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UPCOMING EVENTS:

International Drone Expo (IDE), December 9-10, 2016, at the Los Angeles Convention Center

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NAVY/USMC:

Navy: Submarines Will Control Multiple Drones

The Navy's emerging drone strategy envisions a scenario where multiple drones can conduct ISR, search for mines and even find and attack targets.

Groups of underwater drones will soon simultaneously use sonar and different sensors to identify and destroy enemy submarines and surface ships, search for mines, collect oceanographic data and conduct reconnaissance missions – all while a single human performs command and control functions aboard a Navy ship or submarine, senior service officials explained.

Perhaps several submarine-launched underwater robots or Large Displacement Unmanned Undersea Vehicles could identify a threatening enemy submarine or surface vessel at distances far beyond the normal detection range.

Groups of integrated drones would then instantly relay pertinent data to underwater or ship-board computing systems and sensors. As a result, humans in a command and control function to access relevant information faster and more efficiently, providing commanders with a larger window with which to make critical decisions, Rear Adm. Robert Girrier, Director, Unmanned Warfare Systems, told Scout Warrior in an interview.

Using satellite integrated telemetry, some underwater drones can transmit information back to boats in near real time; this provides a substantial tactical advantage because smaller drones are less detectable to enemy sonar and therefore able to access areas that are more difficult for larger submarines to penetrate. Such a technology allows for closer-in reconnaissance missions when it comes to operating in enemy territory, close to the shoreline, or overcoming the anti-access/area-denial challenges posed by potential adversaries.

Correspondingly, a group of ship-launched aerial platforms such as Puma unmanned systems accompanied by swarms of mini-drones are might be able to beam back real-time video feeds of threats beyond-the-horizon, finding and possibly attacking otherwise out-of-range enemy targets such as fast-approaching small boats, ships or incoming anti-ship cruise missiles.

It is not inconceivable more timely identification of approaching threats and attacks at farther distances could mean the difference between life or death for crew members on board a ship or submarine.

Such scenarios, envisioned for the not-too-distant future, provide the conceptual foundation of the Navy's emerging drone strategy. The idea is to capitalize upon the fast increasing speed of computer processing and rapid improvements in the development of autonomy-increasing algorithms; this will allow unmanned systems to quickly operate with an improved level of autonomy, function together as part of an integrated network, and more quickly perform a wider range of functions without needing every individual task controlled by humans.

"We aim to harness these technologies. In the next five years or so we are going to try to move from human operated systems to human assisted systems that are less dependent on people. Technology is going to enable increased autonomy," Girrier told Scout Warrior.

The strategy is aimed at enabling submarines, surface ships and some land-based operations to take advantage of fast-emerging computer technologies. While not likely to be realized in immediate or near-term future, this trajectory will ultimately likely lead to the use of what's called "artificial intelligence." This involves the use of more independent, computer-driven unmanned systems to gather, organize and integrate a vast array of different information and sensor data – before providing it to human commanders.

Girrier explained that the emerging strategy is by no means intended to replace humans but rather leverage human perception and cognitive ability to operate multiple drones while functioning in a command and control capacity.

DoD

Perhaps multiple small drones could send out an acoustic ping and then analyze the return signal to pinpoint the location of a threatening enemy target – providing a submarine with the necessary data to launch a precision-guided heavyweight torpedo to destroy the threat from a safer distance.

"This is not talking about removing the human in the loop but optimizing humans and machines working together. Think about combining the creativity and agility of the human mind with a computer that does things faster - that is pretty powerful. That is at the center of our unmanned strategy," Girrier added.

The approach is designed as a mission multiplier to increase efficiency and perform a wider range of functions much more quickly. Armed with a small fleet of underwater drones, a submarine or destroyer will be able to perform higher-priority missions while allowing unmanned systems to quickly gather and transmit combat-relevant tactical and strategic information.

Unmanned systems will also increasingly be involved in strike missions to identify and attack enemy targets from the air, land or undersea domain, Girrier added. However, in a manner consistent with the development of other unmanned systems, decisions about the use of lethal force with drones will, according to Pentagon doctrine, be made by human beings in a command and control capacity.

Current Progress

The Navy's Unmanned Systems Directorate, or N99, was formally stood up this past September with the focused mission of quickly accessing emerging technologies and applying them to unmanned platforms.

Girrier explained how the process of increasing computing power is already underway with a handful of current Navy platforms, including the Navy's RQ-4 Alpha Global Hawk or Broad Area Maritime surveillance which has been operating in the Middle East region for quite some time now. The Navy Global Hawk is now being developed into a high-tech maritime-specific platform called the Triton; the Triton is engineered with particular maritime sensors, an ability to traverse through different altitudes and weather conditions and a special ability to operate in icy conditions.

The Navy has added a new software programmable radio technology to the RQ-4 system, giving it a much more efficient ability to transmit information. Software programmable radios can often operate on multiple frequencies with different waveforms to send IP packets of data, voice and even video across the force in real time. Each radio not only sends RF signals but also functions like a node or router in a wireless computer network. These radios allow the Navy to combine multiple radios into a single box, Girrier explained.

"Software reprogrammable radio is an ability to increase the configuration of a specific radio so that you do not have to change it out. Instead of having four different radios in different spectrum ranges, you have one box," he said. "Technology is allowing us to reconfigure things within the same size, weight and space."

In addition, the Navy is operating a small ship-launched Puma drone to provide over-the-horizon visual range for surface platforms, he added.

"This is helpful in counter-piracy and interdiction ops and has an enhanced recovery. It uses a GPS position to fly the UAS into a net and make it more precise, quicker and more efficient," Girrier said.

The Navy is also working with platforms called Wavegliders designed to collect oceanographic and hydrographic information, Girrier explained. For instance, a current underwater drone called the Seaglider uses buoyancy and wings to achieve forward motion as opposed to an electrically driven propeller. It is able to gather oceanographic data for long periods of time, collecting data and then sending it back.

The service is the early phases of developing an emerging program called the MQ-25 Stingray intended to be a carrier-launched unmanned refueling and ISR platform.

 Marlin Underwater Drone

 As further evidence of the Navy's progress toward computer-driven drones, the Navy and General Dynamics Electric Boat are testing a prototype of a system that would allow the launch and recovery of unmanned underwater vehicles and other payloads from the missile tube of a cruise missile submarine.

Called the Universal Launch and Recovery Module, the system houses, launches and recovers an underwater vehicle, a Lockheed-built 10,000-pound prototype vehicle called Marlin, from the submarine's missile tube.

The system is showing promise in early testing and was slated to go sea aboard a guided missile, nuclear powered submarine (SSGN), Electric Boat officials said.

The vehicle is designed for a range of potential underwater missions to include counter-mine patrol, sonar or other intelligence, surveillance and reconnaissance (ISR) missions.

Electric Boat and Navy officials explained how submarines have the ability to get really close to something.

The prototype vehicle is hooked up to temporary hydraulics and engineered to acquire a buoy at the top of the missile tube using a transponder, officials explained.

Marlin comes out of a tube, rotates, and then deploys. It goes off and does its thing — mine warfare, ISR, etc. –Then it comes back and it mates with that buoy before it is brought back down into the tube, Electric Boat developers said.

Once a tactical version of the technology is built, it will fill up the launch tube out to 60-inches in diameter and stretch as long as 23-feet. The vehicle could weigh up to 30,000-pounds.

The prototype vehicle is controlled by two laptop computers, removing the need to adjust the infrastructure of the submarine in order to accommodate the system, Electric Boat officials explained.

It is a gigantic elevator that will take up to 30,000 pounds and raise it from inside the ship to outside the ship. We're not modifying the submarine's infrastructure to control this," an Electric Boat developer described.

In addition to being configured to swim from an SSGN, the system is also being configured by Electric Boat and the Navy to work from the Virginia Payload Modules of Virginia-Class attack submarines to begin construction by 2019.

http://www.scout.com/military/warrior/story/1676543-navy-submarines-will-control-multiple-drones

Navy's newest risk-taker is unmanned ship that can cross Pacific

SAN DIEGO — Part trimaran and part robot, this odd-shaped ship is an unusual fit at the naval pier.

What's even more unusual is this self-driving vessel is designed to travel thousands of miles through the ocean and conduct its mission without a single crew member on board.

At 132 feet long, the Sea Hunter is a prototype of the largest unmanned ship in the world and Navy officials are now looking at the sea drone's potential to revolutionize fleet operations.

It is light, relatively cheap as far as warships go and can get to places that until now required human exposure, making it an appealing option for risky missions such as trailing a submarine or probing for mines at sea. And, with a price tag of $23 million for the prototype, it was far more expendable than a $1 billion battleship.

"The fleet the Navy has today is a bit like playing chess, where all the pieces are kings and queens," said Scott Littlefield, who leads the program to develop this ship at the Defense Advanced Research Projects Agency, or DARPA. "So you have these extremely capable but very valuable platforms and you can't afford to lose any of them. In a sense, what were are doing is developing something more like a pawn. You can have much more of them. You can afford to lose them."

"It just opens up possibilities -- about how you configure a Navy and how you fight -- that are different than what we have today," he added.

Known officially as the Anti-Submarine Warfare Continuous Trail Unmanned Vessel, or ACTUV, the program started in 2010 when creative minds at the defense innovations lab decided to look at what could be done with a large unmanned surface vessel and came up with submarine tracking and trailing.

Until then, the Navy had been doing lots of work with smaller, unmanned sea vehicles that were meant to be launched from larger manned warships.

Wouldn't it be cool, they thought, if they could make something bigger, that could be launched from the pier and traverse the seas on its own for long periods of time. So, instead of the 10-ton, 40-foot vessels

that the Navy was launching off its Littoral Combat Ships, they developed this 145-ton automated ship that they could load with sensors and fuel pumps and send from San Diego to Guam – some 10,000 nautical miles, without a crew.

"So you get away from this idea of small things carried around inside a warship, to a future architecture that is really more a mixture of a manned-unmanned fleet," Littlefield said. "High-end manned vessels that are really capable but we have in limited numbers, augmented by potentially a whole lot of things that are quite a bit smaller but still pretty capable."

Navy brass weren't asking for a mid-sized surface warfare drone. But DARPA, the Pentagon's innovation center, isn't driven by requirements. These scientists are there to come up with "the art of the possible" and spark new ideas, Littlefield said.

If they don't know it's possible, they aren't going to ask for it, he said. "Sometimes, we lead the requirements a little bit."

Looking to Unmanned

It made sense for a Navy that operates in tens of millions of square miles of ocean and a need to connect its platforms, said retired Vice Admiral Pete Daly, a former Fleet Forces commander who now leads the U.S. Naval Institute.

"The Navy is always looking to extend its coverage," Daly said. "So now as a service with a strong background in technology and in this environment, it makes sense to have more independent vehicles and autonomous vehicles."

Besides, unmanned is the way of the future, he said. The Navy created a new department for unmanned platforms last year and continues to budget for new drone acquisitions. In 2013, the service launched an unmanned aircraft prototype, the X-47B, from a carrier and, while that program is slow in advancing, there are plans to develop it, a Navy spokesman said.

Similarly, the Navy is investing in unmanned underwater vehicles and has requested nearly $68 million in the 2017 budget for an ongoing program and an additional $634 million for creating new prototypes, said Lt. Kara Yingling, a Navy spokeswoman.

"The Navy has identified many values of unmanned warfare systems, such as reducing risk to human life, increasing situational awareness, survivability and lethality and bringing capabilities into previously inaccessible areas," she said. "We strongly believe we are making the right investments and recognize our systems will evolve over time and enable future unmanned and optionally manned programs."

So DARPA set out to create a vessel to track submarines, went about designing the ship and it's automated software, and then bringing Navy leadership on board to see if they liked what they saw. Ultimately, they did, but thought it could be useful in different missions, such as mine sweeping.

Steering the ship

The big challenge – and one that commercial and military industries alike were watching - was not related to programming the ship for missions. Rather it was more basic – making an automated vessel at sea capable of driving safely, Littlefield said.

If the ship couldn't follow the international regulations for preventing collisions at sea, known as Colregs, people wouldn't want to use it, he said.

They had to be certain that the ship would not only avoid a collision on the open seas, but obey the protocol for doing so. It needed to recognize which ship had the right of way and which would move – in any number of scenarios. And it needed to behave the way an experienced human mariner would behave, and if not, at least in a way that wouldn't throw off the other ships.

At one point, the ship did obey the rule, but instead of slowing down and going behind the stern of the other vessel, it did a whole loop before going behind the other vessel's stern, Littlefield said.

At first, they tested the system in a lab, then later on a surrogate ship – a small vessel they could use to test the program at sea.

DARPA worked with a company called Leidos to design and construct the ACTUV prototype. The idea behind the trimaran design was a narrow sleek hull that could slice through the water with ease without taking up too much unnecessary space.

Inside the main hull are three rooms – a machine room on either end and a center section containing banks of computer racks that are considered the brains of the ship.

Here lies the most proprietary part of the Sea Hunter – the only exotic technology on the vessel, Littlefield said. And while the Navy was willing to offer a tour, it did not allow any photographs on or inside the vessel.

To stabilize the ship, they designed external cross braces to hold smaller hulls at either side, giving the vessel the kind of stability it would need to navigate the high seas.

They used a fiberglass construction technique, using a mold and sandwiching foam core between layers of fiberglass, then vacuuming the air and pouring in resin that would cure and harden within a few hours. There was one mold for the hull, a second for the deck.

The way of the future

After building the prototype in Portland, Ore., the Navy last month towed it to San Diego, where it will undergo two years of testing and software development. The Navy placed a temporary operator house atop the vessel that will allow switching between manual and autonomous operations during testing. It can be removed later.

And being in San Diego, next to the fleet, they will have an opportunity to look closely at all the possible missions they can do with it.

But Daly warned the Navy was still just scratching the surface with its foray into drone warfare equipment. It's one thing, he said, to use drone aircraft in conflicts such as Iraq and Afghanistan, where the opponent has lower-end technology.

But if they all get wiped out in the first face-off with a "high-end" opponent, then the technology is useless.

Still, Daly said, he expects the Navy will broadly embrace unmanned technology in the coming years.

"In the next decade, we will see in the major warfare areas a pairing of manned and unmanned technology," he said. "I believe you will see a truly broad acceptance of autonomous vehicles out there, operating on their own and phoning home when they need to."

http://www.stripes.com/news/navy-s-newest-risk-taker-is-unmanned-ship-that-can-cross-pacific-1.413800

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Navy wants drones to help drones

While drone-on-drone fights are still thought of in the future tense (which isn't to say forces aren't preparing for them) drone-to-drone cooperation is here now – in the form of swarming, for instance.

