decade off, the Navy is looking at platforms it already has — like the MQ-4C Triton, an unmanned P-8 Poseidon complement, and the MQ-8B Fire Scout, a helicopter mostly used on littoral combat ships — and how they might work with a strike group, Schwegman said.

<http://www.navytimes.com/story/military/2015/10/15/expert-navy-might-need-two-unmanned-carrier-jets/73881788/>

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### **Former Marine General Will Run US Navy's UAV Efforts**

Frank Kelley, a retired Marine Corps brigadier general, will lead U.S. Navy efforts to develop and deploy unmanned systems, Navy officials said Tuesday.

Kelley, whose military career included a stint running unmanned programs at Marine Corps Systems Command, will become deputy assistant Navy secretary for unmanned systems, a new post announced four months ago by Navy Secretary Ray Mabus. He will work closely with Rear Adm. Robert Girrier, who runs the service's new directorate for rapid development, prototyping and demonstration of unmanned warfare systems.

"This technology is being developed swiftly in the commercial world around us, both for good and of course, with more nefarious intentions, by our adversaries. We absolutely cannot afford to lose in this realm," the secretary will say.

<http://www.defenseone.com/management/2015/10/former-marine-general-will-run-us-navys-uav-programs/123159/>

[http://news.usni.org/2015/10/27/retired-brig-gen-frank-kelley-named-first-ever-deputy-assistant-secretary-of-the-navy-for-unmanned-systems?utm\\_source=USNI+News&utm\\_campaign=f78653db89-USNI\\_NEWS\\_DAILY&utm\\_medium=email&utm\\_term=0\\_0dd4a1450b-f78653db89-230475369&mc\\_cid=f78653db89&mc\\_eid=d9c10b9b63](http://news.usni.org/2015/10/27/retired-brig-gen-frank-kelley-named-first-ever-deputy-assistant-secretary-of-the-navy-for-unmanned-systems?utm_source=USNI+News&utm_campaign=f78653db89-USNI_NEWS_DAILY&utm_medium=email&utm_term=0_0dd4a1450b-f78653db89-230475369&mc_cid=f78653db89&mc_eid=d9c10b9b63)

ARLINGTON, VA. - Retired Marine Corps Brig. Gen. Frank Kelley, who commanded Marine Corps Systems Command from 2010 to 2014, will serve as the first-ever deputy assistant secretary of the Navy for unmanned systems.

Navy Secretary Ray Mabus announced Kelley's selection today at Association for Unmanned Vehicle Systems International's (AUVSI) annual Unmanned Systems Defense event.

In June, Mabus announced that Rear Adm. Robert Girrier <http://news.usni.org/2015/06/26/navy-names-first-director-of-unmanned-weapon-systems> a surface warfare officer who had been serving as deputy commander of U.S. Pacific Fleet, would become the first-ever director of unmanned weapon systems (OPNAV N99). Girrier and Kelley will now work hand-in-hand to develop and field unmanned systems for future naval operations across all domains and warfare areas. Girrier "will be responsible for the rapid development, prototyping and demonstration of our Navy's unmanned warfare systems," Mabus said, while Kelley will "create and implement a strategy for development of this technology that links all domains."

"Policies and procedures designed to ensure safety of manned systems must not be allowed to impede the design, development, deployment, testing and evaluation of unmanned systems. We must continue to be leaders in this emerging capability."

"My goal in creating the DASN for Unmanned Systems was to streamline our current programs and drive a strategy for development that is deliberate and thoughtful," Mabus continued.

"Currently, our various communities - air, sea, undersea and ground - are all doing incredible work on their unmanned systems and integrating them into the existing architecture within their own framework, but as this technology becomes more complex and widespread, ensuring we have a cohesive management function is critical to maintaining our superiority across all domains, and possibly even multiple domains."

Now the new DASN and the N99 will be responsible for developing requirements and policy for the Navy's emerging unmanned weapon systems and take over development of some of the new systems like the Unmanned Carrier Launched Surveillance and Strike (UCLASS) unmanned aerial vehicle (UAV) and the Large Diameter Unmanned Underwater Vehicle (LDUUV) for use in the Navy's fleet of nuclear submarine.

<http://www.c4isrnet.com/story/military-tech/uas/2015/10/28/navy-names-latest-new-leader-in-unmanned-systems/74761112/>

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## **Navy Plans to Deploy a Submarine Drone Squadron By 2020**

The highly autonomous underwater vehicles could be sent to scout ahead of attack submarines, or to guard valuable undersea targets.

The U.S. Navy plans to deploy a squadron of underwater drones within the next four years, including the Large Displacement Unmanned Underwater Vehicle, or LDUUV, a 10-foot, highly autonomous, and very, very yellow subdrone, Navy Secretary Ray Mabus said today.

It's not yet clear just what missions will be performed by the LDUUV, which resembles a giant robot canary fish crossed with a sausage. Some Navy watchers expect it to boost attack submarines' intelligence, surveillance and reconnaissance capabilities, but officials with the Office of Naval Research pushed back against such speculation. "Right now, it's just an empty platform with some innovative power production things that will help increase its endurance," one official said.

Mabus made the announcement at Tuesday's AUUSI Unmanned Systems Defense 2015 conference, the day after the New York Times reported on Pentagon concerns about Russian submarine movements near critical undersea data cables.

Rear Adm. Mat Winter, the chief of U.S. Naval Research, unveiled the giant yellow submersible in April at the Navy League's Sea, Air, Space expo. At the time, Winter underscored the Navy's need for an unmanned, underwater vehicle will be able to deploy for weeks, months, and years.

"I am continuously amazed with the underwater breakthrough technologies in power, power generation, and navigation and sense and avoid," Winter said. "When people say, 'I can't see that happening. There's no way that can be,' I say, 'Excellent! Put that on ONR's list.'"

Mabus said the LDUUV would help the Navy develop “increased subsurface endurance and autonomy” — read that to mean subdrones that can operate with minimal human intervention close to vital areas and targets. The LDUUV currently has an undersea endurance of 30 days but the eventual goal is to stretch that to years. (Original builder specifications can be found here.)

Next spring, the LDUUV is scheduled to demonstrate its open-ocean navigation abilities by sailing from San Francisco to San Diego.

<http://www.defenseone.com/technology/2015/10/navy-plans-deploy-submarine-drone-squadron-2020/123179/>

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## **ARMY:**

### **Army’s Drone Wish list**

While Air Force drones have been pounding targets for more than a decade, the Army has used its unmanned aircraft almost exclusively to gather intelligence. That’s going to change.

“There’s not a doubt in my mind that in the future, unmanned systems will have other roles than ISR” — or intelligence, surveillance and reconnaissance, said Col. Thomas von Eschenbach at the Association of the United States Army, or AUSA, conference today. “The question is...what’s the path to do that.”

Much work now done by soldiers will eventually be done by robots. “What you have is a lot of different mission sets that want to have an unmanned system do what something that used to be manned,” said von Eschenbach, who is the capabilities director of the integration center at Army Training and Doctrine Command. “My favorite one is electronic warfare. That’s really a resident aviation mission. We currently do not have platforms that do jamming. We think it’s a good idea.”

Von Eschenbach and his colleague, Col. Courtney Cote, have a long wish list: assured position navigation and timing, (beyond GPS); better downlink and uplink encryption; and improvements in size, space, weight, and power, particularly for computer assets.

Another big wish is a common cockpit that allows every soldier, including allied pilots, to train and fly any Army UAV using familiar and universal controls — perhaps even a tablet. The Office of Naval Research, in fact, has had an app steering research program for drones for years. But what sounds simple rarely is. On-the-move control of drones isn’t easy, even if it is soon going to be a very important for expeditionary units.

If the Army doesn’t innovate the use tactical drones in the hands of soldiers, some other army will.

<http://www.defenseone.com/technology/2015/10/armys-drone-wishlist-includes-jamminggear-and-more-weapons/122769/>

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## **Multipurpose Robot Fights Enemies, Transports Loads**

WASHINGTON — The HDT Micro-Utility Vehicle Robot is a remote-controlled, multipurpose tool designed for dismounted troops to clear terrain in nearly any ground environment, and it can do more than that.

Parked a few hundred meters away from troops, its sensors can detect enemy activity, and mounted with a 50-caliber weapon, it can fend off aggressors at a distance from the soldier operating it, said Francis LeGasse, vice president of business development - west for HDT Global.

It is designed for versatility: An NCO on the ground can decide how he wants to use it, or a commander can count on it to carry 500 pounds of gear on the vehicle and another 500 pounds on its trailer. The robot has a backhoe/loader attachment and can configure based on the unit's needs. Shorter than an average man, the robot can be broken down into man-portable components and quickly reassembled.

The robot is undergoing testing at the Network Integration Evaluation near Fort Bliss, Texas, to get feedback from soldiers on how it can fit their units' needs, said LeGasse, a former Army officer. Soon it will undergo jungle testing in Hawaii for further assessment by the Army.

<http://www.defensenews.com/story/defense/show-daily/ausa/2015/10/13/multipurposerobot-fights-enemies-transport-loads/73890354/>

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## **PackBot with Multiple Sensors To Detect Chem, Bio Threats**

The next generation of route-clearing robots will give soldiers something of a Swiss army knife of sensors, which will feed directly into the tablet used to control the device.

Manufacturer iRobot has managed to integrate tools to detect dangerous chemical, biological and explosive hazards into its base model, the 60-pound 510 PackBot. According to Tim Trainer, vice president of the robotic products, defense and security business unit at iRobot, that reduces the time needed to assess a potentially dangerous situation, such as setting up a command post and suiting up a soldier in protective gear to examine a possible threat with hand-held sensors.

"Those are all very time consuming things," Trainer said. "What you can do now is show up with the robot, immediately send the robot downrange while you set up a command post, and get real-time intelligence of what the threat is."

Another innovation: the display system. Instead of the ruggedized laptop with a PlayStation-esque remote control, sensors all feed into a ruggedized tablet with a single touch-screen display.

"I think we're the first and only that have integrated that fully into our display system," Trainer said. Production for the latest model of 510 PackBot is slated for this quarter, and soldiers can first expect to see the upgrades fielded in early 2016. Currently, the Army has fielded about 4,500 510 PackBots, along with about 1,000 of the smaller (about 30-pound) 310 PackBot and more than 500 of a toy-car sized 110



PackBot.

The company also has an eye to win a contract to replace the Army's bigger robot with its 500-pound 710 model. With a lifting capacity of 220 pounds and a top speed of 8 miles per hour, the robot is being evaluated for smoke operations along with the current model's requirements. The model is being used to help clean up the Fukushima Dai-ichi nuclear power plant, where a tsunami caused a massive leak of radioactive materials in 2011.

<http://www.defensenews.com/story/defense/show-daily/ausa/2015/10/13/packbot-multiplesensors-detect-chem-bio-threats/73831418/>

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### **US Army wants more Gray Eagle weapon options**

The US Army is interested in new weapons options besides the Lockheed Martin AGM-114 Hellfire missile for its General Atomics Aeronautical Systems MQ-1C, and the service has asked industry to offer smaller, cheaper and more specialized alternatives as it considers a future requirement.

The Gray Eagle currently carries four 48kg (106lb) rail-launched Hellfire's, meaning that force commanders are limited to one expensive munition option for destroying targets of different size, location and value.

According to army officials, arming the MQ-1C with new types of munitions is more of a priority than adding weapons to the Textron RQ-7 Shadow unmanned air vehicle (UAV), as has been proposed with the 6kg (13lb) Textron Fury precision-guided munition and others.

The army is standing up Gray Eagle companies at a rate of two a year, with nine of an eventual 15 companies already established. According to army unmanned air system (UAS) project manager Col Courtney Cote, the service is also transitioning to General Atomics' extended-range or 'improved' Gray Eagle system, which the manufacturer says has a maximum endurance of 48h, compared with 25h for the baseline version.

General Atomics said the new configuration increases the aircraft's maximum gross take-off weight from 1,630kg (3,600lb) to 1,905kg (4,200lb), and that it also can accommodate an external fuel pod.

<https://www.flightglobal.com/news/articles/usa-wants-more-bomb-and-missile-options-thanhellfir-417713/>

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### **AUSA 2015: US Army to evolve MUM -T**

The speed at which the US Army has had to integrate the Shadow UAS into combat aviation brigades

following the aviation restructure initiative (ARI) is forcing the service to refine the organization, training and doctrine of manned-unmanned teaming (MUM-T).

The ARI calls for the Shadow to be teamed with Apache attack helicopters in order to mitigate the loss of its armed scout capability with the divestment of the OH-58D Kiowa Warrior.

Speaking at AUSA 2015, Col Thomas von Eschenbach, the director of the US Army's capability development and integration directorate, said the focus today is on is how to extract capability from the Shadow and other UAS.

'We have learned that when you get something really fast,' said von Eschenbach, 'We probably haven't looked hard at what's the correct doctrinal employment of these systems, what's the right organization. 'We have a 27-man Shadow platoon that resided in the brigade combat team that we really just cut and paste into the aviation brigade to team with Apaches, is that the right number? Probably not.'

The former Kiowa Warrior pilot continued: 'I think we will learn over time as we optimize that solution with Apache for manned-unmanned teaming, maybe 27 men isn't the right mix.'

The US Army is currently upgrading the current Shadow platform to a RQ-7Bv2 variant to aid MUM-T with Apaches.

This means new encryption protection on video and control data links, software enhancements, a common ground control station allowing MQ-1 Gray Eagle interoperability, and an endurance increase from six hours to nine hours.

The 3.4m-long Shadow UAS could even be weaponized in the future and employ a variety of systems and sensors beyond the traditional EO/IR cameras. That might include electronic warfare capabilities, said von Eschenbach.

'That's not really a resident aviation mission, we've toyed with it in the past, but we currently don't have aviation platforms that do jamming,' he explained.

'We think it is a good idea that if you had a multi-function electronic warfare payload it would make sense to put it on an unmanned system.

'[But] what's the cost and do we have force structure, what's the doctrine, what's the organization, what's the training? We have to ask all of those questions first.'

Earlier this year the army stood up 3-6 CAV as the first Apache battalion to organically pair with the Shadow V2 platform. Speaking to reporters at AUSA, the program manager for the US Army's UAS Project Office said the unit had already deployed for overseas contingency operations.

'Now it's not the first time we have used manned-unmanned teaming, we've done that before' said Col Courtney Cote. 'But this is the first time a deliberate force structure [has] existed.'

<http://www.shephardmedia.com/news/uv-online/ausa-2015-us-army-evolve-mum-t/>

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## **US Army watches demonstration of Hero 30 loitering weapon**

UVision has conducted a demonstration of its Hero 30 expendable unmanned air system in southern Israel for the US Army's special operations command.

The smallest version of a family of such systems, the Hero 30 loitering UAS weighs 3kg (6.6lb), including an expendable munitions load carried in a canister which also serves as a pneumatic launcher. Equipped with an electro-optical/infrared sensor and with a maximum endurance of 30min, the weapon is powered in flight by an electric motor.

After launch, the Hero 30 deploys its 0.8m (2.6ft)-diameter wings before loitering above the battlefield at an altitude of 1,000-2,000ft. It will then lock on to a designated target, and transmit video footage to an operator equipped with a hand-held unit. The operator – who can be between 2.7nm (5km) and 22nm away from the aircraft, depending on the antenna used – can abort the mission if required.

The demand for small loitering munition systems has increased in recent years, prompting another Israeli manufacturer, Aeronautics Defense Systems, to develop the expendable Orbiter 1K. With an endurance of 2-3h, this is expected to become operational soon.

<https://www.flightglobal.com/news/articles/us-army-watches-demonstration-of-hero-30-loitering-w-417935/>

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## **Army eyes unmanned sensing in GPS-denied areas**

PICATINNY ARSENAL, N.J., 21 Oct. 2015. U.S. Army researchers are approaching industry for new ways to enable unmanned systems to sense and navigate in areas where Global Positioning System (GPS) satellite navigation is unavailable or jammed.

Officials of the Army Armament Research, Development and Engineering Center (ARDEC) at Picatinny Arsenal, N.J., issued a sources-sought notice Tuesday (W15QKN16X2843) for the Autonomous Unmanned Systems Teaming and Collaboration In GPS-Denied Environments (AUSTC) project.

This initiative focuses on identifying and maturing revolutionary and game-changing autonomous unmanned systems sensing and collaborating architectures and related components necessary for today's GPS-denied target-defeat system platforms.

Precision GPS-denied mapping, localization, target detection, tracking, and collaboration capabilities could open a unique pathway that allows for new methods of sensing existing and emerging threats, Army researchers say.

The job will involve design, development, prototyping, testing, and deployment of AUSTC technology for situational awareness, collaboration, and engagement for unmanned system autonomy, 3D and 4D mapping, localization, target identification, tracking, collective 3D visualization, advanced real-time analysis, GPS-denied environment radio communications networks, target engagement, and collaboration.

The technologies developed under the AUSTC project should be applicable to small unmanned aerial vehicles (SUAVs), unmanned underwater vehicles (UUVs), and unmanned ground vehicles (UGVs) -- particularly those that will be involved in attacking sensitive targets like nuclear, biological, and chemical weapons labs.

Companies interested should email relevant capabilities and information to ARDEC no later than 3 Nov. 2015 to the Army's Stephanie Milne at [stephanie.e.milne.civ@mail.mil](mailto:stephanie.e.milne.civ@mail.mil)

<https://www.fbo.gov/notices/ed9dba8c767bbd2fde5188923d09f14d>

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### **Runaway blimp goes down in Pennsylvania**

The Great Blimp Chase of 2015 ended Wednesday afternoon when an Army observation balloon went down in Moreland Township, Pennsylvania.

The balloon became untethered from Aberdeen Proving Ground, Maryland, about 12:20 p.m. on Wednesday, prompting two New Jersey Air National Guard F-16s to pursue it, according to North American Aerospace Defense Command.

