



Unmanned Systems Sentinel Summary

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NAVY/USMC:

House, Senate Armed Services Committees Agree To Support UCLASS

The House and Senate armed services committees came to an agreement on the National Defense Authorization Act of Fiscal Year 2016, releasing a \$604.2-billion authorization plan after months of hashing out nearly 900 discrepancies between the bills.

The Senate Armed Services Committee agreed to the House Armed Services Committee's plan to add a fourth MQ-4C Triton for \$65 million.

The Navy had originally requested \$134.7 million for its Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) system, and while the House bill would have authorized that spending, the Senate had concerns that the Navy would face delays while awaiting the Department of Defense Intelligence Surveillance, and Reconnaissance Strategic Portfolio Review. Instead, the Senate included in a Defense Department-wide research and development fund "\$350.0 million for continued development and risk reduction activities of the Unmanned Combat Air System Demonstration (UCAS – D) aircraft that would benefit the overall UCLASS program, and \$375.0 million to be used for a competitive prototyping of at least two follow-on air systems that move the Department toward a UCLASS program capable of long-range strike in a contested environment," according to the joint statement.

"The conferees believe that the Navy should develop a penetrating, air-refuelable, unmanned carrier-launched aircraft capable of performing a broad range of missions in a non-permissive environment. The conferees believe that such an aircraft should be designed for full integration into carrier air wing operations – including strike operations – and possess the range, payload, and survivability attributes as necessary to complement such integration," according to the statement.

The document goes on to state the committees agreed on the \$350 million for UCLASS, and though the \$375 million for competitive prototyping did not make it into the bill, language directs the Navy to apply some of the \$305-million plus-up towards prototyping.

<http://news.usni.org/2015/09/29/house-senate-armed-services-committees-agree-to-support-uclass-additional-aircraft-procurement>

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Navy, Contractors Urge Staying Course On Troubled Mine-Hunting System

The head of the Senate Armed Services Committee thinks it's the poster child for a failed weapons program. But the Navy and its contractors insist the mine-hunting system being developed for its new

fleet of small warships will eventually work as advertised – so long as the Pentagon and Congress let them stay the course.

Service leaders and industry officials are smarting after a scathing committee report this month that called the Remote Minehunting System, under development for the new fleet of Littoral Combat Ships, the “epitome” of Pentagon waste.

The Navy has paid some \$706 million for a program that would result in half as many systems as it once wanted – 54 instead of 108 – a fact that committee chairman Sen. John McCain (R-Ariz.) singled out in an installment of his series "America's Most Wasted."

Plus, as the report observed, the Pentagon's own evaluations have found the system, whose major components are built by Lockheed Martin, Raytheon, and Northrop Grumman, unreliable and unable to handle key tasks for which it was designed.

When – or if – the Navy can field remote mine-hunting equipment that works as hoped, sailors will be able to keep safely away from dangerous sea mines and not have to sail their ships through potential minefields. That's the promise offered by remotely operated or autonomous equipment, and the Navy says it's making progress in improving the performance and reliability of the RMS by incorporating upgrades that it asserts the committee report didn't take into account.

Among the planned upgrades, the Navy is planning to add the ability to deploy the minehunting system from a pier, meaning one of its littoral combat ships wouldn't need to be around to launch it for tests. Not needing a ship means engineers could test more often.

The Navy and its contractors say they're optimistic that the minehunting equipment can reach "initial operational capability" by January, depending on the outcome of a major operational test scheduled for November at Panama City, Fla.

The test will send the littoral combat ship USS Independence into an area seeded with inert mines whose locations are known. Engineers will score the system based on how many it can locate, Johnson said.

“Maintaining the RMS production line ensures the Navy will be prepared to address the minehunting capability gap that will occur with the imminent retirement of the Navy's legacy minehunting vehicles,” Dougherty said.

The Navy's plans called for LCS, using its ability to swap out different types of mission equipment, to take the mine-hunting mission as needed – without being dedicated to it fulltime. That way, planners thought, when a ship wasn't sweeping for mines it could be assigned other missions, including chasing pirates or hunting submarines.

That means Navy leaders treat mine warfare seriously in terms of big-picture strategy, but that the daily reality is that it has become an orphan capability, said naval expert Eric Wertheim, author of the benchmark "Combat Fleets of the World."

The Navy could try to buy or lease foreign minehunting ships, said retired Navy Capt. Jan van Tol, now a senior fellow with the Center for Strategic and Budgetary Assessments, but that would be very difficult to sell to Congress. Or the Navy could seek agreements with allied powers that sought to put them on the hook for minesweeping in the event of a regional crisis, the way the U.S. tried in the Cold War.