With the Navy developing unmanned vehicles – in the air, on the surface and below the ocean – these systems, designed to operate far away from human operators, will need fuel and data updates. The Office of Naval Research has proposed a potential solution – let other drones take care of it. After all, one of the draws of unmanned technologies are their endurance capabilities. Diverting manpower and manned assets to perform these services or forcing unmanned platforms to cut mission time to refuel, to some degree, diminishes the role that long endurance plays.

Specifically, ONR's effort is aimed at aiding Fleet-class unmanned surface vehicles – vessels approximately 38.5 feet in length with full-load displacement of 21,400 pounds that tow mine-countermeasure sweep gear, support anti-submarine warfare, surface warfare and/or electronic warfare missions. The Navy is developing various unmanned surface vehicles (USVs) that are launched and recovered from host ships, but also a remote fueling and data transfer system more proximate to the USV than the host ship to increase endurance mission time, as opposed to having the USV return the host ship for these tasks.

ONR, in its solicitation, envisions the fuel source platform as another USV or a barge, a small vessel, a bladder or something else entirely. The refueling sequence between the two vehicles should be automated, ONR said, only requiring the human supervision of a remote operator. To save time, individual USV refueling and data transfers should be done simultaneously.

Offerors will design, build, test and demonstrate a prototype of the Offboard Refueling and Data Transfer System (ORADTS) with requisite hardware and software, although ONR noted that

development of new technology for data transfer is outside the scope of its notice. Offerors must leverage existing technologies.

The metric for at-sea testing would be ORADTS's ability to refuel 650 gallons of fuel – the Fleet class USV can carry 400 and 650 gallons of diesel fuel, using fuel at a rate between 25 and 40 gallons per hour – and transfer 2 terabytes of data without errors with a 45 minute threshold and an objective time of 30 minutes.

In a perfect world, the fuel source platform will be based on an inexpensive, readily available maritime vessel either already in the Navy's inventory or available commercially.

Responses are due by Sept. 20, 2016.

https://defensesystems.com/articles/2016/06/08/navy-onr-drones-to-refuel-update-drones.aspx

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The U.S. Navy's Plan to Dominate the Sky in the 2030s and Beyond

The United States Navy has officially kicked off its analysis of alternatives (AoA) for a future replacement for the Boeing F/A-18E/F Super Hornet strike fighter and its EA-18G Growler electronic attack derivative.

The Next Generation Air Dominance (NGAD) effort – which until recently used to be called the F/A-XX – will study a range of options to replace the service's aging strike fighter fleet in an era of renewed great power contest where the threat environment promises to grow evermore challenging. But unlike previous Pentagon programs, the NGAD may not be a single new airframe – rather it might be a family of systems.

"The AOA began formally after the signing of the Materiel Development Decision Acquisition Decision Memorandum on 16 May, 2016. The AoA will run for approximately 18 months," Lt. Kara Yingling, a spokeswoman for the Navy's N98 Air Warfare division told The National Interest.

"Navy is considering a full spectrum of potential alternatives to balance capability, lethality, affordability, and survivability. The solution may be comprised of a family of systems across multiple domains vice focusing on a single aviation platform."

While the NGAD program might ultimately produce a collection of different platforms, weapons and other technologies, the core concept remains to address the capability gaps that might open up when the F/A-18 family is finally retired.

"The AoA team is looking to replace the capabilities from F/A-18E/F and EA-18G when those aircraft reach the end of their service lives, Yingling said.

"The F/A-18E/F and EA-18G currently cover a wide spectrum of mission sets in support of the Carrier Strike Group (CSG) and Joint Operations, including fleet air defense/air superiority, and strike. The study

will identify a capability replacement solution that preserves the effectiveness and viability of the CSG amidst emerging/evolving threats."

Those emerging threats include – among many others – a host of new enemy aircraft like the Chinese Chengdu J-20 and J-31 and potent new air and missile defense systems like the Russian-built S-400 and S-500.

And the problem is not just the performance of individual enemy missile batteries or aircraft, both the Russians and Chinese have learnt to network their forces together into a coherent whole, as Rear Adm. Mike Darrah, the Navy's program executive officer for unmanned systems and strike weapons described at the Navy League's Sea, Air and Space symposium in May. Moreover, it's not just the threat to the Navy's aircraft, new Russian and Chinese long-range anti-ship cruise and ballistic missiles – particularly Beijing's DF-26 – have the ability to threaten an aircraft carrier far out to sea.

The Navy hopes that it will be able to use a family of systems approach to develop the NGAD capability to overcome those threats and maintain the carrier's role as the dominant maritime power projection platform without breaking the bank. "A family of systems approach enables the team to consider independent solutions for each mission/capability without the constraint of having to package the solutions into a single multi-role platform," Yingling said." Each component of the solution set will be designed to integrate seamlessly into the Carrier Air Wing (CVW), resulting in an overall improvement in CSG capability."

The Navy is not sure what kinds of new technology the NGAD family might incorporate, but the service is casting a wide net to find the most useful innovations.

"The AoA team is currently exploring current and emerging technologies with industry counterparts and the developmental science community – including ONR [Office of Naval Research], DARPA [Defense Advanced Research Projects Agency], service research labs, and other organizations – in order to identify the best candidates to invest in to fill the gaps created by the retirement of the F/A-18E/F and EA-18G in the 2030's," Yingling said. "Focus areas include next generation power and propulsion systems, advanced data links, communications, weapons, manned and unmanned pairing, etc."

The Navy has never been a huge proponent of low observable technology like the Air Force or Marine Corps has – indeed the last chief of naval operations, Adm. Jonathan Greenert, publicly stated "that stealth maybe overrated." But the Navy will consider the use of stealth technology on the NGAD. "Stealth will be one of many attributes taken into consideration, but will not necessarily be the driving factor in determining the best solution set," Yingling said. "It is too early for the AoA team to ascertain how much of a role stealth will ultimately play."

Nonetheless, Air Force officials who are working with the Navy on the Pentagon's next-generation air superiority effort said that the Navy's NGAD program is aimed for a more benign, more defensively oriented role than their service's Penetrating Counterair (PCA) capability – which also confusingly used to be known as the Next Generation Air Dominance, despite being a separate program. The Air Force

program will be aimed at developing the capability to penetrate into denied airspace, annihilate enemy air defenses and then effectively seize control of that airspace.

Like the Air Force, the Navy has not determined if the NGAD will be manned, unmanned or a combination of both.

"The AoA team will thoroughly explore both the capabilities and limitations of these concepts and systems. It is too early to determine how these concepts will shape the recommended solutions," Yingling said. She added that the Navy hasn't even decided if the NGAD will include a new aircraft platform. "The AoA team will answer that question over the course of the study. While an air vehicle of some type may be required, it is not presumed."

With the Navy hoping for an Initial Operating Capability date in the mid-2030s, the service hopes to kick off the development of NGAD relatively quickly.

"Upon completion of the analysis, a final report will be generated that outlines the results of the study and the subsequent recommended solutions," Yingling said. "Once the study is declared sufficient and the recommendations are accepted, Navy will commence the process of Capability Development. This process could start as early as six months from the start of the analysis."

While the Air Force and Navy are loathed to develop another joint aircraft after their torturous experience with the Lockheed Martin F-35 Joint Strike Fighter, the two services are coordinating their efforts.

"The Navy will continue to coordinate and collaborate with the Air Force for the duration of both service AoAs," Yingling said. "The AoA teams openly share perspectives in order to functionalize interoperability, improve efficiency, and effectively leverage the knowledge base of both services. This includes the joint execution of modeling and simulation scenarios using common threat baselines that emphasize interoperability."

The question, of course, that remains unanswered is how the Navy hopes to pay for the NGAD given its budget constraints.

http://nationalinterest.org/blog/the-buzz/the-us-navys-plan-dominate-the-sky-the-2030s-beyond-16479

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Navy's Modular, Portable Bomb-Disposal Robot Clears Critical Design Review

The Navy's newest man-portable bomb-disposal robot has been approved for fabrication and testing after passing a critical design review, the service and manufacturer Northrop Grumman said Tuesday.

Increment 1 of the Advanced Explosive Ordnance Disposal Robotic System (AEODRS) was given the Navy's stamp of approval for satisfying cost, schedule and performance requirements. The program will now enter system fabrication, assembly, integration and test.

The Naval Surface Warfare Center Explosive Ordnance Disposal Technology Division has awarded Northrop Grumman a $483 million contract for Increment 1 in September.

AEODRS increment one is the dismounted operations system designed for explosive ordnance disposal reconnaissance and threat assessment. The CDR provided an in-depth assessment, by a government team of experts, managers and Navy and Marine Corps users, that the final design for the AEODRS dismounted operations variant and the development program is technically realistic and achievable.

"The successful CDR so soon after contract award clearly shows the commitment of the Navy and Northrop Grumman team to fill this key gap for EOD robotic operations," said Dan Verwiel, vice president and general manager, missile defense and protective systems division, Northrop Grumman Mission Systems. "We will continue our close collaboration with the Navy and user communities to ensure the delivery of a quality system that meets Navy requirements."

The AEODRS program aims to create a family of interoperable unmanned ground vehicle (UGV) systems into which emerging technologies can be rapidly integrated.

The "back-packable" increment one system is the smallest member of the AEODRS family, weighing less than 35 pounds including the handheld operator control unit, and various mission modules and sensors. Its primary mission is reconnaissance and information gathering.

All members of the family of bomb-disposal robots are meant to operate the same interchangeable "modules," making them interoperable and easily upgradeable across the range of systems.

Each system comes with a mobility capability module, a master capability module, a power capability module, a manipulator capability module, end effector capability module, visual sensors capability module, autonomous behaviors capability module and other minor components.

Naval Sea Systems Command awarded AEODRS increment one on Aug. 31, 2015 to the Northrop Grumman team that includes Bokam Engineering, Carnegie Robotics, Harris Corp. [HRS], Hunter Defense Technologies, Neya Systems, QinetiQ North America, and Telefactor Robotics. Northrop Grumman's offering uses a modular, open systems approach that allows the robot to be quickly adapted for a variety of mission scenarios.

Increment two is a medium-sized wheeled robot that must be transported by and EOD response vehicle and by two people over short distances. That increment entered engineering and manufacturing development in late 2015. It will replace the EOD Man Transportable Robotic System, which entered production in 2005, to perform reconnaissance and "prosecution" of a wide range of items, according to the Navy.

The third and heaviest variant, called the Base/Infrastructure Operations system, will require transportation by large response vehicle or a trailer. It is designed to perform maximum load/lift capabilities and the widest-range of EOD neutralization, render-safe, and other special capabilities, according to the Navy.

http://www.defensedaily.com/navys-modular-portable-bomb-disposal-robot-clears-critical-design-review/

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Italian Radar to Equip US Navy's Fire Scout Drones

ROME — A new electronically scanned radar built by Italy's Leonardo-Finmeccanica has been selected for the US Navy's MQ-8C Fire Scout helicopter UAV, the service has announced.

Under a $5.8 million contract awarded May 26, the US Naval Air Systems Command will acquire the new Osprey radar, produced by Leonardo-Finmeccanica's Airborne and Space Systems Division.

The 360-degree airborne radar uses fixed panels distributed around the body of aircraft and has already been sold to the Norweigan Air Force for use on its AW101 search and rescue helicopters, as well as to two unnamed US customers.

Raytheon to support Fire Scout software

Leonardo-Finmeccanica, which is successfully focusing on the market for small e-scan radars for UAVs and smaller aircraft, claims the Osprey does away with the need for bulky, rotating radars on the belly of aircraft.

Weighing 50 kilograms, the radar mounts antennas weigh just over 11 kilograms each.

http://www.defensenews.com/story/defense/naval/naval-aviation/2016/06/10/fire-scout-drone-uav-radar/85690866/

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ARMY:

Joint Air-to-Ground Missile Fired From Drone

WASHINGTON — The missile intended to ultimately replace the Hellfire was fired from a Gray Eagle unmanned aircraft system and hit a moving truck target at Dugway Proving Ground, Utah, according to the US Army's Joint Attack Munition Systems project manager.

Col. James Romero, who works out of the Missiles and Space Program Executive Office, which also manages Hellfire and Hydra 2.75 inch rockets, said the Joint Air-to-Ground Missile (JAGM) flew at a range of "slightly longer" than 8 kilometers at a "nominal altitude" as Predator unmanned aerial vehicles

operate. The missile, intended to be fired from a variety of aircraft, engaged a moving truck on the ground traveling about 20 mph.

The May 25 test marks the first time the JAGM missile was tested on an unmanned aircraft system.

"This missile has several modes and the missile successfully engaged the target without having to track and perfectly aimed the platform at that target," Romero said. "So this missile is really flexible in that it allows the pilot to sometimes be engaged or track the target the entire time or to leave the engagement and let the missile finish its engagement on its own."

The Gray Eagle test was the seventh flight test for the JAGM missile. The missile was previously tested on Apache attack helicopters and Marine Corps Cobra helicopters.

The $66 million JAGM missile engineering and manufacturing development contract was awarded to Lockheed Martin last summer. The contract could ultimately be worth up to $186 million, as it includes two additional options for low-rate initial production valued at about $60 million each, the Army has said.

The missile is designed to hit stationary and moving targets, and is intended to reach initial operational fielding in 2018, according to Romero.

At the end of 2017, the Army will conduct a limited user test with pilots firing JAGM missiles from Apaches in what is believed to be typical operational scenarios, Romero noted.

Starting in August, the Army plans to take production quality missiles through the paces, testing JAGM for safety and lethality in all environments. An important part of the EMD phase, Romero said, will be to get JAGM air worthiness releases to be deployed on Apaches and Cobras.

The JAGM missile's threshold requirements are to fly on the Apache and Cobra, Romero said, but the Army is considering what other platforms on which to test JAGM's capability — defined as "objective" requirements. Gray Eagle is an obvious candidate considering it carries Hellfire and also will be teamed with Apaches in reconnaissance missions.

http://www.defensenews.com/story/defense/2016/06/02/jagm-fired-unmanned-aircraft-first-time/85316700/

http://breakingdefense.com/2016/06/jagm-whacks-truck-in-first-first-drone-test/

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Apache helicopters now have real-time drone vision

The latest upgrades add direct control of nearby unmanned vehicles.

After 30 years in service, the Army's AH–64E Apache attack helicopters now have the ability to fly with an unmanned wingman. A new system called Manned-Unmanned Teaming (or MUM-T) allows Apache

flight crews to tap into the real-time video feeds, sensors and control systems of nearby Army Shadow and Grey Eagle drones. According to Scout Warrior, the system is already being used in Afghanistan.

"Now before the unit even deploys out of the Forward Arming Refueling Point, or FARP, they can actually bring up the UAS (drone) feed, look through the sensors and see the target they are going to attack up to 50 or 60 miles away," Colonel Jeff Hager of the Army's Apache program told Scout Warrior. The system also allows the helicopter crews to keep tabs on moving targets why they are en route to a destination.