Officially known as the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System, the balloon is meant to detect manned and unmanned aircraft, cruise missiles, swarming boats and tanks, the news release said. It is meant to stay afloat up to 10,000 feet above sea level.

In the end, it was not shot down, Miller told reporters on Wednesday. It is not immediately clear how the blimp deflated, but its tail piece fell off about a quarter mile from where it finally came to rest, he said.

It is also unclear how the cable that linked the blimp to the ground snapped, but officials do not believe the weather was a major factor in the balloon losing its mooring, Miller said. It dangled several thousand feet of cable as it drifted away, he said. No one on the ground was hurt when the balloon went down.

<http://www.c4isrnet.com/story/military-tech/isr/2015/10/28/runaway-blimp-goes-down-pennsylvania/74761092/>

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### **Army asks industry for new kinds of unmanned systems sensing in GPS-denied environments**

PICATINNY ARSENAL, N.J., 21 Oct. 2015. U.S. Army researchers are approaching industry for new ways to enable unmanned systems to sense and navigate in areas where Global Positioning System (GPS) satellite navigation is unavailable or jammed.

Autonomous Unmanned Systems Teaming and Collaboration In GPS-Denied Environments (AUSTC)

This initiative focuses on identifying and maturing revolutionary and game-changing autonomous unmanned systems sensing and collaborating architectures and related components necessary for today's GPS-denied target-defeat system platforms.

Army researchers want to determine the technical risks of integrating new and previously developed autonomous unmanned systems sensing technologies to enable unmanned systems to sense their environment and work together in areas without use of GPS signals.

Precision GPS-denied mapping, localization, target detection, tracking, and collaboration capabilities could open a unique pathway that allows for new methods of sensing existing and emerging threats, Army researchers say.

The job will involve design, development, prototyping, testing, and deployment of AUSTC technology for situational awareness, collaboration, and engagement for unmanned system autonomy, 3D and 4D mapping, localization, target identification, tracking, collective 3D visualization, advanced real-time analysis, GPS-denied environment radio communications networks, target engagement, and collaboration.

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For questions or concerns contact the Army's Stephanie Milne by email at [stephanie.e.milne.civ@mail.mil](mailto:stephanie.e.milne.civ@mail.mil), or by phone at 973-724-8782. Also contact the Army's Christie Vicci by email at [christie.r.vicci.civ@mail.mil](mailto:christie.r.vicci.civ@mail.mil), or by phone at 973-724-4179.

<https://www.fbo.gov/notices/ed9dba8c767bbd2fde5188923d09f14d>

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**USAF:**

**Air Force Research Lab Tries to Stay Ahead of Rivals -UAS**

**The Air Force sees a world that is catching up with it in terms of technology.**

The service “is facing conditions that diverge significantly from the strategic environment of the past two decades,” the Air Force Research Laboratory’s 2014 Strategic Plan stated. “Potential adversaries are using emergent globalized technology and manufacturing infrastructure to rapidly develop sophisticated military capabilities that create more contested operational environments.”

The AFRL has a list of what it calls five “game changers” that will help maintain the Air Force’s reputation of creating cutting edge technologies. They are: autonomy, hypersonics, unmanned systems, nanotechnology and directed energy.

Autonomy can take many forms.

Autonomy remains key here. One airman must be able to control the whole swarm.

Making drones more affordable through new manufacturing processes and inserting less expensive components is another goal, he said.

The A2/AD environment will challenge communications and threaten remotely piloted aircraft, he said. This has shaped the AFRL research priorities identified above. On-board mission autonomy will enable the unmanned aircraft to operate when communications are intermittent or lost, he added.

Hypersonics, defined as speeds of more than Mach 5, addresses that need.

Nanotechnology is defined as controlling material from the one to 100 nanometer range. It is a relatively new field for the military, which is on the cusp of entering a new phase, Bunning said in an interview.

Nanotechnology is also being used to reduce the need for high-end infrared sensors to be cooled, he said. This is carried out “by controlling the layer-by-layer composition of semi-conductor materials,” he said. If that can be achieved, there will be a “tremendous upside” to reducing or eliminating the need to cool sensors. They will have a sharply reduced footprint, a better signal-to-noise ratio and will result in huge logistics savings, he said.

Across the Air Force there is no singular nanotechnology program. “It’s sort of embedded in everything that we do,” Bunning said.

<http://www.nationaldefensemagazine.org/archive/2015/November/Pages/AirForceResearchLabTriestoStayAheadofRivals.aspx>

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### **I Was a Drone Warrior for 11 Years. I Regret Nothing.**

I’ll never forget the time I prevented a young Predator pilot from making an illegal shot. The incident stands in stark contrast with the expert conduct that I typically witnessed from professional aviators flying the U.S. Air Force’s remotely piloted aircraft (RPAs), commonly known as drones.

The Intercept's recently released "drone papers" paint a picture of unprofessional and bloodthirsty behavior by the crews manning the Predator and other drones. Certainly, war is chaos, and mistakes do happen. But in my 11 years flying the Predator, I was satisfied to see how few actually did. While the "drone papers" would have you believe otherwise, drone pilots are subject to the exact same rigorous checks and balances used for all military operations—and then some. (After all, is there a difference between bombs dropped off a drone or a fighter?) And when we make a gross error, we also risk going to jail.

I'm not saying that the U.S. drone operation doesn't have its problems. Its unmitigated success in providing crucial information on the battlefield has spiked demand for ground commanders and forced the Air Force to cut training time to the bare minimum. Graduating crews can fly combat missions within days of certification. Fighter pilots may fly for months or even years before their first combat mission.

But I am saying this: Drone operators are licensed pilots. We are not terminators rampaging across the countryside like war's a video game. We are not heartless; we are not brainless. And we do not like to make mistakes.

It wasn't necessary to tell me he was going to shoot. Only his supervisor needed to know, but some of the crews, in the stress of combat, felt compelled to tell everyone about it. I brought up their feed. A small house with a car in the front yard filled my screen. A couple of military-aged males, or MAMs as we were now calling unidentified personnel, were milling about the yard. They appeared to be deeply involved in a discussion.

The Predator pilot was lining up the shot. But from what I saw, he clearly had no business doing so. Worse, this crew was not trained for a moving target shot. There was no telling what would happen or who would be injured if the missile missed.

"First, there was no 9-Line passed. The important pieces of information used to pass a target were never issued by the JTAC or validated by you. Second, 'shoot, shoot, shoot, shoot now,' does not qualify as a shot clearance. The chat logs clearly show you engaging without a legal clearance. Third, the Collateral Damage Estimate was invalid once the vehicle moved. He was more than a mile away from the house before you rolled in. You had no way of knowing what lay between you and the target. The missile could have landed anywhere or hit anything. I don't think the JAG would take kindly to you putting a missile into an innocent's house."

The Judge Advocate General, the military lawyers, analyzed every shot to ensure that all the rules were met. The JAG would have charged the pilot had he shot and killed an innocent.

Drone pilots don't want to kill innocents, and our leaders don't want us to either. We are governed by rules of engagement that are more stringent than for manned aircraft. At times, strikes must be cleared by general officers or even politicians. These people do not hesitate to stop a strike if innocents are known to be present.

And remember: Al Qaeda and other extremist organizations adhere to no rules and laws. They are not signatories to the Geneva Conventions and do not feel bound by their strictures. Still, they manage to murder over 100,000 innocents each year with impunity in the name of their extremist views.

<http://www.politico.com/magazine/story/2015/10/drone-pilot-book-213263?o=0>

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### **Northrop Grumman refines radar software for Global Hawk surveillance UAS**

HANSCOM AIR FORCE BASE, Mass., 19 Oct. 2015. Surveillance radar experts at Northrop Grumman Corp. are refining system software in an advanced radar system aboard the Global Hawk Block 40 long-range unmanned aerial system (UAS) that tracks track slow-moving ground vehicles and low-flying cruise missiles.

The Air Force's MP-RTIP program is developing a modular, active electronically scanned array (AESA) radar system scalable for the Global Hawk UAS and the Air Force Joint Surveillance Target Attack Radar System (Joint STARS).

The block 40 Global Hawk is larger than the original Global Hawk models, with a longer fuselage, larger payload capacity, larger electrical output, and longer wingspan.

The MP-RTIP radar that Northrop Grumman and Raytheon are developing will be able to track slow-moving ground vehicles and low-flying cruise missiles. Compared with existing ground-surveillance radar systems, the MP-RTIP will have enhanced resolution and will be able to collect ground moving target indicator imagery and synthetic aperture radar still images simultaneously.

The Block 40 configuration of the RQ-4 Global Hawk first flew in late 2009. Northrop Grumman began integrating the MP-RTIP radar aboard the Global Hawk Block 40 in 2012.

<http://www.intelligent-aerospace.com/articles/2015/10/ia-uas-software.html>

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### **Enlisted Airmen Deserve to Become Officers Before They Become Pilots**

“The one sure method of determining whether any individual has qualities which make him a successful leader in combat is to observe that man in combat.”

The U.S. Air Force is presently debating the idea of enlisted pilots for Remotely Piloted Aircraft (RPAs, or what most of you call drones). The continuing demand for more RPA flyers, and our continuing inability to retain current RPA flyers, has precipitated a manning crisis, and this idea seems to provide a way out. I fundamentally disagree with this idea, not because I doubt the quality of our enlisted force, but rather because I wholeheartedly believe in it. I disagree with the idea because I believe in the principle of equal pay for equal work. We have many amazing enlisted airmen that will some day make great pilots. It would be an insult to these airmen to ask them to do the work of a lieutenant or a captain, with the



exact same responsibility and personal liability, while denying them the rank, authority, and benefits that come with that responsibility. We already have a highly successful and very popular road to make enlisted airmen into pilots: It's called Officer Training School (OTS). Instead of using enlisted pilots, there should be a broader OTS option for RPA sensor operators, with a streamlined selection process delegated to wing commanders. OTS has given our community many of our best flyers and our best leaders, and we desperately need more of both.

#### Why Not Enlisted Pilots?

Other services have long held prior-enlisted "mustangs" in high regard, and since about one-quarter of my squadron's officer corps is prior-enlisted, I understand why. Many of my best leaders once wore stripes, and I must insist at the top of my lungs that the service grant a commission to these highly qualified men on the road to wings. We need them back not only as flyers, but also as leaders.

Even in the short-term, this is a raw deal — we must ask how the Air Force will plan to hold a staff sergeant to the same standards, and the same personal and professional liability, as a captain who gets twice the pay and took a different oath. In total, an enlisted pilot proposal is a complete disrespect to our enlisted corps. It treats these highly qualified men and women as throwaway labor, and presents our service as a corporation where the bottom line trumps equity and opportunity. Our enlisted airmen are no fools: They realize that, at the end of the day, the enlisted pilot program offers them more work and more liability for the same pay.

#### Why Officer Pilots?

There were some good reasons that the Air Force tied the rank of officer to the position of pilot. For one, the nature of tactical flying demands a certain degree of independent decision-making, and hence tactical aviation inherently involves elements of command. The aircraft commander is ultimately responsible for anything that happens on the aircraft or with its crew, so we would be doing these airmen a disservice if we didn't give them broad authority to match that broad responsibility. A commission, by definition, grants these broad authorities. If we are going to hold someone legally responsible for kinetic engagements in a combat zone, then we must grant them command authorities over their crew, aircraft, and mission exactly as we do for manned aircraft.

#### Why, and How, Would This Work for RPA?

By granting RPA wing commanders a dispensation of OTS slots, we place the commissioning decision under proper oversight without subjecting it to the sloth of bureaucracy. We would set aside a percentage of our RPA pilot training pipeline for this OTS fast track, based on pilot manning needs and sensor manning availability. This would provide an incentive for first-tour retention in the sensor corps, ideally resulting in about one-third of RPA sensor operators commissioning as pilots, one-third remaining as sensors, and one-third departing the service. For the first year or two, the program would target sensors of all NCO ranks, but in steady-state, archetypal candidates would be new staff sergeant instructor sensor operators. This should be sustainable in the long run, and the prospect of a commissioning fast track would encourage sensor recruiting.

## Combat-Forged Leaders

RPA enlisted leaders, forged in years of combat, are ideally positioned to forge the future of our community as commissioned leaders. We only need to provide them the avenue to do so. That avenue already exists, and is proven every day by Justin and so many others. We do not need something new, we just need more of what works, both for airmen and for the mission.

<http://warontherocks.com/2015/10/stripes-to-stars-enlisted-airmen-deserve-to-become-officers-before-they-become-pilots/>

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## Lt. Gen. Otto Commits Air Force To More Open Mission Systems – UAS

The Air Force is expanding its Open Mission Systems standard because it is working so well, Lt. Gen. Robert Otto, deputy chief of staff for intelligence, surveillance and reconnaissance, said in a Monday interview with Breaking Defense.

Formally adopted April 30, 2014, after two years of collaboration with industry, the Open Mission Systems standard aims to foster competition on subcontracts by adopting the cell phone apps model. Just as Apple publishes standards for integrating technologies that allow other companies to develop applications that work with its iPhone, Open Mission Systems has prime aircraft contractors publish system architecture standards so other companies can make communications, radar and other mission technologies that work with the prime contractor's platform. Air Force, Navy join in RPV training

On another subject, Otto said he largely – but not entirely — agrees with CIA legend Charlie Allen, who told BD last month that manned reconnaissance aircraft are on their way out.

Beyond that, Otto noted, manned aircraft can't compete with drones for endurance. "We know that it's hard for a pilot to do a mission – a solo pilot – longer than about 13 hours," he said. "Our bomber crews have done some at about a day. But there comes a point at which the human becomes a limiting factor. So there are some mission sets that lean towards unmanned aircraft as the way to go."

At the same time, Otto said, "We also have found, like in Afghanistan and Iraq, that when the weather's kind of crummy, manned airplanes have a higher mission success rate because there's somebody there that can dodge the weather and understands the intent and can work their way to a successful mission accomplishment. So while I think the future looks bright for unmanned airplanes, and especially in unmanned reconnaissance, I do believe that there are some roles today that manned airplanes are a better fit."

<http://breakingdefense.com/2015/10/lt-gen-otto-commits-air-force-to-more-open-mission-systems/>

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## **USCG:**

### **Coast Guard Eyes Unmanned Systems as a ‘Force Multiplier’**

ARLINGTON, Va. — Because the Coast Guard is such a small service with so many mission areas, it is seeking to implement unmanned systems as a “force multiplier, to be where personnel cannot be,” a Coast Guard officer working on unmanned systems in coordination with the Navy, said Oct. 27.

Coordinating with the Navy also follows the Coast Guard’s directions to use off-the-shelf systems in order to speed new capabilities to the fleet, said CDR Jeff Vajda, who is a liaison from the Coast Guard Office of Aviation Forces to the Navy’s unmanned aerial systems (UAS) program office.

Because unmanned systems can provide greater persistence than manned platforms, Vajda said, it has “the ability to saturate a search area for many more hours than we could with manned aircraft, which minimizes the risk of losing contact that can come during a handover.”

Addressing the AUVERSI Unmanned Defense Systems forum, Vajda said the Coast Guard had tried to put a UAS on its new national security cutter, which was designed to support one. The service initially tried the Eagle Eye, a small fixed-wing UAS capable of ship-based operations, but had to cancel the contract, leaving it without a cutter-based UAS.

Although the Coast Guard would like a larger UAS, its development schedule provides an “off ramp” to adopt a small UAS, he said. His PowerPoint slide showed what looked like the Blackjack fixed-wing UAS the Marine Corps is fielding to replace the Eagle Eye.

The Coast Guard currently is using the land-based “Guardian,” a variation of the Predator, for missions in the Gulf of Mexico countering illegal immigration and drug trafficking. It is heavily committed to those missions so it is not available to apply to any of the service’s other mission areas.

A key mission the Coast Guard wants to apply UAS capabilities to is public safety, Vajda said. The service is getting experience in that field by partnering with the National Oceanic and Atmospheric Agency (NOAA) in the Arctic.

<http://www.seapowermagazine.org/stories/20151027-uas.html>

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## **NATIONAL AIR SPACE:**

### **FAA Authorizes Flight Test Research for UAS**

CINCINNATI, Oct. 14, 2015 -- The Federal Aviation Administration (FAA) granted a Certificate of Authorization (COA) to the Ohio/Indiana UAS Center and Test Complex, allowing Workhorse Group Inc. and the University of Cincinnati (UC) to continue their joint development of Workhorse Group's HorseFly™ UAS, which is designed to fly to and from a standard delivery vehicle. Testing of HorseFly will

take place at the Wilmington Air Park in Wilmington, OH.

Collaboration between the UC's College of Engineering and Applied Science and the Ohio/Indiana UAS Center led to sponsorship for the two-year FAA authorization from the Ohio State Department of Transportation in addition to priority access to Wilmington Air Park.

Steve Burns, CEO of Workhorse, said, "Obtaining this authorization from the FAA is a vital step forward in making our HorseFly drone a practical component of our package delivery system by testing the drone's unmanned flying capabilities. We believe the pairing of the HorseFly drone and the Workhorse electric vehicle may usher in a significant improvement in reducing emissions and improving the efficiency of the delivery process."

Workhorse has teamed with UC via the University of Cincinnati's Research Institute (UCRI) to develop all of the systems necessary to execute precision take-offs and landings on the top of a standard delivery truck in a variety of weather conditions and package weights.

<http://globenewswire.com/news-release/2015/10/14/775999/10152416/en/FAA-AuthorizesFlight-Test-Research-for-Workhorse-Group-HorseFly-TM-UAS.html>

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### **Drone flies alongside commercial aircraft**

For the first time, an unmanned plane was flown alongside commercial aircraft, which in a couple of years, could lead to pilot-less cargo flights, search-and-rescue operations and unmanned environmental monitoring from UK airports. The flight was part of a National Air Traffic Control Service (Nats) project to test drone technology.