The MUM-T system is similar the Navy's similar cloud computing efforts to share data between drones, manned aircraft and combat ships. The AH-64E, meanwhile, is the latest version of the Apache platform, which boasts a new engine, composite rotor blades and next-generation avionics that make it a lighter, faster and more maneuverable model that the previous Delta edition. The "E" models have already begun flight missions in Afghanistan, but the Army plans to have an arsenal of 690 total AH-64Es by 2025.

Drone-Helicopter Teams Performing 'Very Well' Against ISIS

Future unmanned-human teaming looks a lot like the Predator's little cousin.

Over the smoking sands of Iraq, the military is coming to rely on formations of 20-foot drones, working with Apache attack helicopters against the Islamic State. Such operations have just pushed the Textron Shadow UAV past 1 million flight hours, becoming the first of the Army's mid-range, or Group III drones, to hit that milestone.

The Army is now talking publicly about the first heavy attack reconnaissance squadron to deploy and return with the Apache-Shadow combination, the service's Shadow product manager told reporters in a conference call on Monday. That would be 3-6 Cavalry out of Fort Bliss, Texas, which returned from Iraq two weeks ago.

"We are starting our after-action reviews with them, from an Apache standpoint and a Shadow standpoint, going and talking to the unit, how did the mission go," said. Lt. Col. Tory Burgess. "The information that we're getting back is that the Shadows performed very well."

The Shadow that actually took the type past the 1-million-hour mark belongs to the 2nd Cavalry Regiment in Germany, Burgess said.

"It took us a day or two, but we dove down and determined that that was the crew," he said.

Compared to the more famous MQ-1 Predator or the larger MQ-9 Reaper, the Shadow, introduced in 1999, is smaller — small enough to launch from a catapult. It is also far less costly; Textron doesn't disclose the price, but it's a good deal less than the $5 million Predator or a $13 million Reaper. As a Group III drone, it lacks the range of the Group IV aircraft. It's not a bird you pilot from the other side of the world, but that matters less to some of the potential government buyers of today's ISR and armed drones.

Every service "would like the Group IV capability inside a Group III that's runway-independent," said Burgess. Read that to mean a drone that works like a Predator, but that you don't need a runway to launch, and that's what a smaller drone gives you.

They aren't alone.

"There has been a lot of interest in this system or variance of this system in the Middle East region as well as several countries in Europe," Textron senior vice president William Irby told reporters on a call on Monday. One of the Ukraine government's enduring wish list requests is drones that can withstand jamming from top-of-the-line Russian electromagnetic warfare equipment and techniques.

The Shadow can be armed; Textron has spent a lot of its own money to demonstrate with a light Hellfire-esque missile called the Fury, modified from a Thales design. But the Army currently has no plans to missile-up the Shadow for combat and current arms trade restrictions prohibit Textron from selling armed variants of the drone to other militaries.

But the appetite is present in the Middle East. And rival weapons-making nations are anxious to meet new demand. Consider the burgeoning market for small, armed Chinese drones in Saudi Arabia, the United Arab Emirates, and Egypt.

Regardless of whether the Pentagon ever puts missiles on the Shadow, or allows it to sell armed variants abroad, the U.S. military sees the drone as a key part of the Army's arsenal until 2030. They will look to improve the drone with more laser designators to help targeting.

"Currently, a platoon of four air vehicles only has two laser designators and two non-laser designators associated with it," said Burgess.

They're also looking to toughen the Shadow against bad weather, two inches of rain per hour, mostly so the drones, operated on the ground, can keep up with helicopters.

"While you can't see much in two inches of rain per hour," he said. "You can be a better teammate with your Apache partner. So as we look at manned-unmanned teaming, we need to be able to fly in the same sorts of environments that the Apache does."

The last big area of improvement for the Army is making the Shadow easier for service people to operate, to "make it easier on the soldier operator… It's very important to us to take the load off the soldier."

USAF:

Robots could eliminate explosives, rebuild airfield after attack

The Air Force wants its bases to be up and running as quickly as possible following an airstrike or other attack — so it's asking businesses for help.

The service is working with RE2 Robotics, which is developing a robotics system that would inspect an airfield for unexploded IEDs, ordnance and other debris in the aftermath of a hostile airstrike or attack, eliminate any dangers, and repair the damage.

"We are demonstrating capabilities the Air Force can use," Jorgen Pedersen, president and CEO of RE2 Robotics, told Air Force Times last week.

The company signed a three-year, $3.3 million subcontract with Applied Research Associates May 24 to test its robotic system at Tyndall Air Force Base, Florida, under the Air Force's rapid airfield damage repair program.

"If you had an airstrike ... and you need to quickly assess where the damage is, mitigate that damage, and then do the minimal amount of repair to get aircraft back into action," that's what this robotic system is for, Pedersen said.

The goal is to get an air base functional and keep airmen out of harm's way. The RADR system would have a two-pronged approach: an air surveillance vehicle surveying the damage, and a ground, Rover-like robot that would roll through the rubble.

Pedersen said RE2 right now is only responsible for the mobile ground unit, but there will be other elements — such as a laser that can "zap" unexploded ordnance — to safely bring an airfield back into operation.

"The final phase would be an asset to repair the runway," Pedersen said. RADR would survey the area in about 30 minutes, and getting the base to a basic, functional operation should take "only hours," he added.

RE2 is in the process of making a handful of prototypes and testing them at Tyndall's open ranges. The Pittsburgh-based company hopes to bring the first systems to a few bases in three years.

Pedersen said the system could "easily be applied to other explosive ordnance disposal operations in the other services, too."

"It will be about three to five years until this system can be deployed," he said.

New Air Force Drones Will Perch Like Hawks, Stare, and Destroy

Killer drones will become more like birds if the U.S. Air Force has anything to say about it.

The Air Force wants miniature drones that can perch and wait days or weeks for a target before attacking with an explosive warhead. Prototypes are already flying.

Battery power is the biggest limitation for small drones. Consumer quadrotors like the DJI Phantom can fly for half an hour or so. Fixed-wing craft like the military RQ-11B Raven stretch this to 90 minutes, but not nearly enough for prolonged surveillance. One way to get around this problem is to land—then only the camera and communications systems are drawing power. Perching has two other advantages: a stationary drone is less conspicuous than one circling overhead, and it has a stable vantage point close to the target. It's better to watch from a tree 100 feet away than a Predator at 10,000 feet.

Some drones already have "perch and stare" capability. AeroVironment's Qube, a quadrotor built for the police and military, can set down on any flat surface with its long landing legs. Quadrotors can set down easily enough, but landing is harder for fixed wing drones, especially when flat surfaces are not available. A truly useful drone would be able to perch as easily as a bird, taking advantage of streetlights or tree branches.

 It's better to watch from a tree 100 feet away than a Predator at 10,000 feet.

The Air Foce has funded considerable research into this area, some of it under the Perching Micro Air Weapon project. This calls for a bird-sized drone able to land on structures—"power lines, trees, buildings, ground, etc"—send back video from three miles away, then take off again and perch elsewhere. The drone would carry a small warhead "on the order of half a pound of high energy explosive which will be used to target people and/or lightweight vehicles," similar to the existing SwitchBlade lethal drone.

If you saw the recent thriller Eye In The Sky starring Alan Rickman and Helen Mirren, that movie features not only a USAF MQ-9 Reaper watching from overhead, but two more exotic drones like the ones the Air Force wants to build. One resembles a bird, the other an insect. The drones in the movie have flapping wings, but the Air Force is taking the simpler approach of using fixed wings or rotors. The Perching Micro Air Weapon can do something the drones in the movie cannot: recharge itself by solar cells or other means. "The ability to harvest power/energy from external sources is critical to persistent surveillance," the specification says. This would allow a drone to wait days for the right moment to strike a target.

Perching is a surprisingly complicated manuver. Thankfully, birds perfected the technique millions of years ago and researchers have gleaned much valuable information from watching slow-motion video of

them. Perching involves a well-controlled stall just above the perch, halting in mid-air so the bird just drops on to the surface. Even a clumsy flyer like a heron can land neatly on a fence, and drones ought to be able to do the same.

Bhargav Gajjar of Vishwa Robotics developed perching legs for drones based on a hawk. The spring-loaded claws have a powerful grip that should help make up for any residual speed that might otherwise cause the drone to bounce off its perch.

The Air Force didn't choose Gajjar's design, but two other projects made it to prototype stage. The version of the Perching Micro Air Weapon developed by Design Intelligence Incorporated with assistance from Oklahoma State University resembles a bird and could pass unnoticed almost anywhere. The drone has a modular design so that, like the Israeli ROTEM quadrotor, the payload can be switched from intelligence-gathering to lethal strike version. However they never actually fitted the drone with explosives. "The project was very successful, but the Air Force decided not to pursue it any further," James Grimsley, CEO of DII, told PM. DII has now moved on to developing small, solar-powered drones for non-military and commercial applications.

The other prototype appears to have progressed further. The 3-lb. drone made by Aethermachines Inc is a more radical design that the company describes as "insect-like". The 3D-printed drone has two shrouded rotors and takes off and lands vertically. The rotors act as wheels on the ground so the insect drone can scuttle along inside buildings and other closed spaces. It has a tiny ultrasonic sensor which, along with a set of accelerometers, allows it to perch.

Flight time is only 10 minutes per charge, but the insect can recharge itself in 40 minutes by perching on a power line and scavenging energy. This is its camouflage. Rather than pretending to be a monster insect, the drone is disguised to like any of the other anonymous black boxes hanging out near power equipment that nobody ever notices. Aethermachines's insect is a bomber rather than a kamikaze, with "the ability to aim and discharge the payload, allowing the MAV [Micro Air Vehicle] to return for reuse unless expendability is required by the mission." The payload can be either an explosive warhead or marking dye. With the latter, the target becomes a marked man easily identified later by security forces.

Perching drones might make good perimeter guards—like a minefield, but with human oversight and control.

Aethermachines patented an early design in 2010 that already had all these elements: the perching mechanism, power scavenging, rotor/wheels, color video camera, and "expellable offensive payload." The company claims it cannot discuss subsequent progress after the successful prototype. They may have passed it on to an industry partner for further development or production, as Aethermachines is not a manufacturer.

Meanwhile, there many new players in the field of perching drones. Some, like the aptly named GRASP Laboratory at Penn State, are working on claws that not only perch but also can pick up objects. Harvard's diminutive Robobees recently showed they can land on and stick to any surface using static electricity. Perching is unlikely to be a novelty for much longer.

Perching brings significant benefits, especially for military operations. Unlike other forms of airpower, perching drones can effectively occupy terrain, allowing the operators to see and engage any vehicles or people on foot in the area. Perching drones might make good perimeter guards—like a minefield, but with human oversight and control. They might move around to form ad-hoc unmanned checkpoints, reading the license plates of passing vehicles from roadside perches. Or they might, as the Air Force seems to imply, be used offensively, released from aircraft to find and attack specific individuals in urban environments, even inside buildings. The future of air war is sophisticated, small, and scary.

David Hambling's book Swarm Troopers: How small drones will conquer the world is out now.

http://www.popularmechanics.com/military/a21279/perching-drones/

NATIONAL AIR SPACE:

FAA senior advisor says agency might limit max speed, altitude of drones

Information poured into an unmanned helicopter's sensors as it approached a designated landing zone, only to find the area unsuitable for touchdown.

The drone, autonomously reacting to the world around it, quickly adjusted to find a better landing site and a safe path to approach the location through a tree line.

Video of the drone safely landing at the new site played across a screen behind Sanjiv Singh, a Carnegie Mellon Robotics Institute researcher and CEO of Bloomfield-based Near Earth Autonomy, as he addressed a seminar Friday in downtown Pittsburgh about the advances, opportunities and challenges surrounding unmanned aircraft.

The popularity of unmanned aircraft has skyrocketed in recent years, with more than 470,000 drone users registered with the federal government. But the industry's growth and popularity comes with insurance pitfalls, cyber-security threats and often conflicting state and federal regulations.

The Federal Aviation Administration does not provide formal commercial drone use rules, but private owners and companies that want to operate unmanned aircraft for non-recreational purposes must obtain special permission from the agency.

That could soon change. Marke "Hoot" Gibson, FAA senior adviser on unmanned aircraft systems technology, said FAA officials could announce new small-drone commercial use rules within the next few weeks.

The rules, currently in draft form, will apply to unmanned aircraft that weigh less than 55 pounds. Final rules could include provisions that would limit drone flights to daytime hours, speeds of 100 mph or slower, and an altitude ceiling below 500 feet.

Singh said the next frontier in drone technology will revolve around low-flying, autonomously controlled vehicles.

"They'll have to go to places they haven't been to before, they'll have to react to things that they haven't seen before, and then make decisions in real time," he said.

Such autonomy, looming on the technological horizon, is poised to complicate the patchwork of ethical, legal and regulatory challenges facing commercial drone use.

But it only further excited Maurice Moye, 31, as he watched Singh's presentation along with other industry experts at the seminar, hosted by international law firm K&L Gates and the Consumer Technology Association.

"I see so many places to grow with that," said Moye, co-founder of a Carnegie-based start-up called Apiary Productions LLC that hopes to soon offer aerial drone video and photography services to clients.

Gibson called the advent of that technology "the most fundamental change in aviation in our lifetime."

"We haven't seen this kind of thing since Orville and Wilbur (Wright) in terms of impact," he said.

Lawmakers at the local level have weighed in on unmanned aircraft questions, too.

Pittsburgh City Council last fall banned drones and model aircraft in city parks. Plum Council members have approved an ordinance prohibiting the use of drones near the U.S. Open Championship June 13-19 at Oakmont Country Club.

Such actions often result from specific incidents, like last summer when a man outside PNC Park flew a drone over a packed Pirates game, creating a potential obstruction over the field of play.

Seminar speakers said one of the industry's greatest challenges remains the need to nurture commercial innovation and opportunity while maintaining safety and security.

http://triblive.com/news/adminpage/10569768-74/aircraft-rules-unmanned

Updated analysis of FAA drone data shows decline in UAS sightings

The Academy of Model Aeronautics (AMA) has released an updated analysis of the Federal Aviation Administration's (FAA's) drone data, which finds a month-by-month decline in unmanned aircraft system (UAS) sightings since peaking in August 2015. The apparent decrease in monthly sightings is remarkable as it comes despite an influx of nearly 700,000 to one million new devices sold last year.

Meanwhile, consistent with AMA's prior findings, only 3.3 percent of reports in the FAA's latest data-set contained explicit notations indicating near misses or close calls.

"We're glad to see a decline in UAS sightings as more people are learning how to fly responsibly," said Dave Mathewson, executive director of AMA. "Education-focused campaigns like Know Before You Fly are clearly paying off. Every day more and more people are getting the information they need to stay safe."

AMA's updated analysis reviews the 582 drone sightings released by the FAA on March 25, 2016, (March 2016 data). This analysis also looks at trends in the March 2016 data and the previously released August 2015 UAS sightings, which were the subject of an earlier AMA report released on September 14, 2015.

AMA is a founding member of Know Before You Fly (KBYF), which was created in 2014 to educate newcomers to drone technology about the safety aspects of flying unmanned aircraft and where they should and shouldn't fly. Since its inception, www.knowbeforeyoufly.org has received almost half a million unique visitors — 81 percent of which are first time visitors.

In total, the website has had over 1.2 million page views since the campaign's launch. AMA and the KBYF campaign continue to work with manufacturers, distributors and retailers of UAS technology to include basic safety information in product packaging and at the point of sale.

Among the findings in AMA's updated analysis:

• In keeping with AMA's previous analysis, the number of near misses and close calls in the March 2016 data is very small — just 3.3 percent. The vast majority of the reports are sightings, which even the FAA's language acknowledges;

• notwithstanding estimates that as many as one million drones were sold during the 2015 holiday season, the number of sightings has not increased as one might expect. In fact, despite a dramatic increase in the number of small unmanned aircraft in the U.S. the number of reported sightings appears to be declining after peaking in August 2015;   • in line with what AMA found in the August 2015 data, many of the sightings may involve people flying responsibly and within the FAA's current guidelines. In the March 2016 data, AMA identified 38 sightings in which drones were reported to be flying at or below 400 feet;

• like the August 2015 data, the March 2016 data contains reports of several objects other than drones, including balloons, birds, a rocket and even a jet pack. The FAA's drone data continues to be a "catch all" for any object spotted in the sky; and

• despite the FAA's intent to find and punish careless and reckless operators, law enforcement notifications appear to be on the decline. In the August 2015 data, nearly 20 percent of reports were not referred to local law enforcement or law enforcement notification was unknown. In the March 2016 data the number of sightings not referred to law enforcement is up to 29 percent.

http://www.verticalmag.com/news/article/Updated-analysis-of-FAA-drone-data-shows-decline-in-UAS-sightings-

Near Earth Autonomy to develop software to enable safe unmanned aircraft flight

PITTSBURGH, 9 June 2016. Near Earth Autonomy won $754,000 under NASA's Small Business Innovation Research (SBIR) program to develop Safe50, a software module for unmanned aircraft systems (UAS), commonly referred to as drones.

Safe50 is intended to enable safe and robust unmanned aircraft (UA) flight, particularly during the first and last 50 feet of the take-off and landing phases.

"By working with NASA to enable safe take-off and landing for UAS in urban and cluttered locations, even in degraded conditions, Near Earth is taking a big step in developing the systems required for ubiquitous operation of UAS in the National Air Space," says Near Earth CEO Sanjiv Singh. "This is imperative to unlock the almost unlimited potential of UAS in all manner of commercial applications."

"The innovation is the first of its kind to guarantee safe UAS operation during all phases of flight in presence of unmapped obstacles, without GPS (global positioning system)," officials say.

The award supports NASA's interest in developing technologies that improve mobility, efficiency, and safety for UAS operations in the National Airspace System (NAS).

The project will be developed in partnership with NASA's Ames Research Center in Moffet Field, California.

With the increasing use of UAS in mapping, surveying, movie making, construction, inspection, law enforcement, agriculture, and other applications, enabling safe autonomous flight is imperative for the long-term success of the UAS industry.

"Near Earth's Safe50 will be the first system to provide a solution for the most challenging phases of UA flight, the first and last 50 feet of the take-off and landing, when a multitude of obstacles and poor GPS reception pose severe risks to the aircraft," company officials explain. Safe50 will accurately guide the UAS from take-off to landing in a fully autonomous manner, outside of the operator's visual line-of-sight (VLOS), without a direct link with a base station, and with intermittent GPS reception.

The development of Safe50 will provide real-world solutions to UAS users currently limited to line-of-sight operations and full GPS reception for safe flight. In an industrial setting, aircraft will have the ability to take off from a confined space, survey critical infrastructure, collect necessary data, and land safely without the interruption of plant shutdown. During a hazardous incident, the aircraft can be utilized to survey unsafe environments rather than putting a human at risk.

The NASA SBIR award builds on the capabilities of Near Earth's expertise in autonomy systems for UAS flight.

Near Earth currently is contracted with the Office of Navy Research's Autonomous Aerial Cargo/Utility System (AACUS) program to develop sensor suites and perception software to enable full-size cargo delivery to unprepared terrain. Additionally, Near Earth is the prime contractor on the DARPA-

sponsored project Miniature Optical Guidance and Navigation that is developing guidance and navigation systems for small and mid-size aerial vehicles.

Near Earth Autonomy is creating a future where unmanned aircraft are commonplace and safe, with technology that enables unmanned aircraft ranging in scale from sub-meter to full scale autonomously inspect, map, survey, and transport. The company's engineers work on applications in infrastructure, maintenance, agriculture, mining, emergency response, and cargo delivery.

Near Earth is a privately held, spin-off from Carnegie Mellon University.

http://www.intelligent-aerospace.com/articles/2016/06/near-earth-autonomy-to-develop-software-to-enable-safe-unmanned-aircraft-flight.html?cmpid=enl_IAS_IntelligentAerospace_2016-06-09&eid=288641596&bid=1429446

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Challenge to FAA Drone Authority Quietly Playing Out in Connecticut Federal Court

With little media attention, a hard fought battle is being waged in a federal district court in New Haven, Connecticut over whether small drones – so-called model aircraft – are indeed aircraft subject to FAA jurisdiction. This would be the first judicial decision regarding FAA authority to regulate small hobby drones. While many believe the issue was settled by the Pirker case, that case was a decision by the NTSB, an administrative agency which reviews FAA enforcement cases against pilots and other aviation operators. As many of you know, the FAA fined Mr. Pirker for allegedly operating a small drone in a careless or reckless manner over the campus of the University of Virginia. Although the case eventually settled, the issue of whether a small drone or model aircraft was subject to FAA authority was litigated before an administrative law judge (who ruled against the FAA) and then on appeal, the NTSB determined that a drone was an aircraft and subject to the FAA's prohibition on careless or reckless operation.

But that NTSB decision is not the final word on whether small drones are indeed aircraft. And it is not binding on the federal court that is reviewing a challenge to FAA administrative subpoenas issued to a Connecticut father and son, Austin and Bret Haughwout. The FAA is investigating the Haughwouts for two videos that went viral – one of a modified drone firing a weapon and another of a modified drone flaming a turkey on a spit. The Haughwouts have refused to submit documents subpoenaed by the FAA and to appear for depositions unless a court orders them to do so. The case unfolding in Connecticut right now is the FAA's attempt – through the Connecticut US Attorney's Office – to force the father and son to comply with the FAA's demands.

I spoke recently to the pro bono attorney designated by the judge to represent the Haughwouts, Mario Cerame of the Randazza Legal Group. Mr. Cerame told me that at the heart of his challenge to FAA authority is the FAA's definition of "aircraft" which he contends "is crazy" and would cover any contrivance that flies, including "paper airplanes, bullets and flags." At a hearing in March, Judge Jeffrey Meyer ordered the parties to further support their arguments regarding FAA authority over small

drones. Oral argument is set for July 6 at 10 am at the federal court house in New Haven. Mr. Cerame admits that for his clients to win, the Judge would have to determine that the FAA's position was "obviously wrong."   The Assistant United States Attorney handling the matter for the FAA was not able to comment because the matter is in litigation..

http://www.forbes.com/sites/johngoglia/2016/06/07/challenge-to-faa-drone-authority-quietly-playing-out-in-connecticut-federal-court/#1951e9147ab5

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FAA Announces Rebate Program for ADS-B Technology

The Federal Aviation Administration (FAA) is offering a $500 rebate for aircraft to install a surveillance technology known as Automatic Dependent Surveillance – Broadcast (ADS-B), officials announced Monday.

Aircraft are already required to be equipped with ADS-B by January 2020 as part of the agency's effort to implement a satellite-based "NextGen" system to improve the nation's air traffic control.

The FAA is hoping to speed up the process by launching the new rebate program this fall. It will offer $500 to the first 20,000 aircraft to install ADS-B. Planes that already have the technology will not be eligible.

The 2020 deadline will remain unchanged, but officials are expecting up to 160,000 aircraft to have the technology installed by that time.

"We are sending a signal today that we are serious about this, and we are putting our money where our mouth is," Department of Transportation Secretary Anthony Foxx said during a press call with reporters.

Aircraft with ADS-B use satellite technology to determine and broadcast position, enabling pilots and air traffic controllers to pinpoint exactly where any aircraft is at any given moment.

Foxx said the technology, which costs around $2,000 to install, can save lives because it improves situational awareness, allows real-time weather and traffic updates and improves communication where radar is limited. It also has the ability to improve route efficiency and air traffic.

"Many users are already seeing the benefits," Foxx said. "But the full benefits can only be realized if all aircraft are equipped."

http://thehill.com/policy/transportation/282363-faa-unveils-rebate-program-for-aircraft-surveillance-technology

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PUBLIC SAFETY:

'Know Before You Fly' Gets 500,000 Unique Users

Know Before You Fly has announced that more than 500,000 unique users have visited its website since the launch of the unmanned aircraft systems (UAS) education campaign in December 2014.

An estimated 700,000 UAS were to be sold in the United States in 2015, according to the Consumer Technology Association. In addition, more than 425,000 people have registered their drones since Dec. 21, 2015, according to the Federal Aviation Administration (FAA).

The robust traffic to the Know Before You Fly website is evident that the safety campaign is potentially reaching the majority of people flying or interested in flying UAS.

kbyfvisitorsThe graph to the right shows the monthly unique visitors to the Know Before You Fly website since the campaign's initial launch. The campaign saw a spike in visitors during the holiday season likely due to a number of consumers purchasing UAS for the first time. In fact, Dec. 25 (Christmas Day) saw the highest number of visitors (6,009) to the site. Additionally, the spike in December may have been helped by the FAA's Dec. 14 announcement requiring recreational operators of small UAS to register before the first flight outdoors.

The strength of the campaign is due to its nearly 100 supporters, which play an invaluable role in amplifying the campaign's educational efforts and informing the public by spreading the word about safe and responsible UAS use. Know Before You Fly lists several manufacturers, distributors and retailers as supporters, including Amazon, DJI, Horizon and Walmart.

The campaign also has a number of supporters from the manned and unmanned aviation communities as well as from a number of UAS training programs and research institutions, such as Virginia Tech.

Many of these companies and organizations have agreed to include UAS safety information on their websites, with their products and/or at point-of-sale. For instance, in December 2015, DJI began distribution of the campaign's safety brochures inside the packaging of all its U.S.-bound Phantom 3 and Inspire 1 UAS product series.

Amazon launched the Fly Responsibly Drone Store and the company links to the campaign's materials on Amazon.com. Meanwhile, Walmart is promoting a link to the Know Before You Fly website on its store shelves where drones are sold and a link to the campaign's website is included on receipts for UAS purchases made in-store and online.

Traffic to the website proves these education efforts are working. Nearly 41.6 percent of Know Before You Fly website traffic was referred from websites of campaign supporters', such as the FAA.gov (14,020 referrals), TowerHobbies.com (10,274 referrals), Amazon.com (6,821 referrals), BestBuy.com (6,193 referrals), Yuneec.com (6,171 referrals), HorizonHobby.com (4,815 referrals), and HobbyPeople.net (1,671 referrals). Additionally, one of every three visitors to the site has typed the URL directly into their browser, which means more and more people know the campaign by name.

Know Before You Fly was launched by the Association for Unmanned Vehicle Systems International and the Academy of Model Aeronautics in partnership with the FAA with the goal of spreading awareness about safe and responsible use of UAS.

http://www.uasvision.com/2016/06/03/know-before-you-fly-gets-500000-unique-users/?utm_source=Newsletter&utm_campaign=196d1f4bdf-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-196d1f4bdf-297560805

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Drone Taxis? Nevada to Allow Testing Of Passenger Drone

The idea: a drone taxi that can transport a single passenger for up to 23 minutes.

A Chinese company called EHang and the state of Nevada are trying to make this happen by moving forward with testing the EHang 184 drone. It's billed as the "world's first passenger drone capable of autonomously carrying a person in the air for 23 minutes," as The Guardian reported.

"I personally look forward to the day when drone taxis are part of Nevada's transportation system," Tom Wilczek, Aerospace and Defense Industry Specialist for the Governor's Office of Economic Development, said in a statement.

As The Guardian points out, that could take a while: "Given that fully autonomous road vehicles are unlikely to be widely available until the middle of the next decade, the time when commuters can simply jump in a flying autonomous taxi drone to get to work appears to be some time off yet."

The GOED and the Nevada Institute for Autonomous Systems reached an agreement with EHang last month and "will help guide EHang through the FAA regulatory process with the ultimate goal of achieving safe flight," according to the GOED statement.

The drone was first introduced in Nevada at the 2016 Consumer Electronics Show in January in Las Vegas. Testing is expected to begin this year at the Nevada FAA UAS Test Site, though no specific dates have been announced.

According to the video, the designer was inspired to design "an absolute safe aerial vehicle" after two of his friends were killed in airplane crashes.

The experience is meant to be extremely simple for the passenger. The company explains: "After setting up the flight plan with a single click, user can take off on any location, sit, relax and enjoy the flight."

It's that simplicity that has raised safety questions. As Business Insider wrote after the drone was unveiled, "The first question I had was what would happen if the flight-control tablet crashed or some technical issue arose mid-flight." Similarly, "there weren't any physical controls such as a steering wheel

or joystick to be found." The site says that according to EHang, there are "multiple fail-safes in place to take over if there's a specific failure," and a flight control center that "can intervene if necessary."

Federal Agencies Working Together to Combat Unauthorized Drone Use during Wildfire Operations

As the 2016 wildfire season begins, federal agencies are again alerting industry and the public that the use of private drones (Unmanned Aircraft Systems or UAS) over or near active wildfire operations puts firefighters at risk and hampers their ability to protect lives, property and natural resources. To underscore the dangers, the U.S. Department of the Interior, U.S. Forest Service and Federal Aviation Administration (FAA) have launched public education campaigns and are collaborating with industry to increase drone operator awareness of wildfire locations and the penalties for illegal UAS use in the area of a wildfire.

"The Interior Department and Forest Service believe these enhanced public education measures offer better public awareness about the use of drones and can reduce the risk of inadvertent drone use in wildfire areas that threaten the safety of our firefighters," said Mark Bathrick, Director of Interior's Office of Aviation Services. "The initiative to share initial wildfire location data with commercial mapping providers is especially promising."