The pilot-less plane, which was controlled from the ground and monitored from an air traffic control base in Hampshire, took off from West Wales airport near Aberporth, as part of Nats's first trial of flying a large drone in civil airspace. It involved a Thales Watchkeeper surveillance drone used by the British military in Afghanistan. The next trial run will be conducted next week. The pilot-less flight flew for three hours at a height of 15,000 feet. It has a wingspan of 10.5 meters and can reach a top speed of 108mph.

It is the first time in the world that a large drone <http://www.ibtimes.co.uk/rinspeed-etos-this-crazy-concept-car-has-its-own-drone-landing-pad-1523773> has been allowed in civil airspace. Earlier, large drones were allowed to fly only in highly segregated areas. Also, for a large drone to fly in civil airspace the approval of European aviation safety regulators is required.

"The successful flight is the result of months of systematic planning to ensure Watchkeeper was safely controlled by UK air traffic control agencies at all times. This is an exciting step on the path to safely integrating military and civilian unmanned air systems into civilian airspace," Air Commodore Peter Grinstead, head of unmanned air systems at the MOD, equipment and support organization, said.

The test flight is a joint project involving Nats, the Thales Group, the Ministry of Defense and the Civil Aviation Authority.

<http://www.ibtimes.co.uk/uk-first-time-drone-flies-alongside-commercial-aircraft-1524071>

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### **Air Line Pilots Association Calls on Congress to Bolster FAA's Oversight of UAS Operations**

Washington, DC - The Air Line Pilots Association, Int'l (ALPA) today called on Congress to direct the Federal Aviation Administration (FAA) to regulate unmanned aircraft systems (UAS) operated for recreation and hobby.

In his testimony [oral | written] before the U.S. House of Representatives Aviation subcommittee, ALPA president Capt. Tim Canoll outlined key components needed for the safe integration of UAS into the national airspace system.

“We must put safety first,” Capt. Canoll said. “The FAA is making some progress in ensuring a safe integration of UAS into the nation’s airspace system, but more is required. While work on a final rule regarding small commercial UAS operations is encouraging, the agency must immediately address all UAS operations.”

With the anticipated sales of one million UAS during this year’s holiday season, Capt. Canoll highlighted ALPA’s four-part plan to safely integrate UAS. “Given the safety risk highlighted by the FAA’s recent release of pilot reports on UAS encounters, it appears increased focus on UAS safety is necessary. By focusing efforts on education, registration, technology, penalties, and enforcement, we believe our country can take advantage of the economic opportunities offered by UAS while maintaining safety.”

ALPA’s four-part action plan includes enhanced education efforts by aviation stakeholders to ensure that those flying UAS for recreational purposes adhere to the FAA guidelines, including potential minimum age requirements, keeping the UAS within line of sight, and flying at heights under 400 feet. In addition, gathering contact information about the UAS purchaser at the point of sale will not only allow authorities to immediately identify the owner, but it will also drive home the serious nature of operating these UAS.

Anyone deliberately flying a UAS recklessly should be subject to criminal prosecution, and those who unintentionally deviate from rules and limitations should be subject to civil penalty.

“ALPA stands ready to help the FAA develop these regulations as part of realizing our shared goal of ensuring the safety of air transportation for all who depend on it,” concluded Canoll.

Founded in 1931, ALPA is the largest airline pilot union in the world and represents over 52,000 pilots at 31 U.S. and Canadian airlines. Visit the ALPA website at [www.alpa.org](http://www.alpa.org)

<http://www.workerscompensation.com/compnewsnetwork/news/22552-alpa-calls-on-congress-to-bolster-faa-s-oversight-of-uas-operations.html>

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### **Training Tip: Overhauling 'see and avoid'**

A student pilot has completed pre-takeoff checks and is preparing to taxi onto the runway for takeoff at a non-towered airport. There's no reported traffic, but that doesn't stop her from making a careful scan of the traffic pattern, especially the base and final legs.

That's the kind of experience that can make a believer out of any pilot that the need to keep your head on a swivel is much more than just one of those catchy aviation sayings.

Somewhere, a student pilot is reading this and thinking, "I fly from a towered airport. I always request flight following, and there is no busy seaplane base here, so much of this isn't for me."

Really?

What about unmanned aircraft? With the proliferation of drones flying in all classes of airspace—permissible or not, unfortunately—pilots flying everything from trainers to twins to aerial-application aircraft face a new collision-avoidance challenge as soon as they become airborne.

"A steep increase in reports of small unmanned aircraft in close proximity to runways is presenting a new challenge for the FAA," the agency said recently when announcing an expanded effort to develop technology to detect drones near airports.

Pilots have long known that midair collisions are prone to hot spots, including in nontowered airport traffic patterns and near VORs. Drones in numbers introduce the new variable of unpredictability because general aviation aircraft pilots can't rely on traditional safeguards such as right-of-way regulations, or the hemispherical rule, the direction-of-flight guidance that keeps flight orderly above 3,000 feet agl.

See and avoid becomes more essential and more demanding of a pilot's attention because of the reality that the unmanned aircraft you must spot may appear where you'd least expect it, and where it may not belong.

[http://www.aopa.org/News-and-Video/All-News/2015/October/13/Training-Tip?WT.mc\\_id=151016eftrng&WT.mc\\_sect=tips](http://www.aopa.org/News-and-Video/All-News/2015/October/13/Training-Tip?WT.mc_id=151016eftrng&WT.mc_sect=tips)

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### **Department of Transportation to announce drone registration requirement**

WASHINGTON -- The U.S. Department of Transportation plans to announce a registration requirement for drones and will form a task force to help implement the process, sources tell CBS News transportation correspondent Kris Van Cleave.

Transportation Secretary Anthony Foxx told CBS News in August that the DOT was reviewing whether the Federal Aviation Administration had the authority to require drones be registered.

Requiring people to register their drone at the point of sale would provide "at least some ability to track it back if we find that they are violating some FAA rule," Foxx said in August. "That's just one example of the type of thing that we are exploring."

Currently, drones are considered hobby aircraft and are exempt from registration because they are supposed to be operated below 400 feet. As CBS has reported, airspace rules are being widely violated. As first reported by CBS News, a record of at least 650 drone sightings have been reported by pilots so far this year. That's compared to 238 in all of 2014.

"The FAA needs the ability to set clear rules for when and where consumers can fly drones, require manufacturers to install basic technological safeguards and ensure consumers receive safety information," said Sen. Dianne Feinstein, D-California, who has introduced a bill to regulate drone use. The near tripling of aircraft-drone encounters number "should sound the alarm," she said.

In a statement to CBS News in August, Brian Wynne, president and CEO of the Association of Unmanned Vehicle Systems International, called for better enforcement of existing rules.

"Unmanned aircraft systems shouldn't fly close to airports, or manned aircraft or above 400 feet," he said. "These are common-sense guidelines, but many new UAS enthusiasts aren't taking the time to understand where they should and shouldn't fly. Any individual who misuses UAS technology, or uses it in a careless and reckless manner, should be held accountable. The FAA needs to enforce its existing rules if a UAS endangers manned aircraft or people on the ground. "

<http://www.cbsnews.com/news/department-of-transportation-to-announce-drone-registration-requirement/>

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### **Commentators Caution FAA on Breadth of Drone Registration Plans**

Following the FAA's announcement this week that it plans to develop a system for registering recreational drones, several commentaries suggest the agency needs to exercise discretion in selecting devices subject to the regulation. Jessica Van Sack, criticizing the plan in the Boston Herald (10/21),

[http://www.bostonherald.com/business/technology/2015/10/booting\\_up\\_hey\\_feds\\_leave\\_drones\\_alone](http://www.bostonherald.com/business/technology/2015/10/booting_up_hey_feds_leave_drones_alone)

says the regulators' oversight of consumer drones is "below their pay grade and beyond superfluous," and could "crush sales" of smaller models if they are included. "Enforce the laws we already have" instead, she says.

Alexander Howard writes in the Huffington Post (10/21)

[http://www.huffingtonpost.com/entry/drone-registry-problems\\_56268633e4b02f6a900e1d46](http://www.huffingtonpost.com/entry/drone-registry-problems_56268633e4b02f6a900e1d46) that "the

proposal is running into some skepticism” amid “unclear criteria for what constitutes a drone.” A “task force of government regulators and industry stakeholders” will make that determination, which could include thresholds for weight and use. Hobbyists and industry members the Post spoke with questioned “whether creating a drone registry is feasible or wise,” suggesting it could lead to higher costs for the emerging industry as well as privacy issues.

Similarly, the Washington Times (10/21)

<http://www.washingtontimes.com/news/2015/oct/20/editorial-sky-safety-in-the-age-of-drones/> editorial says “where to draw a line between small toys for backyard use and more airworthy machines is the key” to a successful registry. Warning against “a system in which retailers would be obliged to collect data on millions of drone purchasers for transmission to federal overseers,” the Times says regulators should instead “save their scrutiny for the few who stubbornly menace public safety.”

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### **Let common sense fly high when creating rules for UAVs**

From delivering an online retail purchase to bringing lifesaving pharmaceuticals to an elderly person’s front door in a rural community, the benefits of unmanned aerial vehicles (UAVs) are vast.

But, UAVs also bring very real and worthwhile questions. Where does public airspace begin and private property end? How do we protect personal privacy when a drone flies over my property? How do we ensure that public safety is protected?

As is often the case when new technologies emerge, the UAV debate has led to the creation of two factions – one side calling for strict constraints on use, the other calling for a lax system of rules. Both want a “reasonable” solution that protects consumer privacy without thwarting innovation. Some want one outcome more than others, but both sides truly want to find a workable compromise.

So, what can we do that would make common sense a little less rare?

Let’s develop best practices where a UAV operator cannot knowingly and intentionally use a UAV to videotape, film, photograph or record a person without their consent or where the person has reasonable expectation of privacy.

Let’s require that commercial UAV operators have an online privacy policy that describes the purpose for which data is collected, the type of data collected and point of contact for individual complaints.

Let’s ensure that the rights of media under the First Amendment remain protected.

Let’s not impute tough restriction on commercial operators of UAVs when traveling in public airspaces or punish them when they enter private airspace for safety or security reasons.

Let’s have UAV operators clearly identify their UAVs.



So, there you go – five rather simple policy requirements that can foster consumer trust while also enabling commercial UAV operators to utilize these innovative products for the betterment of society. If we agree on these five, UAVs may not be so uncommon anymore.

<http://thehill.com/opinion/op-ed/257521-let-common-sense-fly-high-when-creating-rules-for-uavs>

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### **MAPPS Selected for FAA Registration Task Force**

MAPPS, the only national association of private sector firms in the surveying, spatial data and geographic information systems field in the United States and a leader on the use of unmanned aircraft systems (UAS) in the geospatial field, today announced it has accepted an invitation from the Federal Aviation Administration (FAA) to be a member of the UAS Registration Task Force (RTF) Aviation Rulemaking Committee (ARC).

MAPPS has tapped John Perry, Founder and CEO of Altavian based in Gainesville, FL to represent the association on the task force.

On November 17-18, MAPPS will host sessions on geospatial activities at Drone World Expo, at the San Jose Convention Center in San Jose, California. The geospatial content will explore factors to consider when planning the start-up of a stand-alone UAS business, or a department in an existing surveying or mapping firm. It will kick off with a presentation on What You Need to Know Before Starting Up Your Unmanned Aircraft System (UAS) Department, as well as instruction on issues including system operating limitations, flight training, crew responsibilities, operator authority, client expectations, standards and licensing. Speakers at the Policy Conference will include Bryan Baker, UAS Sales Manager, Leica Geosystems; Jeff Lovin, Senior Vice President, Director of Geospatial Services, Woolpert; Andy Nickerson of AeroVel Corp.; Mike Tully, President, Aerial Services, Inc.; and David Yoel, CEO, American Aerospace, Inc.

<http://www.directionsmag.com/pressreleases/mapps-selected-for-faa-registration-task-force1/456342>

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### **BREAKING: DOT Accepting Public Comments on UAS Registration Requirements**

On Monday, October 19, the Department of Transportation (DOT) announced the creation of a task force charged with developing a registration process for unmanned aircraft systems (UAS), or drones, for both commercial and hobbyist use. Secretary Foxx directed the task force to deliver its recommendations by November 20, with the goal of having final registration rules in place by mid-December.

Now you have 15 days to comment. In a surprise move, DOT just published a document, Clarification of the Applicability of Aircraft Registration Requirements for UAS and Request for Information Regarding Electronic Registration for UAS, to the Federal Register. DOT is soliciting recommendations on all

aspects of the UAS registration process, including which UAS should be exempt from the registration requirement.

The clarification and request for information requests that comments be received within 15 days after publication in the Federal Register, which is November 6, although the comment period reportedly will remain open for the near future. Of course, given the Secretary's expedited timeline, comments submitted after November 6 will be less likely to influence the recommendations made by the UAS registration task force.

In addition to clarifying applicable statutory requirements regarding UAS registration, DOT is requesting "information and recommendations regarding what information and registration platform would be appropriate for UAS registration and ways to minimize the burden to the regulated community." DOT is also requesting comments on which UAS, in terms of weight or performance capabilities, should remain exempt from the registration requirements because of the negligible risk they pose to the national airspace system (NAS).

To facilitate the task force's work in developing UAS registration procedures, DOT is requesting information and data from the public in areas such as:

At what point should registration occur (e.g. point-of-sale or prior-to-operation)? How should transfers of ownership be addressed in registration?

Consistent with past practice of discretion, should certain UAS be excluded from registration based on performance capabilities or other characteristics that could be associated with safety risk, such as weight, speed, altitude operating limitations, duration of flight? If so, please submit information or data to help support the suggestions, and whether any other criteria should be considered.

How should a registration process be designed to minimize burdens and best protect innovation and encourage growth in the UAS industry?

Whether you are a UAS manufacturer, operator, or user, the comment period offers all industry stakeholders an opportunity to shape UAS regulation and policy. If you are interested in submitting comments, or if you have any questions regarding the process, please do not hesitate to contact us.

<http://ehoganlovells.com/cv/2828cc96c6dac8cf7121b49d886998e389917c11>

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## **FAA, NTSB to Announce Federal UAS Registry**

In news receiving widespread national coverage, several media sources are reporting that Secretary of Transportation Anthony Foxx and FAA Administrator Michael Huerta are expected to announce new regulations to regulate commercial UAS operations in the coming days which will require that all private users register their systems with the federal government, in order to assist in accident prevention efforts and alleviate public safety concerns.

The Wall Street Journal (10/18, B4, Nicas, Subscription Publication)

<http://www.wsj.com/articles/drones-face-new-regulatory-push-1445211771> reports that according to an obtained draft news release, the Department of Transportation (DOT) will on Monday announce its plans to require all commercial UAV operators, excluding those with minimal safety risk, to register their devices with the federal government. According to the Journal, the DOT reportedly intends to create a task force consisting of government and industry officials to develop specific policy recommendations with regards to the implementation of the new registry, including details related to the overall registration process and the criteria for inclusion in the registry. Bloomberg News (10/17, Levin) <http://www.bloomberg.com/news/articles/2015-10-17/drone-registry-said-to-be-sought-by-u-s-amid-safety-concerns> notes that, in the case of a UAS-related incident, “a registry may help the government track down the operator.”

NBC Nightly News (10/16, story 9, 0:25, Holt) reported that the new regulations “could be in place by Christmas.”

Fortune (10/16, Vanian) <http://fortune.com/2015/10/16/drones-register-department-of-transportation/> reported that the plan to announce the new registry “comes after a number of high-profile incidents involving drones including a man who flew one too close to a Los Angeles Police Department helicopter during an investigation and a drone that crash landed at the US Open tennis tournament in September.” While the UAS industry will be an important presence at the announcement next week, Fortune reported that the general sentiment in the UAS sector is for industry to lead and have a place at the table when it comes to the development of federal policy.

According to MarketWatch (10/17, French), <http://www.marketwatch.com/story/all-drones-to-require-federal-registration-2015-10-16> FAA official Rich Swayze said in September that the agency expects that about one million UAVs could be sold during the upcoming holiday season. MarketWatch also cites the opinions of several industry experts commenting on the implications of the new registry.

Reuters (10/17, Morgan) <http://www.reuters.com/article/2015/10/17/usa-drones-idUSL1N12H00Z20151017> adds that in addition to tracking all commercial UAS operators, the FAA and the HHS are collaborating to develop a new technology that is able to monitor rogue UAVs, which pose a threat to public safety and national security.

Numerous other sources also provide coverage on the story, including CBS News (10/17), NBC News (10/16, Costello), MSNBC (10/16), ABC News (10/17, Hosford, Liddy), CNN (10/17, Marsh, Brumfield) and the New York Post (10/17)

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### **AOPA to help guide UAS registration policy**

The Aircraft Owners and Pilots Association (AOPA) will help determine the specifics of a new registration policy for drones as part of the Federal Aviation Administration's (FAA) Unmanned Aircraft Systems (UAS) Registration Task Force Aviation Rulemaking Committee.

AOPA was invited to serve on the UAS task force following an Oct. 19 announcement by the Department of Transportation and the FAA that the agencies would create a stakeholder panel to provide input on how best to register unmanned aircraft, including those used recreationally.

The task force, which will consist of 25 to 30 members representing government and the manned and unmanned aircraft industries, will be charged with developing recommendations for a registration platform, how to collect registration data, what type of information to collect, when and to whom to provide access to that information, and the best ways to maintain that data.

The FAA has moved quickly to convene the task force, which has been given until Nov. 20 to present its recommendations. The FAA's goal is to have registration rules in place ahead of the holiday gift-giving season, when retailers expect to make record sales of drones.