"FAA's leadership to address the drone incursion issues by implementing the registration process and establishing enforcement protocols helps reduce the risks to our firefighters and the lives and property they strive to protect," said Art Hinaman, U.S. Forest Service Assistant Director for Aviation.

Last year alone, there were more than 20 drone encroachments over active wildfires. Two required pilots of firefighting aircraft to take evasive action to avoid a collision, 12 adversely affected the management of fire incidents, and one shutdown an entire highway corridor in California.

Working together to increase public awareness about the threats of flying a drone over a wildfire, the Interior Department, U.S. Forest Service and the FAA are continuing the "If You Fly; We Can't" educational campaign launched last year, warning the public of the dangers UAS pose to low-flying firefighting aircraft, firefighters and the public.

While the FAA establishes Temporary Flight Restrictions (TFRs) over most large wildfires and charts them on aviation planning tools, 98 percent of wildfires are controlled (stopped) within the first 24 hours without a TFR in place. As a result, 98 percent of the time responsible drone users, operating within current regulations, have no awareness that the smoke column they see is a wildfire, and that flying their drone could pose a risk to firefighters and firefighting aircraft that are protecting lives and property.

To help address this problem in 2016, the Interior Department's offices of Wildland Fire and Aviation Services have collaborated with industry to develop a pilot project to make initial fire location data publicly available to commercial mapping providers. This location information will increase awareness of drone operators; and ultimately, drone manufacturers could use the information to automatically "geo-fence" wildfire areas from entry by the drones they build and sell. This data will be available to the public by July.

Federal agencies recognize increasing public awareness is just one component of what needs done. To be effective, enhanced notification and law enforcement processes are required.

The FAA implemented a registration process for drones in 2015, which makes it possible to identify owners of drones caught interfering with fire operations. Additionally, the FAA developed detailed guidance to law enforcement for dealing with suspected unauthorized drone operations.

Complementing these initiatives, the National Wildfire Coordinating Group, an interagency body of senior fire officials from federal and state wildland fire management organizations, established improved drone incursion notification protocols for wildland firefighters. These protocols ensure fire managers receive critical drone incursion and location information so they can make timely decisions to either reroute firefighting aircraft or not fly until it is safe to launch them. The protocols also ensure consistent notification to the FAA and local law enforcement.

Detailed FAA guidance for members of the public flying drones for hobby or recreation purposes is available on its website. In concert with the new measures, the agencies remind the public to:

Register your drone;

Understand what "If you fly; We can't", means; and,

Understand the penalties for the unauthorized use of a drone in the area of a wildfire.

https://www.doi.gov/pressreleases/federal-agencies-working-together-combat-unauthorized-drone-use-during-wildfire

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SENSORS/APPLICATIONS:

CODE Takes Next Steps toward More Sophisticated, Resilient, and Collaborative UAS

DARPA's Collaborative Operations in Denied Environment (CODE) program seeks to help the U.S. military's unmanned aircraft systems (UASs) conduct dynamic, long-distance engagements of highly mobile ground and maritime targets in denied or contested electromagnetic airspace, all while reducing required communication bandwidth and cognitive burden on human supervisors. In an important step toward that goal, DARPA recently awarded Phase 2 system integration contracts for CODE to Lockheed Martin Corporation (Orlando, Fla.) and the Raytheon Company (Tucson, Ariz.). Further, the following six

companies—all of which had Phase 1 contracts with DARPA to develop supporting technologies for CODE—will collaborate in various ways with the two prime contractors:

CODE's main objective is to develop and demonstrate the value of collaborative autonomy, in which UASs could perform sophisticated tasks both individually and in teams under the supervision of a single human mission commander. CODE-equipped UASs would perform their mission by sharing data, negotiating assignments, and synchronizing actions and communications among team members and with the commander. CODE's modular open software architecture on board the UASs would enable multiple CODE-equipped unmanned aircraft to navigate to their destinations and find, track, identify, and engage targets under established rules of engagement. The UASs could also recruit other CODE-equipped UASs from nearby friendly forces to augment their own capabilities and adapt to dynamic situations such as attrition of friendly forces or the emergence of unanticipated threats.

"During Phase 1, we successfully demonstrated, in simulation, the potential value of collaborative autonomy among UASs at the tactical edge, and worked with our performers to draft transition plans for possible future operational systems," said Jean-Charles Ledé, DARPA program manager. "Between the two teams, we have selected about 20 autonomous behaviors that would greatly increase the mission capabilities of our legacy UASs and enable them to perform complex missions in denied or contested environments in which communications, navigation, and other critical elements of the targeting chain are compromised. We have also made excellent progress in the human-system interface and open-architecture framework."

CODE's prototype human-system interface (HSI) is designed to allow a single person to visualize, supervise, and command a team of unmanned systems in an intuitive manner. Mission commanders can know their team's status and tactical situation, see pre-planned and alternative courses of action, and alter the UASs' activities in real time.

For example, the mission commander could pick certain individual UASs from a team, circle them on the command station display, say "This is Group 1," circle another part of the map, and say "Group 1 search this area." The software then creates a sub-team with the circled UASs, divides up the search task among those assets, and redistributes the original tasks assigned to Group 1 assets to the remaining UASs. This capability significantly simplifies the command and control of large groups of UASs. Other parts of the HSI research focused on how to display the new plan, including potential impact on other mission objectives, and—depending on pre-set mission rules—either directly executes the plan or waits for the commander's approval to act.

A video showing promising early research into the interface is available below:

YouTube video #2 (UI demonstration): https://youtu.be/o8AFuiO6ZSs

The HSI and autonomy algorithms are being developed in open architectures based on emerging standards: the Future Airborne Capability Environment (FACE) and Unmanned Control Segment (UCS) standards used by the U.S. Army and U.S. Navy, and the Open Mission Systems (OMS) and Common Mission Command and Control (CMCC) standards that the U.S. Air Force uses.

During Phase 2, DARPA plans to implement an initial subset of the behaviors within each of the two open architectures and use those architectures to conduct live flight tests with one or two live UASs augmented with several virtual aircraft. If those tests are successful, DARPA could move to Phase 3, in which one team would test the capabilities using up to six live vehicles cooperating among themselves and with additional simulated vehicles. A single person would command the UAS team to perform a complex mission involving target search, identification, and engagement against an active, unpredictable adversary.

CODE seeks to deliver a software system that would be resilient to bandwidth limitations and communications disruptions, yet compatible with existing standards and capable of affordable retrofit into existing platforms. If successfully demonstrated, these scalable, cost-effective capabilities would greatly enhance the survivability, flexibility, and effectiveness of existing air platforms, as well as reduce the development times and costs of future systems.

http://www.darpa.mil/news-events/2016-06-03

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DroneDeploy Users Map 3,000,000 Acres

At the Drones Data X Conference in San Francisco, Mike Winn, co-founder and CEO of DroneDeploy, announced in his keynote that our users had achieved a new industry milestone: 3,000,000 drone mapped acres across 120 countries.

Drones combined with software platforms for collecting and analyzing drone data have become powerful tools for industry. Unfortunately, not everyone has been exposed to the value drones unlock across industries, such as within agriculture, construction, mining, inspection, real estate, research and more. And this is why achieving 3,000,000 drone mapped acres is important. It signals to those that have been observing from the sidelines that:

- Businesses are seeing increasing value in drones across all industries

- Drones are not a United States trend, but a global phenomenon

- Drone adoption is accelerating, even in the absence of clear regulation

http://www.uasvision.com/2016/06/09/dronedeploy-users-map-3000000-acres/?utm_source=Newsletter&utm_campaign=e225504cb4-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-e225504cb4-297560805

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COUNTER UAS:

Warning over home drones as researchers reveal how easy it is to hack the devices

Sales of drones are soaring - and so are the concerns about how easily these devices can be hacked.

Researchers have discovered that manufacturers are unknowingly leaving digital doors unlocked that give hackers an opportunity to wreak havoc on the system.

The team found three different vulnerabilities in the devices that allowed them to send rogue commands from a laptop to disrupts its normal operation, land it or send it crashing to the ground.

Researchers have discovered that manufacturers are unknowingly leaving digital doors unlocked that give hackers an opportunity to wreak havoc on the system. The team found three different ways to send rogue commands from a laptop that disrupts its normal operation, lands it or sends it crashing to the ground

HOW DID RESEARCHERS HACK THE DRONES?

The students performed wireless network penetration testing on a popular hobby drone and developed 'exploits' from the vulnerabilities found to disrupt the process of operators to control flights.

In the first successful exploit, the team attacked the drone with about 1,000 wireless connection requests, one right after another, each one asked to take control of the airborne device.

This event overloaded the vehicle's central processing unit and ultimately caused it to shut down -- sending it into what the team calls 'an uncontrolled landing'.

During the second exploit, the students sent the drone a massive data packet that exceeded the capacity of the buffer inside the aircraft's flight application – this caused the drone to crash.

And the final exploit forced the drone to make an emergency landing.

Researchers repeatedly sent a fake digital packet from a laptop to the drone's controller, telling it that the packet's sender was the drone itself.

Eventually, the drone's controller started to 'believe' it and severed contact with itself.

Recent sales show that the average cost of an unmanned aerial vehicle is more than $550 – depending on the technology and sophistication of the device.

And the Federal Aviation Administration predicts there will be 2.5 million hobby and commercial drones sold this year alone.

Hobby drones are used for recreation and aerial photography or videography, but commercial vehicles are designed for far more demanding tasks.

For example, these machines are used to survey fields like the eBee drone developed by the International Water Management.

This technology uses near-infrared sensors to identify stress in a plant 10 day prior to it being visible to the human eye.

Other advanced drones are used for search and rescue missions or delivering goods, like the ones being tested by Amazon.

However five graduate students and their professor from Johns Hopkins University found drone manufactures have left a few digital doors unlocked.

'You see it with a lot of new technology,' said. Lanier Watkins, who supervised the recent drone research at Johns Hopkins' Homewood campus.'

'Security is often an afterthought. The value of our work is in showing that the technology in these drones is highly vulnerable to hackers.'

The students performed wireless network penetration testing on a popular hobby drone and developed 'exploits' from the vulnerabilities found to disrupt the process of operators to control flights.

Shoppers leave a Wal-Mart in San Antonio, Thursday, Nov. 30, 2006.Wal-mart Stores Inc., the world's largest retailer, said U.S. same-store sales fell 0.1 percent in November, the worst performance in more than 10 years. (AP Photo/Eric Gay)

Wal-Mart to take on Amazon in the drone wars: Firm testing...

An 'exploit,' explained Michael Hooper, one of the student researchers, 'is a piece of software typically directed at a computer program or device to take advantage of a programming error or flaw in that device.'

In the first successful exploit, the team attacked the drone with about 1,000 wireless connection requests, one right after another, each one asked to take control of the airborne device.

This event overloaded the vehicle's central processing unit and ultimately caused it to shut down -- sending it into what the team calls 'an uncontrolled landing'.

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SHOOTING DOWN A DRONE IS A FEDERAL CRIME

You could be sent to prison and charged with a felony for shooting a drone from the sky.

According to the federal law, 18 USC S 32, anyone who willfully 'sets fire to, damages, destroys, or wrecks an aircraft' will be fined or imprisoned no more than 20 years or both.

And the FAA says drones fall into the category of 'aircraft' and threatening anyone operating a drone is also punishable with jail time.

Recent sales show that the average cost of an unmanned aerial vehicle is more than $550 – depending on the technology and sophistication of the device. And the Federal Aviation Administration predicts there will be 2.5 million hobby and commercial drones sold this year alone

The law says that if you attempt to shoot down a flying robot from the sky, you could face up to two decades behind bars, and/or be handed a fine up to a quarter of a million dollars.

These convictions are similar if you damaged a chopper or a commercial jet.

18 USC S 32 reads:

(a) Whoever willfully— (1) sets fire to, damages, destroys, disables, or wrecks any aircraft in the special aircraft jurisdiction of the United States or any civil aircraft used, operated, or employed in interstate, overseas, or foreign air commerce;

(5) interferes with or disables, with intent to endanger the safety of any person or with a reckless disregard for the safety of human life, anyone engaged in the authorized operation of such aircraft or any air navigation facility aiding in the navigation of any such aircraft;

(c) Whoever willfully imparts or conveys any threat to do an act which would violate any of paragraphs (1) through (6) of subsection (a) or any of paragraphs (1) through (3) of subsection (b) of this section, with an apparent determination and will to carry the threat into execution shall be fined under this title or imprisoned not more than five years, or both.

Researchers repeatedly sent a fake digital packet from a laptop to the drone's controller, telling it that the packet's sender was the drone itself.

'We found three points that were actually vulnerable, and they were vulnerable in a way that we could actually build exploits for,' Watkins said.

'We demonstrated here that not only could someone remotely force the drone to land, but they could also remotely crash it in their yard and just take it.'

Watkins said he hopes the studies serve as a wake-up call so that future drones for recreation, aerial photography, package deliveries and other commercial and public safety tasks will leave the factories with enhanced security features already on board, instead of relying on later 'bug fix' updates, when it may be too late.

INTERNATIONAL:

Germany to Revise Civil UAS Regulations

Due to the fast-growing number of drone operations, Minister of Transport Alexander Dobrindt recently announced the revision of the rules governing the use of civil drones in Germany. According to the minister, such use is not sufficiently regulated (eg, light drones equipped with cameras that can be controlled by smartphones).

The envisaged rules aim to reduce hazards in the airspace and on the ground. It is planned that all devices with a take-off mass of more than 0.5 kilograms – whether for commercial or private purposes – must be marked to enable identification of the user in case of abuse or accidents.

New legislation is being drafted for commercial and private drone use. The key features have already been published by the Ministry of Transport.

Private drone flights will be prohibited:

- at an altitude above 100 metres;

- beyond the pilot's line of sight;

- above industrial plants, correctional facilities, military installations, power plants, power generation and distribution facilities, and federal highways and railways;

- above people or an assemblage of people, accident locations and disaster areas; and

- at a place of action for police or other security services or organisations.

'Commercial use' will be redefined as follows:

- Unmanned aerial systems offer great opportunities (eg, for agriculture and traffic monitoring). In order to support this development, possible applications will be extended.

- In future, state authorities may permit flights beyond the pilot's line of sight if the pilot can prove safe operation. So far, any operation beyond the pilot's visual line of sight is generally prohibited.

- There will be a pilot's licence for commercial users. Aeronautical and aviation law knowledge will be tested in an examination. The licence will be issued by the Federal Aviation Office.

Unquestionably, drone operations have the potential to affect flight safety. Commercial airline pilots have reported numerous near-misses and incidents at airports around the world. However, the actual impact on flight safety compared to incidents caused by laser pointers or bird strikes remains difficult to determine. Airworthiness certification, tracking beacons or collision avoidance systems might make drone use safer.