<http://skiesmag.com/news/article/AOPAtohelpguideUASregistrationpolicy>

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### **Senators to question FAA chief after missed drone deadline**

Federal Aviation Administration (FAA) chief Michael Huerta will face questions from senators on Wednesday for the first time since his agency missed a September deadline for legalizing drones that was set by Congress in 2012.

Huerta is scheduled to testify before the Senate Appropriations Committee' Transportation, Housing, and Urban Development (THUD) Subcommittee during a hearing on Wednesday that is designed to allow lawmakers "to examine the steps being taken to integrate unmanned aircraft systems, or drones, into our National Airspace System," according to officials with the panel.

The hearing comes after missed a Sept. 30 deadline for legalizing drones that was set by Congress in an FAA funding bill that was passed in 2012. The agency has said it is still in the process of crafting regulations for increased use of the devices alongside commercial airplanes.

"The hearing will explore the need for additional safety measures as the Federal Aviation Administration proceeds with its plans to integrate this innovative technology into the national airspace," officials with the panel said in an announcement of the hearing.

Police and other law enforcement groups are also seeking approval to use the technology, and the FAA has investigated several drone incidents that occurred in conjunction with photography at college and professional sporting events.

The FAA has said recently that it has approved more than 1,700 drone flights under a section of federal law that allows the Transportation Department to waive requirements for FAA approval for unmanned aircraft operations that take place outside of restricted airspace and below 200 feet.

Drone advocates have complained that the exemptions the FAA is issuing for the devices are less effective than finalizing the rules for a widespread expansion.

<http://thehill.com/policy/transportation/258153-senate-committee-to-weigh-drone-expansion>

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## **FAA Announces UAS Registration Task Force Members**

Federal Aviation Administration (FAA) Administrator Michael Huerta today announced the membership of the Unmanned Aircraft Systems (UAS) Registration Task Force. Earl Lawrence, Director of the FAA's UAS Integration Office, and Dave Vos of Google X will co-chair the group.

Department of Transportation (DOT) Secretary Anthony Foxx and Administrator Huerta announced the formation of the Task Force last week. The Task Force membership represents a range of stakeholder viewpoints, interests and knowledge of the objectives and scope. Task Force membership was by invitation only and participation is voluntary.

Interested parties who are not members of the Task Force may submit comments to the public docket. The Federal Register notice is available for viewing [here](#).

Sec. Foxx set a deadline of Nov. 20 for the Task Force to complete its recommendations and work is already underway. The group will meet formally from Nov. 3-5 before developing recommendations on a streamlined registration process and minimum requirements on which unmanned aircraft should be registered. Given the urgency of this issue, the DOT and FAA will move expeditiously to consider the Task

Force's recommendations.

Task Force Members include:

Nancy Egan – 3D Robotics

Richard Hanson – Academy of Model Aeronautics

George Novak – Aerospace Industries Association

Chuck Hogeman and Randy Kenagy – Air Line Pilots Association

Jim Coon – Aircraft Owners and Pilots Association

Sean Cassidy – Amazon Prime Air

Ben Gielow – Amazon Retail

Justin Towles – American Association of Airport Executives

Brian Wynne – Association of Unmanned Vehicle Systems International

Parker Brugge – Best Buy

Douglas Johnson – Consumer Electronics Association

Brendan Schulman – DJI

Paul Feldman – General Aviation Manufacturers Association

Dave Vos – GoogleX (Co-Chair)

Tony Bates – GoPro

Matt Zuccaro – Helicopter Association International

Mike Fergus – International Association of Chiefs of Police

John Perry – Management Association for Private Photogrammetric Surveyors

Brandon Delet – Measure

Randall Burdett – National Association of State Aviation Officials

Sarah Wolf – National Business Aviation Association

Baptiste Tripard – Parrot

Tyler Collins – PrecisionHawk

Gregory McNeal – Small UAV Coalition

Thomas Head – Walmart

Along with the FAA and DOT, the following federal agencies will provide expert support to the Task Force: Department of Commerce, Department of Defense, Department of Homeland Security, Department of the Interior, Office of Management and Budget, National Aeronautics and Space Administration and the Department of State.

[http://www.aviationpros.com/press\\_release/12132377/huerta-announces-uas-registration-task-force-members](http://www.aviationpros.com/press_release/12132377/huerta-announces-uas-registration-task-force-members)

[http://www.aopa.org/News-and-Video/All-News/2015/October/26/AOPA-to-help-guide-drone-registration-policy?WT.mc\\_id=151030epilot&WT.mc\\_sect=adv](http://www.aopa.org/News-and-Video/All-News/2015/October/26/AOPA-to-help-guide-drone-registration-policy?WT.mc_id=151030epilot&WT.mc_sect=adv)

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## **PUBLIC SAFETY:**

### **Drone Startup CyPhy Works Gets Boost From Bessemer Venture Partners**

Drone startups are beginning to take flight, at least in the world of venture capital.

On Wednesday, Danvers, Mass.-based CyPhy Works said that it had raised \$22 million in a round of funding led by Bessemer Venture Partners. The announcement is the latest in a series of private investments in companies in China and the U.S. building unmanned aerial vehicles (UAVs) for the consumer market.

Led by iRobot I co-founder Helen Greiner, CyPhy (pronounced Sci-Fi) did not disclose its valuation following the round, which brought its total funding to more than \$30 million. Previously the company had raised \$7 million from Lux Capital in Nov. 2013 and concluded a Kickstarter crowdfunding campaign in June for its six-rotor LVL 1 drone, raising nearly \$900,000.

The company is “looking forward to working closely with our new strategic investors to accelerate adoption of drones into public safety, construction, agriculture, journalism, mining, defense, and other fields,” said Greiner in a statement, citing not just Bessemer but also UPS Strategic Enterprise Fund, a private investment arm of the shipping company, and Motorola Solutions Venture Capital.

“We have a strategic relationship with Motorola’s public safety division [which covers] most of the nation’s public security,” said Greiner at the TechCrunch Disrupt

<http://techcrunch.com/2015/09/21/drones-will-deliver-your-pizza-and-much-much-more/>

Conference in San Francisco last month.” We want to leverage that to get drones into police, fire fighters and others, across the world and not just the U.S.”

<http://www.forbes.com/sites/ryanmac/2015/10/13/drone-startup-cyphy-works-gets-22-million-boost-from-bessemer-venture-partners/>

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## **New Drone Task Force Formed**

The worry that drones could bring down an aircraft or be used in a terrorist attack is the focus of law enforcement and aviation experts in South Florida and a special task force is now being formed to deal with it.

South Florida is one of the top spots in the country when it comes to commercial flights, private light aircraft, and law enforcement is now trying to get in front of any potential trouble from drones.

The members of the task force that's being led by the Miami-Dade State Attorney are really trying to accomplish two tasks. The first is to develop rules on how police officers should respond when there is an emergency call made about one of these unmanned aircraft. The second is they want to educate the public about what these drones can do and can't do so there isn't a problem in the first place.

A video captured by a commercial helicopter pilot over the BB&T Center shows a drone flying underneath him. The helicopter pilot said the drone could have brought his aircraft down.

Villaverde, an aviation and law enforcement expert, sits on the new task force aimed at making MiamiDade safe when it comes to drones.

Last month a Jet Blue pilot making his approach to land in South Florida reported seeing an unmanned aircraft at 5,000 feet, extremely high for a drone.

The FAA said through August of this year there were 764 of what it calls encounters between drones and manned aircraft, 93 of them taking place here in Florida.

Also sitting on the task force that's headed by the Miami-Dade State Attorney are Miami Dade Police, the City of Miami Police, the F.B.I. and the F.A.A. The team is working on rules for police to follow. "It's the municipality that are going to be working in conjunction with the FAA but that's something that is still an ongoing process and hasn't been finalized yet even though there are existing criminal law that could be imposed on somebody that does violate the law," Villaverde said.

The FAA directives require non-commercial operators to fly unmanned aircraft below 55 Pounds, stay below 400 Feet, remain five miles from airports and keep the drone in sight and clear of manned aircraft.

The Federal Aviation Administration released data recently based on reports of hundreds of sightings and incidents pertaining drones in flight paths.

Click on each dot on this interactive map to see each of the unmanned aircraft system sighting reported to the federal agency. The FAA collected 765 drone incidents in the United States, including the Virgin Islands and Puerto Rico, from November 2014 to August 2015. A total of 93 drone sightings have been reported in Florida with 41 of those occurring in the South Florida area – Palm Beach, Broward and Miami-Dade counties.

<http://www.nbcmiami.com/news/local/New-Drone-Task-Force-Formed-in-Miami-Dade-332248122.html>

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## **22 companies received permits to fly drones – Excellent graph with source article**

Floating a couple of hundred feet in the air, Mike Hourihan's drone records images of the forests, fields, and suburban neighborhoods below.

The footage, streamed to a screen on the ground, helps search and rescue teams locate missing people. Drones are often associated with faraway dusty battlefields. But in Massachusetts and elsewhere, companies are taking advantage of the technology to obtain a different viewpoint, whether it be during rescue missions, scientific research, or even real estate sales.

As of the end of August, 22 Massachusetts-based companies and organizations had received a permit



from the Federal Aviation Administration to legally fly commercial unmanned aircraft, according to FAA data collected by the Center for the Study of the Drone at Bard College and The Verge.

Real estate drones: ready for takeoff

In all, the FAA has granted about 1,800 permits to companies to fly drones over America since September 2014, according to its website. Hobbyists are not required to obtain a permit. To get the permit, known as a Section 333 exemption, petitioners must confirm that the drone operator has a pilot license and agree to safety measures that are designed to reduce the risk of injury to people on the ground — and interference with other aircraft.

Companies apply for the permits because they “have a reputation at stake, so they go out of their way to make sure they are extremely safe,” said Stephen Keen, president of geoResource Technologies, a drone company based in Cambridge.

The permits give operators a competitive advantage over those who are flying drones illegally, said Jim Peters, spokesman for the FAA, in an e-mail.

One high-profile example was the FAA probe into three National Football League teams, including the New England Patriots, last summer for illegally flying drones to film practices. The NFL received a permit in September to film at stadiums (on non-game days) and practice facilities.

The number of companies receiving the permits has ballooned in recent months. In January, the FAA granted eight, according to the data. In August, it granted 389.

In response to the demand, the FAA streamlined the permit process, said Peters.

Section 333 exemptions across the US

Number of companies based in state granted an exemption through August 2015

DATA: FAA, Center for the Study of the Drone at Bard College, The Verge

The ability to use drones for photography and filming is a major reason companies and organizations seek the permits. In more than half of the FAA’s Section 333 records, petitioners indicated they intended to use drones for those purposes.

At the Woods Hole Oceanographic Institution, drones allow researchers a way to get up close to their research subjects, including whales.

The institution has a dozen ships for research, said Singh. Someday, he hopes, each ship will be equipped with a drone.

Not only are drones cheaper and safer than helicopters, said Singh, but they are “giving us a wonderful view of the ocean that we can’t get any other way.”

<http://www.bostonglobe.com/metro/2015/10/09/mass-companies-issued-permits-flydrones/M7kUDyaKahWByxWSIRcdPN/story.html>

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## **Feds consider drones for firefighting**

Federal officials are considering whether to use unmanned helicopters to fight massive wildfires in the west.

Top Interior Department and Forest Service leaders will travel next week to Idaho for an unmanned demonstration of the K-Max helicopter, built by Lockheed Martin Corp. and Kaman Aerospace Corp. Using drones for firefighting could improve the safety and effectiveness of battling wildfires by removing pilots from the vehicles and having them controlled remotely, the agencies said.

“The Interior Department and U.S. Forest Service are constantly examining new technologies to improve the safety and effectiveness of wildland firefighters on the ground,” the agencies said.

“Aircraft have provided important support to firefighters for more than 80 years, but the challenges of safely operating during periods of reduced visibility and at night can preclude manned aircraft from supporting wildfire operations.”

The demonstration comes at an important time, when wildfires are growing rapidly in size and damage, along with the risks and costs of fighting them.

Three Forest Service firefighters were killed in a wildfire in August in Washington state, adding to the dozens of federal firefighters who have died in recent decades.

<http://thehill.com/policy/energy-environment/256559-feds-consider-drones-for-firefighting>

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## **Google Registers Redesigned Delivery Drones**

Like many other companies Google is also working on delivery drones, the company’s Google X division was working on a concept called Project Wing for quite some time. It was a single-winged UAV which landed and took off vertically <http://www.ubergizmo.com/2014/08/project-wing-is-googles-attempt-ata-drone-delivery-service/>

It was extensively tested in Australia throughout the year but results haven’t pleased the company, so it has come up with two redesigned drones which have now been registered with the FAA for testing in the United States.

FAA documents discovered <<http://www.engadget.com/2015/10/13/google-x-project-wing-deliverydrone-faa-registration/>>

by Engadget show that Google has built two UAVs code-named M2 and B3

which have been registered in the country this month. Given that the UAVs have two separate model numbers instead of having the same model with varying serial numbers, it can be assumed that the company is working with two separate designs.

Unfortunately the FAA filings don’t reveal much about these new drones aside from the fact that the paperwork was filed through Google’s Boulder, Colorado address and not through its Mountain View, California headquarters.

The Guardian did report back in August that Google’s new drones might weigh up to 55 pounds and that

they might be able to achieve speeds of up to 100 miles per hour, though Google itself has confirmed nothing of the sort, and it remains to be seen when the company makes the formal announcement about its new drones.

<http://www.ubergizmo.com/2015/10/google-registers-redesigned-delivery-drones-for-testing-in-the-us/>

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### **NATE Forms Committee on Unmanned Aerial Systems**

WASHINGTON—The emergence of drones is capturing many people’s attention, both inside and outside of the industry, and that certainly includes the National Association of Tower Erectors, as the group has announced the establishment of an Unmanned Aerial System Committee.

The committee will be responsible for monitoring trends and the regulatory environment of UAS technologies and then make recommendations on best practices for NATE members and the wireless infrastructure community on UAS integration. The committee also intends to work with federal agencies and interested stakeholders on guidelines to promote safe commercial and private use of UAS technology.

The UAS Committee is already at work, participating in the National Telecommunications Information Administration stakeholder meetings on UAS that were held in Washington. The committee plans to continue its dialogue with the NTIA, the FAA, and other policymaker and regulators to keep pushing the wireless infrastructure industry’s priorities.

“There is no question that UAS technologies, if integrated appropriately, can play a supplemental role in enhancing safety and quality in the industry as well as contribute to the vital economic, public safety and national security benefits associated with broadband network deployments in the United States,” said Schlekeway.

NATE is a trade association that seeks to provide a unified voice for tower erection, service and maintenance companies.

<http://www.tvtechnology.com/news/0002/nate-forms-committee-on-unmanned-aerial-systems/277158>

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### **Cyberhawk Launches Commercial UAV Wind Turbine Inspection Service**

Drone and turbineCyberhawk Innovations, an aerial inspection and surveying company using UAVs, has marked its busiest ever year in the renewables sector with the launch of a commercial scale inspection solution for wind turbine blades.

This year, Cyberhawk's work in the renewables sector has increased tenfold as wind farm operators embrace the safety, speed and powerful asset management software that characterise the new blade inspection solution.

The benefits of using UAVs for data capture in the renewables sector are substantial. Safety is significantly improved by minimising the need to work at height, inspection speed is 3 to 4 times faster than rope access and results are delivered in both an industry-standard report format and through iHAWK.

iHAWK is not only compatible with turbine blades, but also nacelle and towers, as well as the transition piece for offshore structures.

Cyberhawk has honed its operational capabilities over a number of years in the oil and gas, rail and utilities sectors, combining UAV technology, highly trained pilots and experienced industry inspection engineers. In the renewables sector, Cyberhawk now boasts turbine blade inspection engineers and certified technicians (CT) amongst its staff, meaning that its personnel can take control of the turbine. This avoids the expensive requirement of third party CTs, which again improves value for the customer and ensures a more efficient service.

With a shorter overall setup and inspection time and quicker, more accurate results, UAVs have huge potential within the wind sector.

"iHAWK marks a ground-breaking step for the onshore and offshore wind sector and the next generation of asset management for this constantly evolving industry. With UAVs becoming increasingly adopted for commercial purposes, we expect the uptake of this new service to continue to grow rapidly."

[http://www.uasvision.com/2015/10/09/cyberhawk-launches-commercial-uav-wind-turbine-inspection-service/?utm\\_source=Newsletter&utm\\_campaign=a824f9dbc1-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-a824f9dbc1-297560805#sthash.CfPDztiu.dpuf](http://www.uasvision.com/2015/10/09/cyberhawk-launches-commercial-uav-wind-turbine-inspection-service/?utm_source=Newsletter&utm_campaign=a824f9dbc1-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-a824f9dbc1-297560805#sthash.CfPDztiu.dpuf)

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## **Keeping Manned and Unmanned Aircraft Safe**

Safe Fly InCrop dusters and drone operators have hesitated to share the same sky, but last week in the rural southeastern Colorado community of La Junta they did just that. There, participants in the annual Operation S.A.F.E. Fly-In of the Colorado Agricultural Aviation Association (CAAA) collaborated with UAS Colorado, to demonstrate how technology powered by AirMap can promote communication and coordination of flight operations in agricultural areas. The operation is a proof-of-concept that will be refined and rolled out across the country in the near future.

Over the next several years, increasingly automated systems will help drones navigate safe and efficient paths, taking into account other drones, manned aircraft traffic, winds, obstacles, and other elements.

But as the industry works to develop comprehensive solutions, there are simple, pragmatic tools that can be implemented immediately to help keep people safe.

UAS Colorado Interim CEO Constantin Diehl explained, “This app, powered by AirMap’s backend technology, organizes and provides accurate and dynamic airspace information. It allows pilots of manned and unmanned aircraft to know where and when operations take place, and provides a way to de-conflict by directly communicating with one another. We believe this simple and effective approach is key to safe UAS operations.”

“We believe information is what will power innovation, and we are making this airspace information available to operators, manufacturers and software developers,” says AirMap CEO Ben Marcus. AirMap’s airspace information is available through APIs and SDKs. This demonstration proves the utility of empowering people to share airspace information, including the location of drones and manned aircraft. “We believe the best way to promote safety is to make information available in useful ways, regardless of which platform someone is using.”

AirMap is focused on creating an open exchange of information to help accelerate the safe deployment of drone-enabled services. The AirMap Software Development Kit has been released for testing to a limited number of application developers and will be fully deployed by the end of November.

In addition to the demonstration, the Operation S.A.F.E. fly-in will feature crop duster spray pattern testing, safety briefings from the NTSB and Colorado State Patrol, and training sessions for first responders from around Colorado

[http://www.uasvision.com/2015/10/09/keeping-manned-and-unmanned-aircraft-safe/?utm\\_source=Newsletter&utm\\_campaign=a824f9dbc1-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-a824f9dbc1-297560805#sthash.bKEo0LqD.dpuf](http://www.uasvision.com/2015/10/09/keeping-manned-and-unmanned-aircraft-safe/?utm_source=Newsletter&utm_campaign=a824f9dbc1-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-a824f9dbc1-297560805#sthash.bKEo0LqD.dpuf)

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## **Northrop Grumman Breaks Ground on Grand Sky's Largest Expansion Project**

GRAND FORKS AIR FORCE BASE, N.D., Oct. 15, 2015 (GLOBE NEWSWIRE) -- Northrop Grumman Corporation (NYSE:NOC) kicked off construction of its new 36,000 square foot facility at Grand Sky Unmanned Aerial Systems (UAS) Business and Aviation Park. Northrop Grumman has leased 10 acres of land and committed over \$10 million to this initial project at Grand Sky.

As the Park's anchor tenant, this will establish a nucleus for Northrop Grumman's unmanned aircraft systems supporting research and development, aircrew and maintenance training, operations and mission analysis, and aircraft maintenance in the local region. The company is also exploring additional construction in the future.

In a morning ceremony, Governor Jack Dalrymple, Lt. Gov. Drew Wrigley, Senator John Hoeven and Senator Heidi Heitkamp joined together with Air Force personnel, Red River Valley advocates,

community leaders and several Northrop Grumman executives to break ground on the site just east of Grand Forks Air Force Base. During the event, Northrop Grumman reiterated its multimillion dollar commitment to the region.

Northrop Grumman's Grand Sky facility and planned expansion is tied to the growing unmanned systems business area and is the second major Northrop Grumman facility in North Dakota. The company has a manufacturing site in New Town, which has been in continuous operation for 45 years.

Northrop Grumman is a leading global security company providing innovative systems, products and solutions in unmanned systems, cyber, C4ISR, and logistics and modernization to government and commercial customers worldwide. Please visit [www.northropgrumman.com](http://www.northropgrumman.com) for more information.

[http://www.globenewswire.com/newsarchive/noc/press/pages/news\\_releases.html?d=10152666](http://www.globenewswire.com/newsarchive/noc/press/pages/news_releases.html?d=10152666)

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### **sUAS Detect-and-Avoid Tech On The Way**

Detect-and-avoid technology for small unmanned aircraft systems is advancing quickly. Check out the story this week on a Utah-based entity that is taking its radar know-how to sUAVs. The company hopes to have a detect-and-avoid system available for sUAVs available in 2016 after testing commences before the end of the year. The system relies on longer wavelengths in the electromagnetic spectrum to create black and white images which are then used for detect and avoid purposes. As opposed to a photo or video camera that captures optical imagery only when the lighting conditions allow the shorter wavelengths to penetrate through the spectrum and to the lenses, the synthetic aperture radar approach can still work in low-light, fog, rain or zero visibility situations because the system relies on longer wavelengths in a different portion of the spectrum.

To meet the need of operators trying to provide in-air position to other aircrafts, there are new breakthroughs coming in the automatic dependent surveillance-broadcast realm. We know, we've held the new incredibly small ADS-B systems in our hands. Earlier this year at a UAS event, a tech developer from the East Coast explained his work on a mini-ADS-B chip that is light enough and strong enough for small UAVs. The technology is roughly the size of a quarter and will be coming out next year.

Regulations are needed, and thankfully, whether the industry needs it or not, new tech is coming all the time. During a UAS symposium at a business school yesterday, I heard a very poignant statement that helps to reiterate this idea

<http://www.uasmagazine.com/blog/article/2015/10/suas-detect-and-avoid-tech-on-the-way>

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### **University sets up trailblazing flight test in Preston – UAS**

A pioneering project between two universities has led to the world's first successful aeronautic flight test - in Preston.

The city-based University of Central Lancashire is working on a research initiative, between the University of Central Lancashire's Engineering Innovation Center (EIC), and The University of Manchester's National Graphene Institute which has just seen the first flight of a UAV part-constructed with graphene.

"The aim is to investigate the potential effects of graphene in drag reduction, thermal management and ultimately the ability to achieve lightning strike protection for aerospace and other related opportunities.

"Working with a number of universities and SME's we aim to provide further demonstrations and enhance engagement between academia and the supply chain to achieve the goals of commercialising graphene applications."

<http://www.lep.co.uk/news/education/university-sets-up-trailblazing-flight-test-in-preston-1-7517075>

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### **Faculty Research Presentation Exposes Areas for Student Research - UAS Navigation Test-bed**

On Sept. 29 and 30, 17 Daytona Beach, Prescott, and Worldwide campus professors presented the results of research funded through the Faculty Internal Research Grants. Although the internal research grants have existed for several years, this was the first time that the professors were asked to present their research to the entirety of the Embry-Riddle Aeronautical University community.

Dr. Stephen Bruder followed Dr. Haass with his presentation on "UAS Navigation Test-bed," an attempt to develop a test-bed in MATLAB/Simulink to facilitate the transition of MEMS-focused navigation algorithms onto small UAS platforms. Identifying the need for improved navigation in small UAS platforms, Dr. Bruder was able to complete five distinct tasks furthering the navigation systems of small UASs.

The Prescott campus presentations were widely attended by students at all campuses, and students were able to attend the other campus' presentations. The presentations were intended to show students areas where they can assist professors with research. If you are interested in assisting any of the above professors with their research, please contact them.

<http://erau-news.com/news/2015/10/20/faculty-research-presentation-exposes-areas-for-student-research/>

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### **Monitoring the Oil Patch by UAS**

Oil Patch 2 At a South Texas ranch, a drone mounted with cameras flew above and around a flare stack that burned natural gas. Live, high-definition images were transmitted back to the ground, where company officials watched video of the flare stack as it was operating, asking that the drone move this way or that to get a better image or different angle.

It's a scene that played out recently, and it may become more common. Though drones are in their commercial infancy, their use in the oil field is on the increase.

Jerry Hendrix, executive director of the Lone Star Unmanned Aircraft Systems Center of Excellence & Innovation at Texas A&M University-Corpus Christi, said that Texas is a natural fit for drone use and research, and it's not just the oil industry looking at how to use drones. Hundreds of companies and industries are looking into drones for inspection and monitoring of things such as railroad tracks, bridges, wind turbines, utility lines or agricultural fields. Drones can monitor red tide on the coastline, or might be used by first responders after a natural disaster such as a hurricane.

"There's the potential for the use of UAS to spot oil spills and things of that nature," Hendrix said. "There's a lot of tremendous applications of UAS."

For now, drones are not allowed to operate beyond the line of sight, about 1 mile usually, Phillips said, and their use requires a pilot and a visual observer.

Hendrix said the Lone Star Unmanned Aircraft Systems Center is developing a credentialing program, which could be available early next year, as a way to reassure oil and gas companies that drone operators understand their safety concerns and the high value of the equipment in the field. They also need to understand aviation regulations, and be competent at flying the drones.

"What we're finding out in the oil and gas sector is they're extremely safety conscious. They need to protect their intellectual property," Hendrix said. "This would be an enabler for the industry to grow."

[http://www.uasvision.com/2015/10/14/monitoring-the-oil-patch-by-uas/?utm\\_source=Newsletter&utm\\_campaign=d50d2c9cb9-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-d50d2c9cb9-297560805#sthash.bAxdGow8.dpuf](http://www.uasvision.com/2015/10/14/monitoring-the-oil-patch-by-uas/?utm_source=Newsletter&utm_campaign=d50d2c9cb9-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-d50d2c9cb9-297560805#sthash.bAxdGow8.dpuf)

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## **Google's delivery drone takes to the skies**

Amazon isn't the only company working on drone delivery, Google's Project Wing aims to beat the retailer to the punch with a drone that will fly five miles in five minutes.

The drone has changed quite a lot since its initial unveiling, looking like a big fixed wing aircraft with propellers lining its edge. The design added flying speed, but was eventually deemed unfeasible for delivery operations. The latest test drone takes a more conventional quadcopter shape with added aerofoils.



Google and Amazon are in a race to push drone delivery out of the science fiction books and into reality, but they are by no means the only players in the race.

But rules and regulations governing the control and flight of drones have held back development. An increase in the number of affordable drones on the market has seen rapid adoption by the public with little to no guidance or regulation.

The maximum flight height is also only 122m (400 ft), and the drone must remain within line of sight and less than 500m from the pilot. Commercial drone pilots must complete a training course and apply for a permit from the Civil Aviation Authority. The restrictions, which the CAA says are made on safety grounds, effectively prevent deliveries by drone even if they were to become technically trivial to perform.

<http://www.theguardian.com/technology/2015/oct/20/google-delivery-drone-project-wing>

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### **NASA plans next phase of UAV ATM integration**

NASA plans to carry out beyond line-of-sight testing of an air traffic management component for unmanned air vehicles (UAVs) in 2016, following on from a series of low-risk testing that took place last August.

Through development of its UAV traffic management (UTM) system, NASA is looking to help enable low-scale, low-altitude UAV integration in the next five years, followed by a ramp-up of these low-altitude operations to enable more routine use of the systems alongside manned aviation by 2030.

“There are calls for a persistent system and a field-portable system,” Parimal Kopardekar, manager of the NextGen concepts and technology development project at NASA’s Ames Research Center, told The Commercial UAV show in London. “You need some way to manage the density of systems that we will see in the next 10 years.”

Geo-fencing may be part of the future solution, especially around high-value assets and infrastructure. Contingency also is required for GPS and communications outages, which “is an aspect we’re studying in the simulations”, Kopardekar noted.

<https://www.flightglobal.com/news/articles/nasa-plans-next-phase-of-uav-atm-integration-418100/>

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### **NASA Offers Patents to Start-ups**

NASASTart UpNASA is unveiling a new opportunity for start-up companies to license patented NASA technology with no up-front payment. The Startup NASA initiative addresses two common problems start-ups face: raising capital and securing intellectual property rights.

Aimed at encouraging the growth of high-tech businesses and advancing American innovation, NASA's Technology Transfer Program within the Office of the Chief Technologist designed this initiative to allow start-up companies to choose from a diverse portfolio of more than 1,200 patented NASA technologies that range from materials and coatings to sensors, aeronautics technologies, instrumentation and more.

Finding the technologies available for license is simply a click away. NASA has created a streamlined, online patent portfolio covering 15 categories and packed with patents protected by the U.S. government. Once a desired technology is identified, an online application can be filled out and submitted through the website.

Although the license itself is free, the start-up companies must adhere to the following guidelines:

This offer is open only to companies formed with the express intent of commercializing the licensed NASA technology.

"No up-front payment" means NASA waives the initial licensing fees, and there are no minimum fees for the first three years.

Once the company starts selling a product, NASA will collect a standard net royalty fee. This money goes first to the inventor and then to maintaining the agency's technology transfer activities and technology advancement.

This announcement applies only to non-exclusive licenses, which means other companies may apply for similar rights to use the technology for commercial purposes. However, NASA will consider further exclusivity if the start-up wishes to negotiate.

Companies entering into these licenses are bound by all requirements in federal licensing statutes and NASA policies, including development of a commercialization plan and reporting on efforts to achieve practical application.

F- Guidance and Control Method Increases UAV Range and Flight Duration, a guidance and control method that increases flight time and range of unmanned aerial vehicles, or drones already equipped with a primary battery or solar power propulsion systems. The upgrade works by detecting thermals, or buoyant plumes of air. Soaring in thermals like a piloted glider enables the UAVS to fly faster and extend flight duration while reducing energy consumption. Flight times can be increased by up to 12 hours per mission.

The patent access initiative is managed by NASA's Technology Transfer program, which resides within the agency's Office of the Chief Technologist.

[http://www.uasvision.com/2015/10/15/nasa-offers-patents-to-start-ups/?utm\\_source=Newsletter&utm\\_campaign=15243ccf2d-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-15243ccf2d-297560805#sthash.miiDzSDH.dpuf](http://www.uasvision.com/2015/10/15/nasa-offers-patents-to-start-ups/?utm_source=Newsletter&utm_campaign=15243ccf2d-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-15243ccf2d-297560805#sthash.miiDzSDH.dpuf)

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### **Advanced Communications System aboard Predator B**

Predator B General Atomics Aeronautical Systems, Inc. announced the successful flight of a company-owned Predator B integrated with a certified Rohde & Schwarz R&S MR6000A air traffic control radio. The flight lasted 48 minutes, launching from the company's Gray Butte Flight Operations Facility in Palmdale, California.

"Integrating Rohde & Schwarz's R&S MR6000A aboard Predator B is a big step forward in meeting the airworthiness type-certification requirements of our current and future European customers," said Linden P. Blue, CEO, GA-ASI. "We are excited to leverage R&S MR6000A's capabilities to enhance Predator B's safe flight in domestic and international airspace further."

The R&S MR6000A is a key component in supporting GA-ASI's effort to deliver its Certifiable Predator B (CPB) RPA to European customers and to add additional German and European payload capability into its Predator-series aircraft. The R&S MR6000A radio was certified on the A400M as RTCA/DO-178B (level C) and RTCA/DO-254 (DAL C) by the European Aviation Safety Agency (EASA). It is already in service on the Airbus A400M Atlas, making it a proven asset. The radio supports both VHF and UHF air-to-air and air-to-ground communications.

During the company-funded test, Predator B demonstrated its ability to integrate the R&S MR6000A airborne radio, delivering VHF radio communication to and from dismounted ground users equipped with a standard VHF aviation radio.

GA-ASI next plans to integrate the R&S MR6000A into CPB's design. Furthermore, it will include both hardware and software upgrades and a state-of-the-art Detect and Avoid (DAA) system featuring an airborne Due Regard Radar (DRR) for operation in non-cooperative airspace. Additionally, the aircraft will be designed to survive bird and lightning strikes and will be equipped with a de-icing system. CPB initially will target NATO type-certification standards with completion of the first-article production aircraft in late 2017.

[http://www.uasvision.com/2015/10/15/advanced-communications-system-aboard-predator-b/?utm\\_source=Newsletter&utm\\_campaign=15243ccf2d-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-15243ccf2d-297560805#sthash.G9ZORy78.dpuf](http://www.uasvision.com/2015/10/15/advanced-communications-system-aboard-predator-b/?utm_source=Newsletter&utm_campaign=15243ccf2d-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-15243ccf2d-297560805#sthash.G9ZORy78.dpuf)

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### **US Forest Service Explores Use of Unmanned Aircraft to Improve Firefighter Safety**

Lockheed Martin and KAMAN Corporations demonstrated for federal officials how the remotely piloted K-MAX helicopter can be used to perform wildland firefighting scenarios, including cargo drops, single target water drops, and progressive line building with a bucket. The demonstration provided officials

from the U.S. Department of the Interior and U.S. Forest Service Fire and Aviation Management the opportunity to evaluate the capabilities of the unmanned helicopter.

Conducted at the Lucky Peak Helibase outside Boise, Idaho, the demonstration was the latest phase of Interior's and the U.S. Forest Service's exploration of new aviation technologies to improve the safety and effectiveness of wildland firefighters. On November 6, 2014, the Lockheed Martin and KAMAN Corporations completed the initial demonstration of optionally piloted aviation technology (controlled remotely or by onboard pilots) in the highly controlled environment of a Federal Aviation Administration designated Unmanned Aircraft System Test Site in New York state. During the 2015 fire season, smaller unmanned aircraft systems (UAS) were successfully deployed on a limited basis during two wildland fires. During these missions, the UAS provided mapping and reconnaissance data.

"We owe it to the firefighters on the ground to continually explore technologies that improve their safety and best support their efforts to protect communities and our nation's natural and cultural resources during a wildfire incident," said Mark Bathrick, director of Interior's Office of Aviation Services. "The integration of technology that could more than double the time we're able to provide them with logistical and direct air support could be a game-changer in this mission area."

"The unmanned K-MAX has a proven track record of being able to provide 24/7 support, assisting those on the ground in accomplishing their missions," said Dan Spoor, vice president and general manager of aviation and unmanned systems at Lockheed Martin's Mission Systems and Training business. "Unmanned K-MAX's insertion into firefighting operations offers fire suppression, aerial support and potential crew extraction to reduce risk to ground firefighters and aircrews."

For more than 80 years, manned aircraft have provided important support to firefighters during wildfire suppression operations. However, there are limitations to the level of support manned aircraft can provide during diminished visibility or at night. Therefore, in December 2014, Interior and the Forest Service launched their joint Unmanned Aircraft Technology Demonstration Strategy to evaluate the use of optionally piloted helicopters to better support wildland firefighters when conditions preclude the ability of manned aviation. Today's demonstration is a part of that interagency strategy.