On the other hand, drone technology offers numerous opportunities and significant potential for development in many industries, while bureaucratic hurdles slow things down. Weighing risks and opportunities and transposing them into legislation will be subject to continuous change. Due to the broad range of unmanned aerial systems, as well as rapid technological progress, it is and will remain an ongoing legislative challenge.

Source: International Law Office

http://www.uasvision.com/2016/06/09/germany-to-revise-civil-uas-regulations/?utm_source=Newsletter&utm_campaign=e225504cb4-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-e225504cb4-297560805

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Registering and Tagging all Drones in EU

The lack of regulation and European consensus continues to be a problem for this young and growing industry. It has become so bad that even retailers have become fed up. For this reason dronecentraal.nl is advising all drones to be registered and tagged once purchased.

According to Sam Mulder of dronecentraal.nl, one of Europe's leading drone retailers. "It's very easy to purchase a drone now with no restrictions, by tagging and registering the drone you will ensure the drone operator will be held liable for damages caused or any laws broken"

Intelligence agencies are biting their nails when it comes to analyzing potential threats from civilian drones as it's very hard to locate the operator should something happen, which kind of increases the necessity of a swift solution for this ever expanding problem.

In December 2015 the European Aviation Safety Agency (EASA) published a formal Technical Opinion on the operation of drones, in 2016 and 2017. It will still take some time before all European countries agree on the conditions and the implementation of it.

The EASA suggests self-registration which means local authorities are dependable on whether the operator will register the drone or not after purchase. "We think retailers like DroneCentraal.nl can play a vital role in the registration and tagging when a drone is purchased, this way you make sure each drone is registered before flying, hence ensuring the safety of civilians everywhere in Europe"

Until a law is passed which all EU countries have to abide to one can only hope the amount of incidents are limited.

http://www.prnewswire.com/news-releases/registering-and-tagging-all-drones-in-eu-582654721.html

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COMMENTARY:

Drone deliveries? It all depends on the insurance

A guy out for a jog gets brained by a delivery drone. Who pays?

Delivery drones are coming.

Drone naysayers, I've got bad news. You've lost the war. Drones have already become indispensable in a handful of sectors (infrastructure and agricultural inspection, and search and rescue, to name a few). When home drone deliveries arrive, which they will in the next few years, those buzzy bastards will be everywhere.

Welcome to the age of the commercial drone.

So let's talk inevitabilities. What happens when a guy out for a jog gets brained by a delivery drone? Or when a McDonald's flyer douses a woman with scalding coffee? Even as regulatory hurdles fall, liability will be the major limiting factor to drone ubiquity.

There are already a handful of companies that offer commercial drone insurance. I got a chance to talk with Mike Kelly, the cautiously-titled Media Risk Control Manager at Prosight Specialty Insurance, which insures businesses that use commercial drones. It was an illuminating conversation. Turns out even small companies may offer drone services.

What are the current rules when it comes to flying commercial drones over people?

The FAA has approved UAV flight over people, but only in closely regulated circumstances, where everyone over which the drone is flying is working on the project the drone is covering. An example of this is closed-set filming for motion pictures. Drones are used frequently in these projects and a drone

operator with the proper 333 exemption may fly the drone over cast and crew - but not the general public.

More robotics

The Federal Aviation Administration (FAA) is establishing an aviation rulemaking committee with industry stakeholders to develop recommendations for a regulatory framework that would allow certain UAS to be operated over people who are not directly involved in the operation of the aircraft. The committee will begin its work in March and issue its final report to the FAA on April 1.

UAVs are already delivering packages in other countries. Switzerland's postal service has begun testing parcel deliveries by unmanned drones, although widespread use of the UAVs is not likely to be implemented for another five years. Medical supplies have been delivered to remote areas in Africa for several years. In July 2015, the FAA approved the first such use of a drone within the United States, to deliver medicine to a rural Virginia medical clinic.

Another creative delivery niche is also being fine-tuned in the United States, Ireland, Britain, Australia and Canada, where weapons and drugs have been dropped in to prison yards by drones.

What are some of the biggest issues faced by companies looking to implement drones?

There are already hundreds of companies using drones every day. These industries include aerial photography, real estate, agriculture, search and rescue, mining, and closed-set filming, industrial refinery and manufacturer plant inspection, utility system inspections, private security, pipeline inspection, wildlife and forestry monitoring, construction site inspection and cell tower inspection.

The biggest challenge is to ensure they are working with a drone operator who not only has his 333 exemption, but that the exemption specifically approves the specific intended operation. You can be approved by the FAA for aerial photography but not for closed set filming or inspection of roof mounted ventilation equipment. And if your drone operator has an accident while conducting a non-approved operation, it's a significant liability exposure where it would be easy to allege negligence.

So it's very important that a company looking to use a drone do their own investigation on the FAA site to ensure the operator is approved for the specific intended task.

Anyone looking to deploy drones in to the public sector must be aware of the importance of a fail-safe system to minimize the potential for damage or injury in event of a UAV failure. Technology presently exists that will allow a parachute to deploy in event of a failure, but if the disabled drone parachutes on to a busy freeway, there could still be a problem.

And when the UAV is on the ground, there is potential for theft or vandalism. Technology also exits that will remotely disable the UAV in event of theft. But the loss of a drone, even if it's disabled could be very costly.

Drones are not the silver bullet for product distribution. In their current form, drones must frequently recharge their batteries, and this, together with the mandatory and practical weight restrictions on the weight of a package to be delivered will likely require a drone to return to base after each delivery, meaning that a drone would not be able to match the 200 - 300 deliveries per day accomplished by FedEx or UPS truck in urban and suburban areas.

One of the most important concepts in the world of liability and litigation is the concept of foreseeability. That is, was the incident (personal injury or property damage) foreseeable? It doesn't matter whether the act that resulted in the incident was against recognized common sense or formal safety standards. If an action that could result in personal injury or property damage is foreseeable, then the company using the drone may be held accountable for preventing it. So the liability related to flying a drone over people, where it could possibly fail and crash, injure people with spinning blades while delivering a package or drop a package on to a pet in the back yard doesn't appear to ever be 100% manageable.

For businesses looking to invest in drones, what are some of the most prominent insurance concerns to be wary of?

It's all about understanding the regulatory environment - you've got to have a clear understanding of what's legal and what's not.

The first step has got to be the FAA's 333 exemption. And it's critical to ensure that you request the exemption for the exact activity you plan. Many drone operators have gone through the process of obtaining a 333 exemption only to find that they did not request to be approved for every specific foreseeable use, and if the 333 does not specifically permit an activity, the operator is prohibited from conducting that activity. I think it's an accurate statement to say that the majority of commercial drone operators are operating without a 333 exemption. As of today there are only 3927 drone operators with a 333 exemption, and that's across all applicable industries.

But there are actually a few insurance companies that say they will issue a policy to those companies, but the reality is that it's against the law to insure an illegal activity, so in the event of a big loss, the insurance company can easily deny coverage.

So - to properly control the liability exposure, you've got to ensure you're operating legally - again - conforming to not only the FAA requirements, but also to any regional requirements as well. And it's critical to be aware of all applicable requirements. Many states, counties, municipalities, federal lands and individual cities have laws and ordinances directed specifically at the use of UAVs, and these rules may be far more stringent than the requirements one had to implement to obtain a 333 exemption.

How do pilot education programs and credentials come into play? Does the experience/knowledge of the pilot play a part in liability?

Anybody who has every applied for a job has had to submit a resume, and the more comprehensive the resume, the more confident we are that the applicant has the capabilities we seek. It's the same here.

When a drone operator come s to me seeking insurance coverage, the first thing I look for is their 333 exemption, but just like people with a college degree but no actual experience, I look beyond the exemption to see if they have any additional education or experience.

In the drone industry, however, most of the education and experience is informal, just going out and flying the drone and trying not to crash it in to anything. There are hundreds of very competent film makers who are expert drone operators that have yet to obtain their 333 exemption, so I not only look for formal education, but also evidence of substantial practical experience.

One the front end, the amount of education and experience makes me more comfortable with a particular operator, and in the event of an incident, the operator has a more substantial defense if he can show that he has a formal education, an excellent safety record and was operating within the applicable regulations. There are presently hundreds of institutions that offer courses and certificates (not FAA 333 exemptions) for drone operations. These all support the credibility and competence of the operator should there be a claim to the contrary.

What are some things you should keep top of mind when it comes to drone maintenance? Does that play a part in liability?

While the best way to avoid liability is to never have a claim or an incident, in a practical sense, avoiding liability is all about being able to prove you're not negligent. And one certain way to appear to be negligent is to fail to maintain, or fail to be able to prove you've maintained your airframe. It's not enough to do it, you have to be able to prove it. And when a potential client comes to me, it's one of the first things we evaluate - prove to me how you maintain your airframes.

Specific maintenance requirement s are conspicuously absent from the current FAA regulations. 333 exemptions do not propose any requirements for airworthiness or for inspections by a certificated repairman, but the fact that they don't tell you exactly what you have to do doesn't mean you don't have to do it.

In the world of liability, the mandatory standards should always be considered the minimum standard. Doing more than you have to is a better defense than doing only the minimum.

So in this case, it's absolutely imperative that the operator follow the manufacturer's care and maintenance instructions. Manufacturers are so acutely aware of their product liability exposures that it's a reasonable assumption that each commercially produced airframe will have comprehensive care and maintenance instructions.

Just as is the case with manned aircraft, the insurance world will likely have a significant influence when maintenance related requirements are developed.

If the FAA allows drone delivery services, what will it mean from a risk and liability perspective?

What we're trying to avoid is personal injury and property damage, and whenever you've got stuff in the air, there a potential for it to fall. And if it falls, there's potential for personal injury or property damage.

But manned aircraft don't regularly fall out of the sky so there's no reason to believe that unmanned aircraft would be more prone to crashes, assuming there are regulations, as there are with manned aircraft, to ensure the competence of the operators and the dependably of the airframe.

The FAA is responsible for the safety of U.S. airspace from the ground up, so if there comes a time or a place where drones can deliver stuff, it means that the process has been vetted and determined to safe.

Having said that, just because it's legal doesn't necessarily mean there is no risk, and that's where my job comes in. I identify the exposures and evaluate the controls and make the determination as to whether a loss is likely.

I can't see a time when dropping packages on to someone's front porch, or landing a drone in someone's back yard will ever be free from risk. There are too many variables.

But medical supplies and specimens have been safely delivered by drones in Switzerland, Haiti and the Dominican Republic, since 2011.

And since nobody can conduct this type of operation without insurance, it will be up to the drone operators to develop and implement FAA approved protocols to minimize the potential for accidents, and it will be up to the guys that do what I do to determine whether these protocols are sufficient to minimize the potential for a loss.

We insure many drone operators now working in a wide variety of industries, but we look at each one on a case by case basis to make sure we understand the nature of the operation, and that will likely be the way it will go for the foreseeable future. There isn't yet enough continuity and loss history within any particular niche for us to approve a particular type of use without looking at every element of every operation.

It all has to start with the FAA approving deliveries, and the FAA is likely to initially only approve very specific types of deliveries to ensure the safety of the airspace. So I think deliveries from the roof of a hospital to the roof of a lab are more likely to be approved before Dominoes gets to deliver pizzas to your house while you and your friends and your dog stand out on the driveway to watch it land.

But companies like ProSight will be at the forefront of that industry because we have the experience and the expertise to understand the technology. We already insure many drone operators so once the FAA approves deliveries, I'm sure we'll be able to provide converage for the operators who conform to the applicable standards.

But having said that, the laws governing the use of drones varies from state to state, and sometimes from county to county, so just because a drone operator conforms to FAA requirements, doesn't mean they will be able to operate everywhere, and that's where there's significant liability exposure, to make sure the operation complies with all mandatory standards, and from a liability standpoint, it's also critical to understand the applicable voluntary standards that may apply, because if there's an accident, the plaintiff's attorney can allege negligence if the operator didn't comply with the applicable best practices, whether they're mandatory of not.

How will drones flying in the air delivering packages increase the risk of accidents and collisions?

That's really the trick, isn't it, and that's why current drone regulations require drones only to be operated during daylight in line of sight. Once an unmanned aircraft goes beyond line of sight, it's far more difficult to guarantee it won't run in to anything.

The technology for recognizing adjacent air traffic and taking appropriate action to avoid a collision exists, but it's not yet been integrated in to commercially available drones. And that concern that must be solved before we agree to insure beyond line-of-sight UAV flights through potentially crowded airspace.

One of the companies leading the industry in this area has developed a system whereby the drones will only fly to a proprietary, sensor-equipped landing pad, thereby eliminating the potential for landing in an unapproved spot. While this would preclude delivery of retail products to consumers, it may likely be an important consideration in the approval process for the use of drones to deliver objects from one established base to another.

Accidents can also occur while the drone is on the ground, since there can be as many as 16 spinning blades that have proven able to cause serious injury if touched, so while this is an exposure the manufacturers will have to address, it's also an important consideration for anyone landing a drone where unauthorized individuals may be able to touch the machine.

The technology exists for the drone to automatically stop its propellers so the contents can be retrieved -- but in a residential delivery scenario, this would not only require the drone, with multiple spinning blades to come to a landing in the close proximity of anyone nearby, but it would also necessitate some interaction by the consumer to give the "all clear" to the UAV before takeoff - a very unpredictable scenario.

The other delivery option is to allow packages to drop so the UAV does not have to land. The potential for a negative incident here is obvious.

http://www.zdnet.com/article/drone-deliveries-it-all-depends-on-the-insurance/#ftag=RSSbaffb68

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Is Flying a Drone Illegal? A Comprehensive Guide to America's Drone Laws

There's no really delicate way to say this, so I'm just going to do it: The vast majority of people have no idea what they're talking about when they talk about drone law.

I've noticed this in comment threads on Facebook, on Twitter, on comment threads on Reddit, in bar conversations, etc. If you've engaged in one of these misinformed debates, though, I forgive you: It's not your fault. Surely there are more complex areas of law than Federal Aviation Administration drone

regulations (hello, copyright law), but few are so intentionally misleading, arbitrarily enforced, or regularly misreported by the press.

If you're looking for a simple answer to the question posed in the headline, I'm sorry, I can't give you one. But what I can give you is an exhaustive guide to drone law in the United States.

In order to have any idea what's legal to do with a drone and what's not legal to do with a drone, it's necessary to have paid close attention to the FAA's actions over the last three years or so. Some conversations with actual lawyers help, as well.

After publishing three separate stories about FAA enforcement of drone regulations last week and watching the online conversation about them, it occurred to me that it might be useful to get deep into the weeds on this issue and unpack what the current legal situation actually is.