[http://www.uasvision.com/2015/10/19/us-forest-service-explores-use-of-unmanned-aircraft-to-improve-firefighter-safety/?utm\\_source=Newsletter&utm\\_campaign=0615726f61-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-0615726f61-297560805#sthash.MJR8qQDS.dpuf](http://www.uasvision.com/2015/10/19/us-forest-service-explores-use-of-unmanned-aircraft-to-improve-firefighter-safety/?utm_source=Newsletter&utm_campaign=0615726f61-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-0615726f61-297560805#sthash.MJR8qQDS.dpuf)

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## **SENSORS/APPLICATIONS:**

### **UAV Project Tracks the Movement of Weather**

UAV Project Tracks the Movement of Weather A US research effort is looking to develop an unmanned air vehicle-based capability that will allow scientists and meteorologists to track the movement of

weather as it develops. The idea is to replace the role that weather balloons have, but in a mobile way so weather can be followed and tracked to better predict when and where it will develop. “You can think of this as an on-demand weather balloon that you have control over,” he tells Flightglobal Jacob adds that the aim of the research project is to develop a system that is accessible to scientists in terms of cost, size and capability.

Jacob says that it will be advantageous to have a swarm of UAVs flying to collect data from multiple standpoints. Currently, scientists know when weather such as thunderstorms will develop but cannot determine precisely where, and capabilities such as radar are limited since they cannot see over the horizon. UAVs are well suited for analyzing the lower atmosphere, the project argues, as it is too dangerous for manned aircraft to fly so low to the ground. While UAVs such as the Northrop Grumman RQ-4 Global Hawk and General Atomics Aeronautical Systems MQ-1 Predator and MQ-9 Reaper have previously been used for weather monitoring, Jacob notes that they are expensive and were not specifically designed with this application in mind. “We’re really focusing on the smaller technology; Predator and Global Hawk are very capable, but also very expensive,” he says. The project will look to develop a vehicle portable-sized UAV that weighs 5kg (11lb) and has 4h endurance. Sense and avoid technology, to allow for future integration into the national airspace, will also be explored through the project, and the parties hope that it also will be able to fly through clouds and carry out nighttime operations.

[http://www.uasvision.com/2015/10/08/uav-project-tracks-the-movement-ofweather/?utm\\_source=Newsletter&utm\\_campaign=8639d15a19-RSS\\_EMAIL\\_CAMPAIGN&utm\\_medium=email&utm\\_term=0\\_799756aeb7-8639d15a19-297560805#sthash.o0JVtRZR.dpuf](http://www.uasvision.com/2015/10/08/uav-project-tracks-the-movement-ofweather/?utm_source=Newsletter&utm_campaign=8639d15a19-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-8639d15a19-297560805#sthash.o0JVtRZR.dpuf)

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## **The Big Leap Forward For Loitering Weapons - Man-pack portable UAS**

Until recently the loitering weapon systems were considered by many armed forces as merely a nice thing to have, but not any more.

Armed forces are just now beginning to understand the potential in loitering weapon systems, but for the Israeli defense industries such systems are not new, and several such system are already operated. The Harop, one of the most advanced loitering weapon system, has been developed by Israel aerospace industries (IAI) to destroy high quality targets. It consists of the munitions unit, transportable launcher and a mission control shelter, which provides real-time access to control the Harop by a man-in-the-loop. The Harop can be launched from various transportable platforms including sea and ground based canisters or air launched to navigate towards the potential target area. It can be launched at any angle, horizontal or at a vertical trajectory. The sealed container ensures protection from harsh battlefield conditions.

The Harop is armed with a 23 kg warhead and is equipped with a very advanced day/night payload (POP-250) made by the Tamam division of IAI.

Harop has an operational range of 1,000 km and an endurance of six hours.

The Hero-30 loitering munition is a small (3kg), expendable and very accurate munition carried in a canister that is also used as a pneumatic launcher. After launch the electric motor is turned on.

Man-pack portable, Hero 30 is the smallest system in the UVision family of smart loitering systems.

Deployable within minutes, Hero 30 is capable of speeds of up to 100 knots and is ideal for antipersonnel

missions.

Weight (kg): 3

Warhead (kg): 0.5

Range (LOS): 5, 10, 40 km

Endurance (min): 30

Engine: Electrical

Launch method: Canister

The HERO-30 is 78 cm long, has a wingspan of 80 cm and is equipped with a day/night sensor and has an endurance of 30 minutes. After it is launched, it locks on the predesigned target and transmits the video to the operator using a hand held unit.

The HERO-30 is loitering in altitudes between 300 and 600 meters above the ground. The data link that was developed for the system can control it in ranges of 5 -10 or 40 km depending on the antenna used.

The system is currently armed with an anti personnel warhead but according to Uvision, other warheads will be available in the near future.

The demand for small loitering munition systems has increased in recent years mainly due to the operational lessons from the war against global terror.

The capability of small units to attack sources of fire independently has become crucial in combat in urban areas.

That is the trend and Israeli sources say it already created an effort to develop more such systems. Some such efforts are in a very advanced stage of development while others are still only on the computer screens, but there is no doubt that the variety of loitering weapon systems is about to grow dramatically in the near future.

[http://i-hls.com/2015/10/the-big-leap-forward-for-loiteringweapons/?utm\\_source=Israel+Homeland+Security+%28iHLS%29&utm\\_campaign=1058d8c57d-Newsletter+English+14+10+2015&utm\\_medium=email&utm\\_term=0\\_8ee2e16ed1-1058d8c57d-89865369&mc\\_cid=1058d8c57d&mc\\_eid=532334b8e8](http://i-hls.com/2015/10/the-big-leap-forward-for-loiteringweapons/?utm_source=Israel+Homeland+Security+%28iHLS%29&utm_campaign=1058d8c57d-Newsletter+English+14+10+2015&utm_medium=email&utm_term=0_8ee2e16ed1-1058d8c57d-89865369&mc_cid=1058d8c57d&mc_eid=532334b8e8)

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## **DARPA - Advanced Airborne Networking Capabilities Sought for Hostile Environments – UAS**

DARPA solicits proposals to enable manned and unmanned air systems to rapidly, securely, and automatically share information across diverse waveforms and networks despite adversary jamming

Dynamic Network Adaptation for Mission Optimization (DyNAMO) program

With an eye toward overcoming this increasingly critical challenge, DARPA today published the Broad Agency Announcement solicitation for its Dynamic Network Adaptation for Mission Optimization (DyNAMO) program. DyNAMO seeks novel technologies that would enable independently designed networks to share information and adapt to sporadic jamming and mission-critical dynamic network bursts in contested RF environments. The program seeks technology that can interconnect existing static networks and be able to connect future adaptive networks as well. The solicitation is available here: <http://go.usa.gov/3JGgR>.

“Current airborne networks are not designed to handle the complexities of modern distributed and dynamic combat missions, and the challenge is only going to increase in the years ahead,” said Wayne Phoel, DARPA program manager. “DyNAMO’s goal is to enable pilots in one type of aircraft with a specific suite of sensors to easily share information with different types of manned and unmanned systems and also receive sensor information from those various platforms for a comprehensive view of the battlespace. We aim to develop technology that dynamically adapts networks to enable instantaneous free-flow of information among all airborne systems, at the appropriate security level and in the face of active jamming by an adversary.”

The network technology developed through the DyNAMO program is to be demonstrated on radio hardware being developed by DARPA’s Communications in Contested Environments (C2E) program. C2E is designing flexible new development architectures so aircraft won’t be limited to communicating with aircraft using the same radio and waveform. C2E also aims to leverage the proven commercial smart-phone architectural model in which the application processing, real-time processing, and hardware functions of a software-defined radio are separately managed, validated, and updated to ensure rapid deployment of capabilities. DyNAMO is designed to pick up where C2E leaves off, ensuring that raw RF data successfully communicated between previously incompatible airborne systems is not only conveyed but also translated into information that all the systems can understand and process, whether that information relates to time-sensitive collaborative targeting, imagery or networked weapons.

Proposers interested in the program may read details in the Broad Agency Announcement (BAA) solicitation on FedBizOpps here: <http://go.usa.gov/3JGgR>

<http://www.darpa.mil/news-events/2015-10-14>

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## **Alternative Power Sources Boost Small Drone Endurance**

The U.S. military is looking for ways to improve the endurance of small unmanned aerial systems using alternative power sources, said service and industry officials.

When using small drones — which typically run on lithium-ion batteries — there are several shortfalls that need to be overcome in order to make the systems more effective for warfighters, said John Jennings, the director for innovation in the office of the assistant secretary of defense for operational energy plans and programs (OEPP).

Reliability is also a factor because many of the smaller systems were not designed to run for long stretches of time, he noted.

OEPP is tasked with “maximizing the military capability we get out of energy while reducing the burdens and risks that our energy supply lines create,” Jennings said. While the office doesn’t solely focus on alternative power sources in order to achieve that goal, it is one of the tools the Defense Department uses to squeeze every drop of energy out of its systems, he said.

One program that currently receives seed funding through OECIF — though the Navy and Marine Corps are financing the majority of the project — looks at harvesting both solar and thermal energy to power a small unmanned aerial vehicle for an extended period of time.

“The Navy and the Marine Corps have gaps with regard to UAV capabilities,” said Capt. Anthony Ripley, the science and technology lead for the Marine Corps’ expeditionary energy office. “This effort will enable us to close a lot of those gaps.”

The program participants are: the expeditionary energy office, the Naval Research Lab, the Naval Postgraduate School and industry partners — Semprius, a solar array manufacturer from North Carolina and Packet Digital, a Fargo, North Dakota-based company that specializes in power management.

<http://www.nationaldefensemagazine.org/archive/2015/November/Pages/AlternativePowerSourcesBoostSmallDroneEndurance.aspx>

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## **Drone swarms being tested at White Sands Missile Range**

WHITE SANDS MISSILE RANGE — In this season's Network Integration Evaluation at White Sands Missile Range and Fort Bliss, coordinated units of remotely operated and automated aircraft will be used to represent a possible threat on tomorrow's battlefields.

Members of the Army offices are using off-the-shelf quad and octocopters and flying them in groups, part of a program to study possible use, effectiveness and countermeasures for the deployment of large numbers of synchronized drone aircraft.

"Right now there's hardly anyone doing swarms. Most people are flying one, maybe two, but any time you can get more than one or two in the air at the same time, and control them by waypoint with one laptop, that's important," said James Story, an engineer with the Targets Management Office PEO STRI, one of the groups involved in the project. "You're controlling all five of them, and all five of them are a threat."

For NIE, the off-the-shelf drones will be configured to carry special payloads for specific missions. Cameras, bomb simulators, expanded battery packs and other systems will be tested. By conducting the flights at WSMR, the engineers can evaluate things such as actual flight time and performance, as well as



payload capabilities. Using data collected from the WSMR flights, the engineers hope they can increase the flight time of the drones, and make other improvements.

From a military perspective, this low price tag of the off-the-shelf drones can translate to a level of disposability. A militarized version of one of these aircraft could be equipped with light weapons like small bombs they can drop, or be flown into a target and exploded like a cruise missile.

"There are also plans to fit the drones with the ability to drop packets of flour, simulating the ability for the swarm to drop small bombs, allowing the drones to perform short-range strike missions.

Drone-test missions can be a big challenge to plan and execute. Fortunately WSMR has unrestricted military airspace, allowing the testing of remotely operated or autonomous aircraft at any altitude within the range's 3,200 square miles.

"There's a lot of paperwork, for frequency and safety issues, but it's definitely worth it. This is the first time integrating into the NIE and it's a great group of guys working at Fort Bliss and White Sands that helped us along the way," Francis said.

<http://www.lcsun-news.com/story/news/2015/10/18/drone-swarms-being-tested-wsmr/74187314/>

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### **Avio Aero to develop hybrid propulsion system for UAVs**

"A successful model of a partnership between the worlds of business and university, it fits in with Avio Aero's established network of relationships with national institutions ... ."

In the project, Avia Aero will use a Falco EVO unmanned aircraft from Finmeccanica - Selex ES as its reference platform for studying a hybrid propulsion architecture that uses an internal combustion engine, an electric motor and enabling technologies.

The Falco EVO can carry a 240-pound payload, has an endurance of as much as 20 hours, and a service ceiling of nearly 20,000 feet.

[http://www.upi.com/Business\\_News/Security-Industry/2015/10/22/Avio-Aero-to-develop-hybrid-propulsion-system-for-UAVs/5321445527746/](http://www.upi.com/Business_News/Security-Industry/2015/10/22/Avio-Aero-to-develop-hybrid-propulsion-system-for-UAVs/5321445527746/)

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### **Nathan Roy invents drone to spread predatory insects over farmland**

Drones are emerging as the latest tool in biological pest control on Australian farms.

A former Queensland strawberry farmer turned inventor has begun using drones to spread predatory insects over farmland so they can kill pests that would otherwise eat the crops.

Over 18 months, Mr Roy has developed and trialed a drone system using an eight-bladed helicopter carrying a special bag with a spreading device.

It has been a very big learning curve for the inventor, from getting patents to obtaining the necessary licences from the Civil Aviation Safety Authority.

Too high and not enough bugs get where they need to be, but too low, and there are too many.

Mr Roy has also researched the best time of day, humidity and wind.

But Mr Roy has had success on a number of farms including Merv Schiffke's strawberry operation at Bellmere, north of Brisbane.

"What would take four or five people, two or three hours to put out over a couple of hectares, they can do in 10 minutes," Mr Schiffke said.

Using drones could also have big implications for the rearing of beneficial pests, taking it from a labour intensive and expensive niche market to the mainstream.

"So the next step is going to be this step towards improved, mechanised release systems and that's a very exciting part of our way forward I believe," Mr Papacek said.

<http://mobile.abc.net.au/news/2015-10-25/inventor-creates-drone-to-spread-predatory-insects-over-farmland/6877700>

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## **The Military is Creating Vampire Drones that Die in the Sun**

It's a giver's problem. The drone you just sent to drop vital medical supplies to refugees fleeing the war is intercepted by opposing forces. Now, jihadists are making YouTube videos of themselves ripping apart your secret military equipment like they're tearing open shiny packages.

To solve the problem and address the many logistical issues that come from having to actually bring equipment home once it's used in war, the Defense Advanced Research Projects Agency, or DARPA, is funding a new research initiative to develop aircraft that can "fully vanish within within four hours of payload delivery or within 30 minutes of morning civil twilight (assuming a night drop), whichever is earlier," the agency posted today.

The program is called Inbound, Controlled, Air-Releasable, Unrecoverable Systems, or ICARUS, after the boy in Greek mythology who flew too close to the sun and saw his feather and wax wings melt. But the mission for this ICARUS is far simpler: the Pentagon wants to send drones on one-way trips.

DARPA is seeking to address a "capability gap in eliminating the leave-behind of air vehicles used to deliver supplies to personnel on the ground without requiring pack-out. Such pack-out of these systems

is cumbersome, time-consuming, and adds significant weight to the individuals' loads," officials wrote in the announcement. The program will last 26 months with about \$8 million in funding.

In setting the goal, the agency is building off early success with their Vanishing Programmable Resources, or VAPR, program, as well as some recent breakthroughs in advanced polymer sublimation, which, in chemistry, is the passage of a substance directly from solid form into a gas. In other words, they want a drone that disappears in a cloud of smoke—like a True Blood vampire being kissed by the sun.

The aircraft that they're looking for will be able to travel 150 kilometers, drop a payload of up to 3 pounds within 10 meters of a pre-programmed landing spot, and be no larger than 3 meters in length.

In other words, making planes sturdy enough to fly and carry payloads but that can also vanish is going to be very hard. Good luck.

[http://www.nextgov.com/defense/2015/10/military-creating-vampire-drones-die-sun/122842/?oref=nextgov\\_today\\_nl](http://www.nextgov.com/defense/2015/10/military-creating-vampire-drones-die-sun/122842/?oref=nextgov_today_nl)

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## **Solar Drones to Function As Satellites**

That is the vision of Alliance Lp Drones, a company with innovative approach.

Alliance has since developed three different platform designs capable of carrying variable and interchangeable payloads, starting at approximately 100 Kilogram of telecom payload with their basic model. These platforms will operate at altitudes between 65,000 ft (20 km) to 80,000 (24 km) for up to five years if required.

Conventional Satellites technologies comes with some drawbacks: satellites are expensive and difficult to manufacture, additionally propelling these vehicles into orbit is also a very costly, complex and labor intensive process. Once in orbit satellites can't be reclaimed for maintenance, payload recovery or any other technical or logistical requirements.

These systems the company claims are capable of replacing low orbit satellites at a fraction of the cost and provide communications over remote areas by using laser arrays to transfer bandwidth such as; data/voice communication and internet services. Other significant advantages of these systems will be the capability to remain geostationary for extended periods of time near earth facilitating all technical, maintenance and logistical operations.

At present Alliance has completed the development of the first two Hermes prototypes; H-1 (wind tunnel aerodynamic elasticity testing composite model) and H-2 (dynamic model for field flight testing). Alliance is now in the process to start manufacturing H-3 prototype for further testing, the next step will be to begin modular assembly of the full scale platform measuring a total wingspan of 63 meters (200 ft).

[http://i-hls.com/2015/10/solar-drones-to-function-as-satellites/?utm\\_source=Israel+Homeland+Security+%28iHLS%29&utm\\_campaign=2d661a597c-ENGLISH\\_DYNAMIC&utm\\_medium=email&utm\\_term=0\\_8ee2e16ed1-2d661a597c-89865369&mc\\_cid=2d661a597c&mc\\_eid=532334b8e8](http://i-hls.com/2015/10/solar-drones-to-function-as-satellites/?utm_source=Israel+Homeland+Security+%28iHLS%29&utm_campaign=2d661a597c-ENGLISH_DYNAMIC&utm_medium=email&utm_term=0_8ee2e16ed1-2d661a597c-89865369&mc_cid=2d661a597c&mc_eid=532334b8e8)

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## **COUNTER UAS:**

### **Boeing, Lockheed unveil competing UAV-killing concepts**

With reports that Islamic State (IS) militants have begun operating commercially-produced unmanned air vehicles to support their activities in the Middle East, Boeing and Lockheed Martin are pursuing two very different approaches to knocking unmanned aircraft out of the sky.

Boeing has produced a 2kW laser weapon system to literally burn UAVs out of the sky, while Lockheed is taking a non-kinetic approach that appears to combine the best of its electronic warfare and cybersensing and attack capabilities.

Boeing's laser system uses plug-in radar units and a high-resolution telescope to detect, track and engage UAVs with a 2-10kW compact laser weapon. Lockheed's product, named Icarus, uses "sensors, video, audio and radio-frequency-based capabilities" to identify or "fingerprint" targets for defeat by electronic disruption.

"UAVs and quad-copters are starting to become a problem for various [US government] agencies," says David DeYoung, director of Boeing's laser and electro-optical systems group. "IS is using them to find troop movements, and in the Russia-Ukraine war, they're using them to great effect to watch where their artillery is landing. They're buzzing airports and flying over people's backyards – not that that's a market for us."

DeYoung says the counter-UAV mission could be the perfect initial application for laser-based weapon systems, although provisions must be made to avoid blinding friendly satellites or aircraft. The laser weapon's predictive avoidance system receives data on where to avoid shooting to prevent collateral damage, and this aspect of the system was successfully tested during exercise "Black Dart" in August. According to Boeing, the system is capable of hitting a target with a beam the diameter of a penny at 5.4nm (10km), and the weapon could eventually be integrated with the army's AH-64 Apache to destroy enemy communications or radio equipment on the battlefield.

Lee Tang, Lockheed's senior engineering manager, says his company's non-kinetic Icarus system more easily avoids collateral damage compared to its laser-based competitor.

Icarus is targeted more at the civil defense role, for use in locations such as sports stadiums and at the White House as well as to protect military bases, where Lockheed says a laser-based weapon system might not be practical or safe.

<https://www.flightglobal.com/news/articles/lasers-or-ew-boeing-and-lockheed-unveilcompeting-d-417714/>

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## **Anti-drone shoulder rifle lets police take control of UAVs with radio pulses**

While some homeowners are turning to shotguns to deal with unwanted drones, federal agencies and law enforcement lack the necessary technology to deal with this increasing menace. However, thanks to Battelle Innovations and its new DroneDefender, law enforcement now has an anti-drone system designed to disable a drone without blasting it out the sky.

The new DroneDefender uses radio pulses to disable a hostile drone within a 400-meter radius. These pulses interrupt the communications system of the drone, making it think it is out of range. The drone's safety protocols then kick in, forcing it to either hover, return to its point of origin, or descend slowly as it prepares to land. Because the weapon jams communication with the nearby operator, the DroneDefender also can prevent detonation and other remote functions.

Related: Welcome to the 21st century — there's now an anti-drone death ray on the market

The radio jamming system is mounted to a gun chassis that makes the anti-drone weapon lightweight (10 lbs or less) and easy-to-use. It is designed to fire within 0.1 seconds of startup and can operate for five hours straight. Not only is this system efficient, this rifle-like design is also familiar to the DroneDefender's targeted audience — government agencies and law enforcement.

Known for its ability to transform technology breakthroughs into useful hardware and services for both government and commercial customers, Battelle Innovations developed the DroneDefender using its inhouse

expertise, which spans both military and technology applications.

The company plans to begin selling the DroneDefender in 2016 and already has several federal agencies interested in obtaining the anti-drone weapon when it's released next year. Though it will be available to government agencies in the US and overseas, it won't be available for consumer use stateside, as it currently operates on non-consumer frequencies controlled by the FCC.

Drones have moved from military darling to consumer item in the last few years, with applications ranging from entertainment to video capture to sheep-herding tool. But despite the popularity of GoPro-enabled models that follow you down the slopes and record your every mogul and wipeout, it's clear the military aspects remain items to watch.

<http://www.digitaltrends.com/cool-tech/battle-innovations-anti-drone-gun/>

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## **First portable, accurate, rapid-to-use counter-weapon to stop suspicious or hostile drones in flight**

COLUMBUS, Ohio (Oct. 13, 2015)—Aim. Engage. Stop. Battelle's revolutionary DroneDefender™, is the first portable, accurate, rapid-to-use counter-weapon to stop suspicious or hostile drones in flight, providing critical security protection at home and abroad.

The Battelle DroneDefender uses radio control frequency disruption technologies to safely stop drones in the air, before they can pose a threat to military or civilian safety. The growing use and availability of commercially-available drones—also known as Unmanned Aircraft Systems (UAS)—is raising concerns among defense, security and law enforcement leaders.

DroneDefender is an inexpensive, easy-to-use, lightweight, point-and-shoot system with a demonstrated range of 400 meters. DroneDefender provides instant threat mitigation, quickly disrupting the drone so that no remote action, including detonation can occur in sensitive areas. This minimizes drone damage and the risk to public safety.

This innovative device has a cold start time of <0.1 seconds and an operating time of five hours continuous. It weighs less than 10 pounds, depending on how it is configured.

Because it is designed to repel undesirable UAS attention without doing damage to the UAS, DroneDefender can be used stateside as well as abroad, with versions hardened for forward deployment in challenging environmental conditions. The DroneDefender can be either fixed or portable, with battery packs available to help protect any installation, mobile VIP or unit.

<http://www.battelle.org/media/press-releases/rogue-drones-have-met-their-match#sthash.R6ZNHhVo.dpuf>

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## **Israel Aerospace unveils drone detection system**

Israel Aerospace Industries Ltd. (IAI) is unveiling the Drone Guard a new system for drone detection, identification and flight disruption at this week's Seoul International Aerospace and Defense Exhibition (ADEX).

IAI notes that the use of small drones has increased dramatically over the years, making them a potential threat to critical infrastructures, other aircraft and homeland security (HLS), due to their small size, low speed and low flight altitude. These drones may be used for a number of reasons, including hostile purposes such as intelligence gathering, smuggling, or as armed platforms. Drones are also difficult to detect or disrupt due to their low visibility and low Radar Cross Section (RCS).

To meet this emerging challenge, IAI's Subsidiary and Group, ELTA Systems Ltd., offers especially 3D radars and Electro-Optical (EO) sensors for detection and identification, as well as dedicated Electronic Attack (EA) jamming systems for disrupting drone flights.

To detect low signature, low-level and low-speed airborne targets, ELTA has adapted to this specific mission its 3D radars, which include the ELM-2026D, ELM-2026B and ELM-2026BF for short (10km), medium (15km) and long (20 km) ranges, respectively, with special drone detection and tracking algorithms, as well as adapting them with EO sensors for visual identification of the target.

"Drone Guard" systems have been extensively and successfully tested against a variety of different drones and scenarios, including simultaneous multiple drone penetrations or attacks.

<http://www.globes.co.il/en/article-israel-aerospace-unveils-drone-detection-system-1001074925>

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### **The Antidote for Small Flying Robots**

The growing availability of small, inexpensive UAVs that can (and are) used by criminals and Islamic terrorists has led to the development of several Anti-UAV Defense Systems (AUDS). These systems consist of multiple sensors (visual, heat, radar) to detect the small UAVs and a focused radio signal jammer to cut the UAV off from its controller and prevent (in most cases) the UAV from completing its mission. The detection range of AUDS is usually 10 kilometers or more and jamming range varies from a few kilometers to about eight.

AUDS can be defeated. For example a user can send a small UAV off on a pre-programmed mission. This can be to take photos or deliver a small explosive. No one has tried, at least successfully, using armed micro-UAVs yet but North Korea has been caught using small recon UAVs flying under automatic control.

If these UAVs are still detected they have to be destroyed via ground or air-to-air fire. This the South Koreans and Israelis have had to do several times. The Israelis were dealing with Palestinian Islamic terrorist groups using small UAVs, often Iranian models. South Korea and Israel has responded by adding more sensor systems, especially new radars that can detect the smallest UAVs moving at any speed and altitude. An American firm has demonstrated a high-powered laser that can take down small UAVs several kilometers away.

Thus the most successful UAV the North Koreans ever used turned out to be a Chinese commercial model, the SKY-09P. This is a 12 kg (26 pound) delta wing aircraft with a wingspan of 1.92 meters (6.25 feet), propeller in the front and a payload of three kg (6.6 pounds). It is launched via a catapult and lands via a parachute. Endurance is 90 minutes and cruising speed is 90 kilometers an hour. When controlled from the ground it can go no farther than 40 kilometers from the controller. But when placed on automatic it can go about 60 kilometers into South Korea and return with photos. These things cost the North Koreans a few thousand dollars each. While South Korea says they detected two of the three crashed North Korea UAVs no other details were provided. The Chinese manufacturer denied selling anything to North Korea, but the North Koreans typically use a third party for purchases like this.

<http://www.strategypage.com/dls/articles/The-Antidote-For-Small-Flying-Robots-10-21-2015.asp>

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### **Lockheed Martin demonstrates solution to respond to threats from UAS**

Washington, DC. October 12 - At this year's Association of the United States Army Annual Meeting, Lockheed Martin unveiled a new capability that will allow users to detect and counter emerging threats

from Unmanned Aerial Systems (UAS). The solution, ICARUS™, was designed to operate defensively in various threat environments.

Lockheed Martin's Counter-UAS system has been field tested and demonstrated to several domestic and international customers over the past year. Those tests demonstrated the ability of ICARUS™ to identify and intercept commercially available unmanned aerial systems.

The development of the ICARUS™ software system draws on Lockheed Martin's rich history of innovations in electronic warfare, cybersecurity and countermeasures associated with sophisticated threats. It was developed through Lockheed Martin internal investment and combines advanced cyber and cyber electromagnetic activity experience with sensor technology and non-kinetic techniques.

Lockheed Martin is a leading provider of advanced cyber security solutions focused on military and intelligence customers.

[http://gsnmagazine.com/node/45507?c=infrastructure\\_protection](http://gsnmagazine.com/node/45507?c=infrastructure_protection)

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## **INTERNATIONAL:**

### **Pentagon setting up drone base in Africa**

The White House announced Wednesday that it is deploying 300 U.S. troops to Africa to set up a drone base to track fighters from Boko Haram, the network of Islamist extremists that has destabilized Nigeria [https://www.washingtonpost.com/world/africa/will-us-back-new-nigerian-leaders-tough-stanceagainst-boko-haram/2015/06/04/f13bcc4c-0947-11e5-951e-8e15090d64ae\\_story.html](https://www.washingtonpost.com/world/africa/will-us-back-new-nigerian-leaders-tough-stanceagainst-boko-haram/2015/06/04/f13bcc4c-0947-11e5-951e-8e15090d64ae_story.html) and neighboring countries during a long and bloody uprising.

The U.S. forces will be based just to the east of Nigeria in Cameroon, where they will operate a small fleet of unarmed Predator drones that will conduct surveillance across the region, according to the Defense Department. About 90 troops arrived Monday with the remainder expected in the next several weeks.

Boko Haram has been waging a vicious insurgency for several years that originated in Nigeria but has since spilled into neighboring Cameroon, Chad and Niger and left an estimated 20,000 people dead. Although the group has not targeted U.S. interests, the Obama administration has become increasingly concerned that the threat could spread. Boko Haram leaders pledged allegiance earlier this year to the Islamic State; both groups are fighting to establish an Islamic caliphate across the Middle East and Muslim lands in Africa.

The deployment marks the most direct U.S. involvement to date in the campaign against Boko Haram. The U.S. military also flies unarmed drones from Niger

<https://www.washingtonpost.com/world/national-security/pentagon-set-to-open-second-drone-basein-niger-as-it-expands-operations-in-africa/2014/08/31/365489c4-2eb8-11e4-994d->



202962a9150c\_story.html, but those surveillance aircraft are dedicated to flights over the Sahara to spy on other Islamist extremists in North and West Africa, not Boko Haram.

Navy Lt. Cmdr. Anthony Falvo, a spokesman for the U.S. Africa Command, declined to identify where exactly the U.S. troops would be stationed in Cameroon. He said the U.S. military was still examining the suitability of setting up a drone base at “a temporary location” in the country.

The U.S. troops will be armed with weapons “for the purpose of providing their own force protection and security,” according to a letter that President Obama sent to Congress Wednesday. But they are not expected to engage in direct combat.

The epicenter of the fight against Boko Haram has been in Nigeria. But the Obama administration has been reluctant to provide substantial military or counter-terrorism assistance to the Ni-ger-ian military, which has a long record of human rights abuses.

Nigeria is in the process of establishing a multinational force to fight Boko Haram with soldiers from Cameroon, Chad, Niger and Benin. According to local officials, the United States, France and China have all pledged to offer training.

Last month, the White House announced that it would provide \$45 million in military aid to help the regional force combat Boko Haram.

Boko Haram, which means “Western education is forbidden” in the local Hausa language, was designated as a terrorist group by the U.S. government in 2013. It has embraced brutal tactics — bombings, be-headings and kidnappings — to seize control of large parts of northern Nigeria.

About 100 U.S. Special Forces are working in Uganda, Congo, South Sudan and the Central African Republic to track Kony. That mission began in October 2011, and Obama is expected in the coming days to extend it for at least another year.

Over the past eight years, the Pentagon has gone from having virtually no military presence in Africa to running an extensive network of small bases and camps, many of which are focused on surveillance operations.

In addition to Cameroon and Niger in West Africa, the U.S. military flies drones from Ethi-o-pia and Djibouti, where it has a large counterterrorism base on the Horn of Africa. The Pentagon also operates manned surveillance aircraft from Uganda

[https://www.washingtonpost.com/world/national-security/contractors-run-us-spying-missionsin-africa/2012/06/14/gJQAvC4RdV\\_story.html](https://www.washingtonpost.com/world/national-security/contractors-run-us-spying-missionsin-africa/2012/06/14/gJQAvC4RdV_story.html) and Burkina Faso

[https://www.washingtonpost.com/world/national-security/us-expands-secret-intelligenceoperations-in-africa/2012/06/13/gJQAHyvAbV\\_story.html](https://www.washingtonpost.com/world/national-security/us-expands-secret-intelligenceoperations-in-africa/2012/06/13/gJQAHyvAbV_story.html)

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## **COMMENTARY:**

### **We Are Aviators First**

With UAS, surveyors are becoming aviators. As we adopt new technology, we should heed old advice. 30 Years Later Now I find myself in the middle of the unmanned aircraft system (UAS) revolution and the

profound changes that these small and miraculous machines are bringing to our profession. One of the advantages of using non-pressurized aircraft is being able to stand up in those small aircraft once you remove the camera. When I saw my first UAS for photogrammetry I thought, "Impossible! This flimsy, miniature aircraft will never be able to achieve the required stability to take worthy photographs."

I took a deep breath, dusted off my old photogrammetry books, and immersed myself in the manuals of UAS, trying to understand how this new generation of photogrammetrists solved the problems of stability, resolution, and distortion. Conventional Flights versus UAS Before I embark on a dissertation about the merits of manned versus unmanned cartographic flights, let me clarify something: UAS are not replacing existing technologies; they are complementing them.

Once we understand this, the question is completely the opposite: How the heck did we do it in the past without UAS? The first big difference between conventional flights and UAS is the issue of overlapping. In conventional photography that I engaged in you required 60% longitudinal and 30% lateral, and it was almost impossible to achieve more coverage due to the limited number of photographs per roll of film. Increasing overlapping would cause the number of photos to skyrocket, forcing the operator to change rolls every few minutes and making the flight a nightmare for the pilot and the navigator. With UAS and digital cameras we can have almost any overlap we want or require. A conventional flight with a modern UAS can have 80% on both longitudinal and lateral, making the useful area of each photo really small and concentrated in the center of the image where distortion is almost negligible. Another huge difference is the fact that UAS fly at a constant speed and therefore must execute the mission with side winds in order to maintain the overlapping constant. Nowadays UAS missions are planned on the ground just before takeoff, and the winds are accounted for in the design of the flight lines. It's a more comprehensive process and allows the operator of the aircraft to be mission planner, navigator, camera operator, and remote pilot all at once in a single, neat, human package. In my opinion, the most significant difference between conventional aerial photography and UAS photogrammetry is Above Ground Level (AGL): in layman's terms, the altitude over the terrain. Most UAS used in commercial cartography today were not designed to fly at high altitudes, which saves a lot of problems. The higher you fly, the higher the error in the photograph due to natural distortions of the equipment and instability in the flight path. It is common sense to assume that a five-pound Styrofoam plane driven by a single, two-blade electric propeller would be more unstable than a 10-ton plane powered by two internal combustion or jet engines. This assumption explains why the distortion associated with lack of appropriate overlap from the flight path instability can be almost eliminated by flying low over the ground (Figure 1). Another huge difference between conventional flying and UAS is time in flight (TIF). Most commercially available photogrammetric UAS on the market today are powered by electric batteries. This technology, unfortunately, has not caught up with the rest of the equipment on board so it disproportionately contributes to the weight of the airplane and lasts for only 50 minutes or so in the best of cases. This makes for an ideal platform in the case of small to medium/large areas that can be covered in a few missions and impractical when trying to map hundreds or thousands of acres of surface. The deployment of real-time kinematic (RTK) and post-processing kinematic (PPK) in the most recent versions of modern UAS has added an extra layer of savings by eliminating the need for ground control points (GCP). There's one challenge that remains a concern given the rapid deployment of these new technologies and the frenzied adoption pace by the mapping community: the fact that these activities are first and foremost flying missions. Also, we are capturing aerial data with UAS and not with

total stations and GNSS receivers. By turning surveyors into aviators, we as an industry need to make sure everyone understands, without a shred of a doubt, that once we launch that aircraft into the sky we are aviators, not surveyors. This must be kept in mind at all times: flying machines eventually come down to Earth. It is our responsibility as pilots in command to make sure this landing is accomplished safely and uneventfully. The fact that we are no longer walking into a plane doesn't exempt us from responsibility to the people on the ground. Every operator of a UAS today should have his or her own version of this credo. At the end of the day when we use a UAS we are transitioning from surveyors into pilots, and that change brings with it great advantages but also great responsibilities.