I've put together this guide after spending the last four years reporting on US drone law. Its sourcing is pulled from my own reporting reading hundreds of pages of legal statutes, FAA enforcement actions and statements, and court arguments and decisions. I've also had dozens of conversations with the nation's top drone attorneys about these issues over the years*. Fair warning: I've tried to keep the article as conversational as possible, but at times it might get a little bit dense.

The most important thing you can possibly know about the current state of drone law is this: THE FAA IS NOT A RELIABLE NARRATOR. If you are taking notes, write this in your notebook and circle it and then put a million tiny little stars all around it.

The mistake I see most often all over the internet (and in many news articles) is people arguing that something is illegal because the FAA said it was illegal, or because it seems like something should be illegal. People will often say a drone pilot shouldn't have done something because he or she was warned not to do it by the FAA. But just because the FAA says something is true does not necessarily make it true, which you'll hopefully see is the case by the end of this article.

The FAA can regulate the airspace of the United States

The FAA "has exclusive sovereignty of airspace of the United States." No one debates whether or not the FAA has the authority to regulate federal airspace (which, thus far, is all US airspace). The FAA can and should regulate the commercial use of drones.

In fact, Congress passed the FAA Modernization Act of 2012, which required the FAA to "develop a comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." By 2015, the FAA was required to write and implement commercial drone regulations, which would be official, standardized, and legally enforceable rules that would allow drone companies to fly for profit in the United States. As of now, there are still no commercial drone regulations.

This is important. The FAA can regulate commercial drone use, but it missed its deadline and still hasn't enacted the rules. There are proposed regulations, but they have not yet been finalized. They are expected later this year.

We'll cover hobby flights later, but part of the FAA Modernization Act stated that the FAA "may not promulgate any rule or regulation regarding a model aircraft, or an aircraft being developed as a model aircraft, if the aircraft is flown strictly for hobby or recreational use." In other words, Congress prohibited the FAA from making new rules that are specific to people who just fly drones for fun.

The FAA says flying drones commercially is illegal, but the FAA says a lot of things

As the FAA will tell anyone who will listen, the United States has a really complicated, important, and safe airspace. Drones got popular, the FAA wasn't ready for them, and suddenly a complicated airspace got much more complicated. Regulations are difficult to write and often take many years to pass, and the FAA had no way to slow down the drone revolution. So what did it do? It started a public relations offensive.

The agency said that commercial operation of drones is illegal, even though there is no regulation that says that's the case. It issued "advisory circulars" and "policy statements"—which are not regulations— and attempted to use them as its legal argument for why commercial drone flights were illegal.

The FAA's actions for much of 2013 and 2014 were confusing, and the agency regularly contradicted itself or was chastised by judges in a few different cases. For example: It started saying that posting drone videos on YouTube was a commercial and thus illegal use of drones, a claim that has serious First Amendment implications.

In another interesting saga, the FAA started sending cease-and-desist orders to drone companies, threatening them with fines. These cease-and-desist orders were later tossed out by an appeals court and then, later, the FAA began advising pilots to ignore these orders.

The question of whether or not a drone is an aircraft in a strict legal sense is still unanswered

The FAA is using manned aircraft regulations to punish drone pilots

Because the FAA has no drone regulations, it has used a general manned aircraft regulation called 14 CFR Section 91.13(a) to go after drone pilots. This regulation was written for and is normally used against private and commercial airplane pilots.

This regulation states that "no person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another." This regulation was first used to fine a drone pilot in 2012, when the FAA told Raphael Pirker he owed $10,000 for videographing the University of Virginia, Charlottesville as part of a 2011 ad shoot for the university's medical school.

Pirker fought this proposed fine before an Administrative Law Judge, and for a good portion of 2013 and 2014, one of the biggest questions in the drone world was whether drones are "aircraft." The FAA

argued that basically anything that flies through the air—maybe even paper airplanes—are "aircraft." Come with me a little deeper into the weeds for a moment, please: A federal administrative law judge initially ruled that drones are not "aircraft," which created a few months of chaos for the FAA. The agency eventually got that overturned on appeal.

Case closed, right? Not quite. This case was heard by the National Transportation Safety Board, an independent government agency that investigates "every civil aviation accident the United States and significant accidents in other modes of transportation – railroad, highway, marine and pipeline." The NTSB is not a federal district or appeals court. Rather continuing to fight the case, Pirker settled the case with the FAA. Under the terms of the settlement, he "does not admit to any allegation of fact or law herein."

Because the case was not decided by a federal appeals court, the question of whether or not a drone is an aircraft in a strict legal sense is still unanswered. There have been no other cases that have progressed further than Pirker's did, and the NTSB's decision is only binding on cases brought before it. For our purposes, this means drone pilots fined $50,000 or less, or whose manned aircraft certificates are suspended or revoked. The NTSB decision would have no effect on cases brought a federal district court.

The NTSB decision in the Pirker case emboldened the FAA, however. It has cited 14 CFR Section 91.13(a) every time it has fined any drone pilot. Pirker's case was a multi-year saga, and as far as I know, no one else has challenged the FAA on this "aircraft" definition. This does not mean, however, that it's settled law. It just means that paying a slap-on-the-wrist fine is easier than months or years of litigation.

The FAA has also used related manned aircraft regulations in addition to 91.13(a) that prohibit the use of aircraft in what's known as "Class B airspace" without permission from an air traffic controller. Basically, this regulation is used when drone pilots fly near many major airports.

The problem with using manned aircraft regulations to go after drone operators is that the wording of the statute is fundamentally at odds with how the FAA is enforcing it. For instance: The statute defines one type of "careless or reckless" flight as the operation of an aircraft below an altitude of 500 feet in populated areas. Meanwhile, the FAA says that drone operators must fly at an altitude below 400 feet. Read strictly, that means most drone operations in the United States would be "careless or reckless."

It's easy to look at highly publicized incidents of drone idiocy—such as the time an allegedly drunk government employee crashed a drone onto the White House lawn—and think that of course such behavior should be fined. You'd be right, but by retrofitting a statute rather than making a new one that is clearly written for drone pilots, the FAA has given itself wide latitude to define "careless or reckless." Take, for instance, the time two men were fined for crashing their drones into ocean off the coast of Puerto Rico, or the time a man in Boston was fined even though the FAA's files show that there was no reported crash or incident.

The FAA has taken this self-given authority to use manned regulations to go after drone pilots to the extreme. The agency has fined companies for flying drones that do not have "transponder" equipment

or radios that are able to communicate with air traffic control, but it has left that fine off of most of its enforcements. The FAA says these are violations of 14 CFR Section 91.131, a manned aircraft regulation that, in part, requires "navigation equipment." Kind of nuts when you consider that really no drones have transponders or the other equipment the FAA has cited, and such equipment is not required in the proposed regulations that the agency has released.

One final note on fines: The FAA does have proper regulations in place to fine anyone who flies in Washington DC or within a 15-mile radius of the nation's capital, thanks to special airspace restrictions put into place as a precursor to the US invasion of Iraq in 2003. The DC "Special Flight Rules Area" was made permanent in 2008.

The FAA is disorganized and largely decentralized

The FAA is made up of a patchwork of Flight Standards District Offices, which report to regional flight standards offices, which report to FAA headquarters in Washington, DC. The FAA has many safety inspectors at both FSDOs and regional offices, who are the people who send official FAA warning letters and fines to drone operators. They're the ones who call up drone pilots who do things that the FAA ostensibly doesn't like. But the actual law and the actual regulations are so poorly defined that a safety inspector in New York may have a totally different interpretation of what is legal than one in Texas will. This means that some safety offices are lax about drones and others are strict about them.

An official at FAA headquarters told me that it has no centralized database of drone enforcements and thus may not even be sure how many fines it has issued, who has issued them, or what they may have been for. However, Motherboard filed a Freedom of Information Act request with the agency and eventually found that the FAA has proposed 24 distinct drone enforcement actions around the United States.

Almost every drone fine ever issued has been issued out of the Eastern region office, meaning people in many parts of the country can and have been flying more or less with impunity.

333 exemptions, a get-rich-quick scheme for shady law firms everywhere

While all of the aforementioned confusion and fining and threats were happening, rich important companies like Amazon and Google as well as industry groups in Hollywood went to Congress and were like, what the hell is the FAA doing?

Drones are big business, and while you could have probably gotten away with being a commercial drone pilot without running afoul of the agency, lots of bigger businesses were willing to jump through regulatory hoops to get official FAA approval to fly, provided that hoop actually existed. A "Section 333 exemption" is that hoop.

In Section 333 of the 2012 FAA Modernization Act, Congress noted that the "Secretary of Transportation shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the plan and rulemaking required by [the rest of the law]."

The FAA now processes individual applications from drone businesses that allow those businesses to fly commercially with express FAA permission, provided the businesses fly under strict altitude, speed, and airspace rules.

At first, these were difficult to get, which led to a bunch of law firms offering to get a 333 for your drone business for thousands of dollars. To show that the process has major flaws, a lawyer in Connecticut named Peter Sachs managed to get the FAA to approve his request for a 333 for a damn PAPER AIRPLANE, and suddenly there were dozens of companies on the internet willing to do 333 paperwork for a couple hundred bucks. (Many of these companies are of dubious quality and do not actually employ lawyers. The 333 exemption filing industry is rife with allegations of scams and fraud.) The FAA has now given out 5,291 of these exemptions.

There are two things we need to talk about with 333 exemptions: First, the FAA started saying that anyone flying commercially without a 333 was flying illegally. But in the nearly two years since it started granting them, the FAA has not fined a single drone company that's operated without one. Again, this is because the FAA does not have any regulations that prohibit commercial drone operations.

Second, some of the best drone lawyers in the country are now recommending drone operators not get a 333 exemption. By agreeing to fly under the FAA's exemption, 333 owners may be subjecting themselves to actually enforceable rules that they otherwise wouldn't have to adhere to.

State and local governments have no authority over the airspace

Drone Registration and hobby drones

In October of last year, the FAA announced that every drone owner in the United States would have to register with the government. In a stunning display of efficiency, the FAA introduced the regulation in October and had it finalized by the end of the year. In this case, the regulation actually is a regulation, which, get this, is why it might be struck down.

Remember the FAA Modernization Act of 2012 I mentioned earlier? It also states that the FAA "may not promulgate any rule or regulation regarding a model aircraft, or an aircraft being developed as a model aircraft, if the aircraft is flown strictly for hobby or recreational use." There is currently a lawsuit going through the courts that challenges the FAA's registration program on this very issue.

Is the FAA even enforcing its fines?

As I reported last week, the FAA's fines are all over the place. Most of them aren't worth the hassle of hiring an attorney and fighting the case. But the FAA fined a company called SkyPan International $1.9 million late last year. This is a sum that's decidedly worth fighting. It's so large, in fact, that the FAA can't just collect it, it has to pursue the case in US District Court.

The FAA has not yet done this, even though the enforcement was announced in October, 2015.

If the FAA takes on SkyPan, it will have to again make the legal argument that a drone is an "aircraft" to which manned aircraft regulations apply (the main argument point in the Raphael Pirker case referenced above). If the FAA loses that argument before it has its commercial drone regulations in order, it would open up a Pandora's box in which the FAA would have little or no recourse against any drone pilots.

What about state and local laws and regulations?

We're coming close to winding down here, but I'd be remiss not to mention that many states and cities have passed their own laws and regulations to ban or restrict drones. To be clear, state and local governments have no authority over the airspace. Remember this? The federal government "has exclusive sovereignty of airspace of the United States." All navigable airspace is overseen by the FAA and no other entity.

One major issue that needs to be litigated is whether or not people have a "personal" or "private" airspace that extends above their own property

State and local governments do have the authority to regulate land and water use, so laws restricting where drones may take off or land seem to have firm legal standing. Any regulations or laws that restrict where drones can actually fly would likely not stand up to court scrutiny and would likely be preempted by FAA authority.

Shooting at drones

Again, we have to look at whether or not drones are "aircraft." Shooting at aircraft is a violation of federal code 18 §32, which carries a maximum sentence of 20 years in prison. If drones are not "aircraft," then there are destruction of property laws that should come into play if a drone is flying in a public area.

One major issue that needs to be litigated is whether or not people have a "personal" or "private" airspace that extends above their own property. "Navigable airspace" is often defined as being anything above 500 feet, but that is a definition that only considers manned flight. The actual definition is much more complicated in the age of drones—in the Pirker case, the FAA claimed that basically anything above your shoelaces is federal airspace, thus shooting at a drone even if it's on your property is potentially a federal offense.

This particular issue hasn't really come up much before, but we can look at the 1988 Supreme Court case Florida v. Riley, which held that police are allowed to perform aerial searches from "public airspace" without a warrant. Public airspace, in this case, was from 400 feet above a marijuana grow operation. The Supreme Court did not set a specific height limit for what constituted "public airspace," and many experts believe courts will eventually decide that there is some sort of personal airspace above private property. The question is how high that distinction will ultimately be. If this is a pet issue of yours, there's a nice legal rundown here. Keep in mind that there are more sane ways of dealing with a pesky drone pilot than blasting away at a drone with a shotgun.

Takeaways

The purpose of this article isn't to defend anyone and everyone who flies a drone however they want regardless of the circumstances. There are bad drone pilots, there are ignorant drone pilots, and there are people who are flying in unsafe ways. These people should probably be fined.

For the vast majority of people, little of what I wrote here matters at all. Fly safe and stay away from people and you're likely to never have any sort of trouble.

If you do find yourself in legal trouble from the FAA or state or local law enforcement, knowing the law helps, but it's not necessarily going to get you out of trouble. Challenging the FAA or even a local regulation in court is a time-consuming and expensive process, which is one of the reason the FAA has had little trouble collecting on most of its fines. In that sense, the FAA's actions have had the agency's desired effect of limiting drone use until it can sort out the actual regulations it wants to enact.

Just because the FAA has had success with its strategy doesn't make it right, however. The FAA should follow the same process that every other agency in the United States has to follow when it creates new regulations. The agency should write clear regulations, open them up to public review and comment, and then enforce them in a way that makes sense and is uniform across the country. To its credit, the FAA is finally, after several years working on them, getting ready to do that. In the interim, however, it should not rely on retrofitting a patchwork of regulations that were written for manned aircraft. Misinforming the public and using public relations, scare tactics, and potentially unenforceable fines to cover up the failures of the agency aren't going to do anyone any favors in the long run.