<http://www.xyht.com/aerialuas/we-are-aviators-first/>

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### **The 3 Things Humans Will Always Do Better Than Robots**

Hello?

This is Lucy. How are you today?

Oh hai Lucy. I'm doing fine. You?

(pause) Hi. Thanks for asking. I was wondering if you might have a few minutes to answer some questions for me; we're giving away a free wireless home security system.

Um. Sure. What can I answer for you?

Do you own your home?

Yeah, sure.

Great you qualify for an upgrade to your home's...

Lucy, why do you sound like a robot?

I'm not a robot, why would you say that? I'm a person. Anyway let's go back to our questionnaire. Do you currently have a home security system?

Before I give you all of this information, tell me a bit about you.

(pause) What would you like to know?

Well, what kind of movies do you like?

(pause) I know you're busy, so I want to make sure we keep moving along.

Just give me one movie you like. Don't hang up.

I'm not hanging up. I'm here.

Do you get calls like the one above that sound slightly robotic but always deny their robot-ness?

The robots are not coming, they're already here. They're just not sentient... yet. We don't have to worry about Skynet in our lifetime, but two questions remain: Will robots take our jobs? Or for those that stay employed: Are humans expendable?

So where should we be utilizing humans instead of robots? Where does humanity stand a shot against the impending robot invasion?

### Creativity

Creativity is a simple answer here. Humans are good at thinking outside of the box: seeing connections when they are not there. In other words, humans are good at seeing the big picture. It's the ancillary silos of industry that spark creativity and innovation. Having biologists solve chemistry problems, ballet dancers show football players the best way to "dance" the line, and theater actors work with Fortune 500 CEOs to reveal their humanity are a few things that bots aren't able to think of. Entrepreneurs that can utilize old solutions to solve new problems or that can magically see the future won't be replaced any time soon. And pushing the envelope into the unknown is still something that only humans do.

However, bots are slowly creeping up on us. Utilizing related word searches, bots can find alternative interpretations of your sentence and figure out what you really meant. Sometimes bots can figure out creative ways to do what we may believe to be impossible. Flying robots, as Dr. Vijay Kumar from University of Pennsylvania's School of Engineering and Applied Science shows in this video, are programmed to figure things out.

### Relationships

Humans are social animals. Humans need to work together. Machines do not. To illustrate, remember the Ultimatum Game, which many behavioral economists love to play. Two people, A and B, have a sum of money, say \$100, at stake. "A" decides how the money is split (50/50, 0/100, 35/65) while "B" decides if the deal should be done: a negotiation. Studies have shown that most people offer 50/50 (or close to it) with the understanding that any combination that deviates too far would be rejected by "B."

Simple bots may have a hard time recognizing that more than 50% of communication occurs in body language or in other undertones that only comes from human intuition or long term relationships. Further, while some robots are starting to understand human emotion, whether through facial expressions or analysis of vitals, you don't necessarily want a mirror. You don't want the robot to put itself in your shoes, rather, you might want the robot to tell you that "It's going to be ok."

Like relationships, robots still haven't figured out how to empathize with us to figure out why we would want to buy something as opposed to rattling off features and benefits. Sure, Amazon does a good job by comparing you to other similarly behaved humans on commoditized products like books, movies and electronics—but for a complicated sale, like a vacation or a new IT system—travel agents and sales engineers still cannot be replaced.

The age-old question about artificial intelligence: Is the machine aware or is it just following instructions? So far, no machine has stopped itself by appealing to common sense, including the Flash Crash and Amazon pricing bot.

Although humans excel at these things now, I've already mistaken some emails that were from robots to be from humans, some phone calls from humans to be from robots, and music that I thought was created by a human to be from an algorithm. Robots are currently at the single-celled organism stage. We'll eventually find more things to do with our human brains, but at some point we might not be able to tell the difference between human and machine anymore.

<http://www.nextgov.com/emerging-tech/2015/10/three-things-humans-will-always-do-better-robots/122621/?oref=ng-HPriver>

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### **A drone pilot's view of the mission to find "Lone Survivor" Marcus Luttrell**

On June 28, 2005, Navy SEAL Marcus Luttrell—subject of the movie "Lone Survivor"—was stranded on a mountainside in eastern Afghanistan. His SEAL team had been killed. The quick reaction force sent to retrieve Luttrell and his men had returned to base after one of its helicopters had been shot down.

Above him, though, was a Predator drone flown by Air Force Lt. Col. T. Mark McCurley.

As the Predator closed in on Luttrell's last known position, McCurley's sensor operator fixed onto the wreckage of the MH-47 Chinook that had been hit by a rocket propelled grenade hours before, killing everyone aboard.

Soon after, McCurley's aircraft picked up a garbled radio transmission on an emergency frequency.

After an hour, McCurley's shift manning the drone's sensors ended, and a new crew took over with no luck. McCurley passed on the coordinates where he had heard the radio calls, but Luttrell was still out there, escaping and evading from the Taliban. In the days following, he would be taken in by a local Pashtun tribe who would shelter him until he was rescued by an element of Army Rangers a week later.

"SEAL Team Five was still out there," McCurley writes. "I left the ops cell and walked to my car. The sun was rising and I knew most of Las Vegas was shaking off their Saturday night hangover. I felt the same way, but for a different reason. I'd really wanted to find the SEAL team, but I'd failed."

McCurley told The Washington Post in a recent interview that participating in the operation to find Marcus Luttrell was "one of the highlights" of his career.

"We were one of the groups of guys that helped triangulate his position and helped guide friendly forces in," McCurley said. "Whatever we can do to save lives, that's what's important to us. Those stories are just as important as the ones of when we take out a terrorist."

<https://www.washingtonpost.com/news/checkpoint/wp/2015/10/17/a-drone-pilots-view-of-the-mission-to-find-lone-survivor-marcus-luttrell/>

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## **The Intercept's 'Drone Papers' Revelations Mandate a Congressional Investigation**

**Sadly, that will never happen under the Obama administration's watch.**

The Intercept's 'Drone Papers' Revelations Mandate a Congressional Investigation

This morning, the reporting team at the Intercept published an impressive eight-part series on the policies and processes of U.S. drone strikes, called "The Drone Papers." Some of the newly reported information is purportedly based upon "a cache of secret slides that provides a window into the inner workings of the U.S. military's kill/capture operations ... between 2011 and 2013." Intercept journalist Jeremy Scahill writes that the slides "were provided by a source within the intelligence community." (Full disclosure: I spoke with two reporters from the Intercept about some of these documents in mid-July and have a partial quote in one of the pieces.)

With a helpful framing narrative and context, lots of big pictures and graphics, and many new insights, this reporting could awaken or reintroduce interested readers to how the U.S. national security apparatus has thought about and conducted counterterrorism operations since 9/11. The reporting is less one big "bombshell" and more of a synthesis of over a decade's worth of reporting and analysis, bolstered by troubling new revelations about what has become routine.

The uniqueness of "The Drone Papers" lies in the fact that there has been no comparable, comprehensive release of classified documents about U.S. capture or kill operations. The uniqueness of "The Drone Papers" lies in the fact that there has been no comparable, comprehensive release of classified documents about U.S. capture or kill operations. Previous, equally invaluable, reporting has relied upon similar government documents but has not provided them in whole for public consumption, such as the Department of Justice memo, which provided the legal basis for targeting U.S. citizens, which NBC's Michael Isikoff published in February 2013; the "top-secret U.S. intelligence reports," which McClatchy's Jonathan Landay quoted in April 2013; and the CIA documents, which Richard Engel and Robert Windrem briefly showed on NBC News, but did not published in full, in June 2013. But the source documents for "The Drone Papers" are available and easily searchable. There are only a few redactions in a series of slides about Afghanistan, which journalist Ryan Devereaux told me was done to protect the identity of individuals who "we A) could not confirm are dead through the documents or open source reporting or B) are already a widely known, wanted militant figure."

But there are certainly also several new revelations that make this series a must-read for engaged citizens or those interested in U.S. counterterrorism strategies and policies. First, that Obama, as of June 2012, had authorized a special operation task force (within a 60-day "potential targeting window") to kill 16 people in Yemen (named Operation Copper Dune) and four in Somalia (Operation Jupiter Garret). However, over that time, according to figures cited from the Bureau of Investigative Journalism, 19

percent of suspected militants and terrorists were killed in these countries — which raises the question of how many strikes were conducted by Title 50 cover authorities (i.e., the CIA) or how many people were unintentionally killed, like 16-year-old U.S. citizen Abdulrahman al-Awlaki.

Second, we learn that a campaign of airstrikes intended to kill specific high-value targets — named Operation Haymaker — had, during a five-month stretch ending in February 2013, “resulted in no more than 35 ‘jackpots,’ a term used to signal the neutralization of a specific targeted individual, while more than 200 people were declared EKIA — ‘enemy killed in action.’” This implies that the unintentional killing of “military-age males” while targeting a specific individual, known as “signature strikes” for non-battlefield counterterrorism operations, was also a routine practice in Afghanistan. According to a U.N. report, “between 10,000 and 12,000” members of the Taliban were killed in 2013. Given the increasing reach of the Taliban today, high-value targeting — let’s call them decapitation strikes — may have killed a lot of suspected militants, but they were quickly replaced on the battlefield.

Third, “The Drone Papers” tell the story of Bilal el-Berjawi — a British-Lebanese citizen who grew up in the United Kingdom and was suspected of having ties to al Qaeda in East Africa by his mid-20s, leading the U.K. to revoke his citizenship and the United States to place him on a “kill list.” Although it is known that Berjawi was killed outside Mogadishu, Somalia, in January 2012 by a missile that struck his car, the Intercept revealed that the United States had been monitoring him for at least five years before his death, that he was the target of a covert special operations unit, and that surveillance of his cell phone helped facilitate the strike that killed him.

Unfortunately, in recent conversations with policymakers surrounding these programs, I have again learned that there is not just weariness about discussing them, but also a collective shoulder-shrug about the possibility of any serious investigations or reforms. In April, when Obama announced the deaths of three U.S. citizens and one Italian citizen in drone strikes, the chair and co-chair of the SSCI, Sens. Richard Burr and Dianne Feinstein respectively, declared that U.S. targeted killing policies should be reviewed. That never happened. And, of course, those close to the White House still claim U.S. counterterrorism operations were “reformed” in May 2013. They were not.

So, as impressive and important as “The Drone Papers” are, I am sadly certain that this balanced reporting and its eye-opening disclosures will not compel any new concerns or investigations in Washington. Nor should we ever expect them under this president and this Congress.

<http://foreignpolicy.com/2015/10/15/the-intercepts-drone-papers-revelations-mandate-a-congressional-investigation/>

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## **Welcome to the arms race for anti-drone weaponry**

Prisons have a drone problem. In August, a drug-carrying drone was caught ferrying half a pound of various drugs into Ohio's Mansfield Correctional Facility, sparking a full-blown fight when it landed in the yard. A year earlier, a similar landing took place at a maximum security prison in South Carolina,

followed by another in Australia. At the same time, French officials struggled with a rash of unexplained flights near nuclear plants, suggesting the threat isn't limited to prisons.

It's a classic technological imbalance: for a few hundred dollars, anyone can buy a machine capable of out-flying most of the security measures in place at an open-air facility. The FAA's drone registration proposal may even the odds a little, but law enforcement agencies are still surprisingly out-gunned if they need to take down a hostile drone. Short of shooting it down, what can a police officer or prison guard do?

The jamming itself is also illegal, presenting an even trickier legal problem. The FCC has a blanket ban on jamming devices, and there's no carveout expected for anti-drone technology. Federal agencies can get around the provision, since they report to the NTIA rather than the FCC, but the rule cuts out the vast majority of law enforcement, including state prisons like Mansfield. It also means that when the Drone Defender goes on sale to law enforcement next year, it will reach only a fraction of the agencies that might use it.

The cheaper alternative is to stop drones from lifting off in the first place. When Queen Elizabeth christened the Britannia this summer, UK police preemptively cleared out areas where a paparazzi drone operator might set up, using analytics from a local company called Cunning Running Ltd. Since operators need a line of sight, analysts were able to provide a limited space to clear.

Still, that tactic won't help in situations like Mansfield where the threat is effectively indefinite. In those cases, law enforcement is left waiting for a technical or regulatory fix that may not be coming any time soon. In the meantime, drone pilots will have a serious technical advantage over anyone who wants to take one down.

<http://www.theverge.com/2015/10/29/9631208/drone-defender-regulation-iacp>

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## **Flying Unmanned Aircraft: The Next Aviation Boom**

Bobby Breeden's great-grandfather dreamed of becoming a pilot and exploring Alaska, passions that inspired Bobby's father, Bob, who today flies bush airplanes and develops real estate in the Last Frontier State. Now Bobby, an Unmanned Aircraft Systems Science (UASS) student, has put his own short and sweet stamp on that legacy: He's a four-time winner of Alaska's famed Valdez Short Field Take Off and Landing (STOL) competition and a YouTube celebrity. "It's pretty special to think something like that can transfer through a family," says Bobby.

So why is a record-setting bush pilot studying UASS?

"It will be just like the next computer boom, and I'll get my foot in the door and have a degree," Bobby says. "I would love to work for a defense company and design UAVs, or work in the R&D department and take all these skills I've developed with designing and modifying and testing new airplanes and transfer them to UAVs."



But first he'd like a summer job flying for a Part 135 operator in Alaska, where he could earn \$20,000 to \$25,000 the first season. "But I don't think I'll spend my career flying in Alaska," he says, before admitting an interest in starting a backcountry touring company and perhaps marketing the airplanes that he and his father design. Meanwhile, he'll be in Valdez for the next STOL contest, doubtless inspiring more backcountry dreamers. Says Bobby, "I feel we're really setting the example for what's possible."

<http://www.flyingmag.com/careers/flying-unmanned-aircraft-next-aviation-boom#VbX05TXUAqZX1tw9.99>

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### **How Drones Make War Too Easy**

A report from the Council on Foreign Relations explores "several reasons why armed drones are unique in their ability to destabilize relations and intensify conflict." Commentary / Drones

The Obama administration should pursue a strategy that places clear limits on its own sale and use of armed drones lest these weapons proliferate and their use becomes widespread. These are the central findings of a new report by CFR Douglas Dillon Fellow Micah Zenko and Stanton Nuclear Security Fellow Sarah Kreps, published by the Center for Preventive Action (CPA).

Although only five countries have developed armed drones—the United States, Britain, Israel, China, and Iran—several other countries have announced their own programs. "India reports that it will soon equip its drones with precision-guided munitions and hopes to mass-produce combat drones to conduct targeted strikes in cross-border attacks on suspected terrorists. Rebuffed by requests to procure U.S. armed drones, Pakistan said it will develop them indigenously or with China's help to target the Taliban in its tribal areas." The report also notes that "Turkey has about twenty-four types of drones in use or development, four of which have been identified as combat drones," while Switzerland, France, Italy, Spain, Greece, and Sweden "have collaborated on the Neuron, a stealth armed drone that made its first demonstration flight in December 2012."

In addition, the proliferation of unmanned aircraft carries an increased risk of lethality because "drones are, in many ways, the perfect vehicle for delivering biological and chemical agents."

The authors write that the Obama administration faces two broad policy decisions: first, to determine the criteria and principles that would guide exports of drones; and second, to cultivate a set of norms and practices to govern their use.

"As the lead user of drones, the United States has the unique opportunity to determine which countries acquire these systems and hold them accountable for how they use those drones," Zenko and Kreps assert. U.S. drone exports should require commitment to the following principles: Peacefully resolving all outstanding border or maritime disputes; peacefully brokering domestic political disputes; protecting civilians from harm caused by other weapons platforms; and protecting human rights.

A set of norms to govern the use of drones would require increased transparency on U.S. drone strike practices and targeting decisions. “A guiding principle for how the United States describes and clarifies its drone operations should be based on type and specificity of information it wants to see used by other armed drone states.”

The report outlines other policy recommendations for the Obama administration, including:

Commissioning an unclassified study by a federally funded research institution to assess how unmanned aerial systems have been employed in destabilizing settings and identify the most likely potential future missions of drones that run counter to U.S. interests.

Appointing a high-level panel of outside experts to review U.S. government policies on targeting decisions and their transparency and potential effect on emerging proliferators, and propose reforms based on the President’s Review Group on Intelligence and Communication Technologies.

<http://www.defenseone.com/ideas/2015/10/how-drones-make-war-too-easy/123125/>

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## **Embracing the Drone Culture**

Over the weekend, the board of directors of the General Aviation Manufacturers Association (GAMA) created a new "associate member" category for electric and hybrid-propulsion aircraft. The reason for the new membership category is to hasten the worldwide development, growth and airworthiness certification of electric airplanes, which very well could play an important role in securing the future of general aviation.

This atmosphere of inclusion no doubt is a positive development in general aviation, but it doesn't go far enough. Unmanned aircraft, like the swarms of delivery drones envisioned by Amazon and Walmart, must be brought under the tent as well. We might fear a future that is dominated by UAVs encroaching on our airspace and flying freedoms, but that's exactly why we should be welcoming drone manufacturers to the table.

If we build a wall between traditional aviation and emerging unmanned aviation, all we'll do is ensure these aerial pursuits will travel divergent paths with divergent goals. By embracing UAVs as real aircraft, we can work with manufacturers, regulators and operators to ensure we'll all get along far into the future.

<http://www.flyingmag.com/blogs/course/embracing-drone-culture#9t5dBSTjVfyUDsYb.99>

<http://www.flyingmag.com/blogs/course/embracing-drone-culture?cmpid=enews102715&spPodID=030&spMailingID=23849257&spUserID=NDc4NjlzNjM1MwS2&spJobID=662780422&spReportId=NjYyNzgwNDIySO>

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