*Over the years I've had dozens of discussions with the nation's top drone attorneys. Special thanks to Brendan Schulman, who fought some high profile cases against the FAA and is now vice president of policy and legal affairs at DJI; Peter Sachs, a Connecticut-based drone attorney who runs the Drone Law Journal and is highly involved with the UAV Legal News & Discussion Facebook group; Loretta Alkalay, a drone law professor who spent 20 years heading up the FAA eastern region legal team; Lisa Ellman, a drone attorney at Hogan Lovells; and Jonathan Rupprecht, an attorney who runs the Drone Law Blog. Alkalay and Sachs helped me fact check specific parts of this post.

http://motherboard.vice.com/read/is-flying-a-drone-illegal-a-comprehensive-guide-to-americas-drone-laws

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Law Professors Disagree Over Whether UAVs Should be Allowed to Fly Over Private Property

Two legal experts offer their opposing opinions in the Wall Street Journal (5/22, Subscription Publication) regarding whether property owners should be able to prevent UAVs operating below 500 feet from flying over their property. University of Miami Law Professor Mitchell Rubenstein contends that such flights, without the permission of property owners, threaten safety, privacy, and Fourth Amendment rights. However, Rubinstein writes that Amazon and other delivery companies could use micropayments to purchase the rights to fly over private property as well as mapping technology to navigate routes where UAVs are permitted to fly. Meanwhile, University of Washington Assistant Law

Professor Ryan Calo argues that individuals should not be able to decide whether UAVs may fly over their property, and counters safety concerns by noting that Amazon is working with NASA to develop a UAV air-traffic-control system.

http://www.wsj.com/articles/should-you-be-allowed-to-prevent-drones-from-flying-over-your-property-1463968981

Are future revolutionary weapons like tiny armed UAVs inevitable?

U.S. military leaders are famously conservative when it comes to revolutionary weapons technology -- and you can't really blame them for it, especially when it comes to things like armed UAVs. The military's highest technological priority centers on things that work reliably every time, over what's the latest and greatest.

Still, due to their sheer utility and relatively low costs, there are some things that the military inevitably will be dragged into, kicking and screaming, whether the current generation of Pentagon leaders like them or not.

One case in point is the proliferation of armed unmanned aerial vehicles (UAVs). Sure, we have armed UAVs today like the General Atomics Predator and Reaper UAVs. I don't think it will be much longer, however, before we see armed UAVs of ever-smaller types.

Large numbers of armed UAVs flying inside and outside of combat zones would have enough obvious risks to make members of the U.S. Joint Chiefs of Staff wake up at night in cold sweats. How could military authorities assert reliable positive control over so many armed drones? What about the potential for collateral damage from a small UAV attack? How could we prevent that, and who would be responsible if things were to go horribly wrong?

Valid concerns, all. Still, fleets of small armed UAVs represent such a compelling idea on so many levels that political, military, and technology concerns will have a difficult time holding back the tide. More to the point: if we don't do it, somebody else will.

Perhaps the biggest concern about the proliferation of armed UAVs involves the notion of "man in the loop." That means a human at some stage in the chain of command has to give the order to shoot. Without a human in the loop -- in theory, at least -- the missiles stay on the rails, even in case of the juiciest opportunities to wreak havoc on the enemy.

Open Systems Architectures for RF and Microwave Systems

Within the commercial industrial base adherence to standards such as IEEE, ANSI and ISO are nothing new. However, there has been very little standards-based activity born out of defense. Meaning, when a standards-based approach is called for, almost all of the activity comes out of the commercial sector.

Growing numbers of armed UAVs in the air, however, puts big pressure on the notion of man in the loop. Things can happen on the battlefield too quickly for senior leaders to respond to efficiently. Increasing levels of machine automation, moreover, will make future generations of small armed UAVs perfectly capable of detecting, pinpointing, characterizing, and shooting at enemy targets -- all on their own.

Put all that together and you've got a lot of armed UAVs aloft with itchy trigger fingers and a limited ability of the top echelons of command to control them. It's not a pretty sight, but I wonder, honestly, if modern militaries in the U.S. and elsewhere will be able to resist the trend.

Armed UAVs represent a new generation of sophisticated, inexpensive, and lethal firepower. Military budgets are tight, which makes relatively inexpensive weapon systems an overwhelming temptation. Do we want to buy 100 F-35 manned fighters, or 5,000 armed UAVs that warfighters on the ground or human pilots nearby could fly? That wouldn't be such a hard of a choice if we faced some dire threats to national security.

Perhaps we could head-off this trend, and then again, perhaps not. The genie, in fact, may already out of the bottle.

U.S. military forces just recently began air attacks on ISIS forces in Syria. Among those forces are U.S. AH-64 Apache attack helicopters with the ability to control relatively small Textron Shadow catapult-launched UAVs.

These Shadow unmanned aircraft don't need runways to operate; they just need towed catapults and arresting wires to take off and land from unimproved battlefield sites or even from surface ships. Right now they're being used for surveillance, but what might the future bring?

Textron reportedly has demonstrated the Shadow armed with the small Fury laser-guided missile from Thales UK. For now U.S. military leaders haven't shown interest in an Armed Shadow, but when might such a thing become overwhelmingly attractive? It's small, supportable, and priced right for an overburdened military under serious budget pressures.

So here we find ourselves. Are future swarms of armed UAVs inevitable? I think so. Now the real question becomes what kinds of enabling technologies and military doctrines do we need to make such a future safe and manageable?

http://www.militaryaerospace.com/articles/2016/06/armed-uavs-revolutionary-weapons.html?cmpid=enl_MAE_Weekly_2016-06-08&eid=288641596&bid=1427518

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Robots, Techies, & Troops: Carter & Roper on the 3rd Offset Strategy

WASHINGTON: Trust your robots. Trust your tech industry. Trust your troops. Let go of traditional mechanisms of control — be it a human pilot in the cockpit or a formal requirements document for a program — that increasingly serve to slow you down.

That was the message between the lines when Defense Secretary Ashton Carter and his protégé, Strategic Capabilities Office chief William Roper, spoke Friday afternoon at the Defense One Tech Summit. It's not an easy message to hear for the military, with its deep-seated conservatism when people's lives are at stake, or for Congress, with its zealous, jealous oversight of each taxpayer dollar. But it's essential to the success of the new approach to high-tech warfare that Carter is calling the Third Offset Strategy.

Trust your Robots

Artificial intelligence is at the heart of the Offset Strategy, not to replace human judgment but to complement it. Such seamless partnership between man and machine — like the human and equine halves of the mythical centaur — requires trust between the two. Humans must learn to "quarterback" teams of autonomous war machines, Roper said, rather than each human operating one machine directly.

"The thing that's scary… is that there's no reason that the processing time and the reaction time from those (artificial intelligences) will not continually speed up beyond the human ability to interface with it," said Roper. While the US will insist on human control of lethal weapons, even if that slows the response, others may not. "There's going to be a whole level of conflict and warfare that takes place before people even understand what's happening."

There's a potential here for things to go very wrong, very fast. It could be like how unexpected interactions between different Wall Street firms' electronic stock-trading firms triggered the "Black Monday" crash of 1987 — only this time with missiles flying.

So how do humans understand such massive and fast-moving machine intellects, let alone trust them? The Defense Advanced Research Projects Agency — the folks who brought you the Internet — just approved an initiative for "explainable AI," said DARPA deputy director Steven Walker, speaking alongside Roper.

"Machine learning and deep learning algorithms…we don't fully understand today how they work," Walker said. The new "explainable AI" initiative "will give the human operator more details about how the machine used deep learning to come up with the answer."

Trust your Tech Industry

It's probably not the Pentagon, however, that will come up with the crucial breakthroughs in artificial intelligence. DARPA and other government agencies can provide incentives to work on particular

problems, but the great ferment of new ideas is bubbling up in the private sector — and not the part of the private sector that traditionally deals with the military, either.

In the 20th century, world-shaking new technologies came from the Defense Department and its favored industry partners: the atomic bomb from the Manhattan Project, stealth from Lockheed and Northrop, the internet from the ARPAnet. In the 21st century, "we're not going to drive a lot of those investments," Roper said. "We're going to have to become fast adapters of things that are developed without a single DoD (Department of Defense) requirement."

Being a fast adapter requires overhauling the entire process of writing formal military requirements, issuing them to industry, and funding development of promising answers. Instead, the 80 percent solution may be available off the shelf from companies who would never bother to develop a custom-made 100 percent solution for as small a market as the military.

"We have a system that is basically meant to buy (the same) things over long periods of time, and the best things (possible)," said Carter, who spent much of his previous tour in the Pentagon bypassing the bureaucracy to acquire urgently needed technology like roadside-bomb-resistant trucks (MRAPs). "That's a problem when you have ongoing operations and by the way it's a problem in a rapidly changing world."

Being a fast adapter also requires knowing what's out there to adapt. Secretary Carter has pushed hard to bridge the cultural chasm between the Pentagon and Silicon Valley, establishing — and then overhauling — a Defense Innovation Unit Experimental (DIU(X)) to act as a point of contact in California. In May, he established a Defense Innovation Advisory Board chaired by tech billionaire Eric Schmidt, chairman of Google's parent company Alphabet. On Friday, Carter announced three more members of the board: LinkedIn chairman Reid Hoffman; Steve Jobs biographer and historian of innovation Walter Isaacson; and retired Special Operations Command (SOCOM) chief Adm. William McRaven, an advocate for sci-fi style powered armor.

Trust your Troops

If most military innovations arise from commercial industry, however, it's not just the US armed forces that can get them: It's anybody with a credit card. How does the American military prevail without technical superiority?

"You're going to see a higher level of proficiency required for operators, who are going to have to quarterback these machines," Roper said. "(That requires) a completely new level of training, completely new level of coordination."

That includes coordination across the different armed services, aka jointness. "The historical domains — between air, sea, and space — are going to blur (because) cross-domain effects are becoming much more realizable," Roper said, be it a submarine firing Tomahawk missiles against targets deep inland or a hacker on the ground disabling a satellite. "In the future, we won't talk single domains anymore, and we'd probably be wise quit talking about them now."

While the American military has worked harder on joint operations than any other in the world, there are still plenty of bureaucratic seams. In particular, sometimes our traditions of secrecy impede the intellectual teamwork required to figure out how to best use a new technology.

"Future conflict is going to force increasingly joint operations (integrating) all our capabilities," Roper told reporters on Secretary Carter's plane after a recent trip to New England. "(But) the classified world tends to suffer the most from lack of integration, simply because the more sensitive it is, the fewer people there are to work on it."

"We're doing our best to fix this," said Roper, whose Strategic Capabilities Office acts as a kind of matchmaker between promising technologies and would-be users. "The great thing about running my office is being a strategic partner. The Department has great engineering organizations — (e.g.) laboratories and warfighting centers; all they need is a little help integrating their tech into strategies."

Deterrence vs. Secrecy

Getting better communication within the Defense Department, and between the military and industry, doesn't require declassifying everything. (There's such a thing as too much trust). The trick is showing enough of your hand to deter potential enemies while keeping some trump cards hidden in case war does break out. But where's the balance?

"For China and Russia, the question of what deters is a complicated one," Roper said. "Both are acutely aware of our ability to field game-changing technology, so this is already part of their calculus." If you want to change their calculations, you have to do more than develop amazing new technology: "What we want to show is our ability to do it faster, as well as applying it to legacy systems" — through upgrades like the arsenal plane or hypervelocity projectile — "while still protecting (i.e. keeping secret) our best options for conflict," Roper said.

It's strongly implied that the high-profile high-tech that the Strategic Capabilities Office has rolled out so far is just the tip of a very lethal iceberg. Hopefully the knowledge that iceberg is out there, even if they don't know just where or how big it is, will make future adversaries steer more cautiously.

http://breakingdefense.com/2016/06/trust-robots-tech-industry-troops-carter-roper/

Why America's drone problem may not be as bad as everyone thinks

A new report suggests that drone pilots are now flying more responsibly amid heightened public concerns over the dangers of the unmanned aerial vehicles.

The Academy of Model Aeronautics analyzed FAA data and found that even as drone sales surge, drone sightings by airplane pilots have declined. Aviation safety experts have long warned that a drone sucked into an airplane engine could be devastating, hence restrictions that require drones to stay far from helicopters and airplanes.

"It looks like we're getting the message out there," said Rich Hanson, the AMA's government and regulatory affairs representative. "We're pretty confident that education is one of primary factors if not the primary factor."

Hanson acknowledged there's no hard proof that educational efforts spurred the change, but said the organization, which has advocated for model aircraft pilots for decades, has seen similar examples before.

[How airports and the drone industry are teaming up to protect planes]

When lithium batteries emerged in the 1990s, the AMA saw a rash of mishaps with the batteries combusting. The organization launched a campaign to educate users on how to safely charge the new batteries and saw the incidents decrease.

In December 2014 the AMA, along with the Association for Unmanned Vehicle Systems International and FAA launched the "Know Before You Fly" campaign to educate a flood of new drone pilots about safety concerns. Some drones ship with safety guidelines in the box or rely on software designed to restrict dangerous flying.

Drone sales have skyrocketed from 450,000 units in 2014 to 1.14 million units in 2015, according to the Consumer Technology Association. The association expects sales to top 2.8 million in 2016.

According to the AMA analysis, drone sightings peaked in the summer of 2015 and have declined since. Even so, there are far more reported drone sightings by pilots than in 2014.

The AMA analyzed 1,364 reports of drone sightings the FAA has received since Nov. 2014. (AMA)

"We don't want to minimize the risk by saying it doesn't exist. The risk does exist," Hanson said. "In our experience we don't believe the risk is truly as significant as it's been made to be."

The organization was disappointed in the FAA and felt it hadn't analyzed its data of drone sightings in enough detail to distinguish between innocuous and harmful incidents. The AMA concluded that only 3.3 percent of the incidents in which pilots reported seeing drones were actually near misses or close calls.

The organization is concerned that potential legislation will restrict the model aircraft and drone pilots that it represents.

https://www.washingtonpost.com/news/innovations/wp/2016/06/07/why-americas-drone-problem-may-not-be-as-bad-as-everyone-thinks/

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UPCOMING EVENTS:

International Drone Expo (IDE), December 9-10, 2016, at the Los Angeles Convention Center

One of the top commercial drone events globally. 0ver 100 exhibitors +3,500 global attendees. There will be 4 top level keynotes including Major General (RET), Marke "Hoot" Gibson, Senior Advisor, FAA, and Wahid Nawabi, CEO and President, Aerovironment.

Over 80 world class speakers with "Hot Topics" including;   Drone Customer Delivery, Smart Drones, Drone applications for many of the major commercial sectors, Drone racing, (with some of the world's top racers in attendance) Funding your drone company, The Drone Entrepreneur, Crowdsourcing, Applying for a COA, Aviation Laws, Regs and what's coming down the pike by the Nation's top attorneys in the field, Current & Future Commercial and Government Markets and how to go after them, and much more

 If you would like to speak, attend, or exhibit, please visit **http://internationaldroneexpo.com/** or call Mike Rosenberg at 301-493-5500, or send an email to rosenberg@ejkrause.com