<https://www.politicopro.com/defense/story/2015/09/navy-contractors-urge-staying-the-course-on-mine-equipment-055334>

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ONR tests the latest in underwater drone technology

ARLINGTON, Va.—Robotic arms help Explosive Ordnance Disposal (EOD) techs to neutralize underwater mines. Autonomous underwater vehicles map out a ship’s hull in blackness beneath the water. And hundreds of personnel from six nations come together in one place to work on autonomous underwater vehicles and mine countermeasures (MCM).

While undersea autonomous vehicles aren’t on most people’s radar, experts say they represent a vital part of the future for American and allied warfighters.

“The MCM program—with vital contributions from partner commands and our international allies—is making great leaps in developing and fielding autonomous, unmanned systems,” said Dr. Jason Stack, program officer and lead for ONR’s Mine Warfare program. “MCM and EOD represent some of the dull, dirty and truly dangerous jobs performed every day by our Sailors and Marines. These emerging technologies will assist these men and women by making their jobs faster and safer.”

A total of 40 unmanned, autonomous or remotely operated systems were demonstrated and tested over the two-week period, including over 30 in the water at one time. Some of those included:

- * Unmanned underwater vehicles from Canada, the United Kingdom and the United States worked together with an unmanned surface vehicle from the United Kingdom to search the ocean and seafloor for mines
- * Robotic arms built using 3D printing were demonstrated for inspecting and neutralizing underwater explosives attached to ship hulls
- * Advanced sensors capable of finding mines buried under the ocean sediment were demonstrated from a variety of platforms—including one capable of movement in any direction using biologically inspired controls and fins.

In addition to the host command of NAS PAX and ONR, partner commands included Naval Air Warfare Center Aircraft Division and Naval Surface Warfare Center Panama City. Uniformed and civilian partner personnel from the United Kingdom, Australia, New Zealand, Canada and Germany were on hand and helped guide much of the efforts.

<http://www.onr.navy.mil/en/Media-Center/Press-Releases/2015/Pax-River-Unmanned-Underwater-Vehicles-Demo.aspx>

<http://defensesystems.com/Articles/2015/10/05/ONR-UUVs-Pax-River-demonstrations.aspx?admgarea=DS&Page=2>

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Leaders debate next steps for UCLASS, carrier drones

Planes without a pilot in the seat are the future of aviation, top Navy officials have said, but aircraft carriers are in a holding pattern as they wait for the Navy's embattled next-generation carrier drone to get off the ground.

The House and Senate Armed Services committees agreed to invest \$350 million next year into pre-acquisition projects for the Unmanned Carrier-Launched Aerial Strike and Surveillance program. In the meantime, some in the carrier Navy would like to get some more practice before UCLASS comes online around 2025.

Vice Adm. Dave Dunaway, head of Naval Air Systems Command, pointed to acquisitions red tape as the reason for the hold-up.

A request for proposals is the first step to getting a new acquisition project off the ground, and Dunaway said his team has written three of them but was still waiting for congressional approval.

"Can we bring an unmanned vehicle to the carrier much faster? Technically? Absolutely," Dunaway said. "Organizationally, it appears to be impossible."

Lawmakers have been reluctant to get the ball rolling on UCLASS until the Navy figures out exactly what it will be — those S's stand for strike and surveillance, and there's some debate over which should take precedence.

"I am concerned that the current requirements proposed for the UCLASS program place a disproportionate emphasis on unrefueled endurance to enable sustained ISR support to the carrier strike group, which would result in an aircraft design with serious deficiencies in both long-term survivability and its internal weapons payload capacity," he wrote.

But if they go for a more straightforward vehicle that does recon in an uncontested environment, he added, it would favor companies like Boeing and General Atomics.

All four contractors have put forth potential designs, with Northrop's based on its X-47B model. The Lockheed version, dubbed "Sea Ghost," looks a lot like the Air Force's RQ-170 Sentinel, with the same batwing design as the X-47B.

Boeing has come up with the "Phantom Ray," another batwing model, and General Atomics is offering the "Sea Avenger," which looks a lot like the Reapers it has designed for the Air Force and other federal agencies.

All four plans have a wingspan between 50 to 70 feet, with variations in speed, endurance and payloads.

"It's a desire for the Navy, which is the service which has least used unmanned systems and is behind the Army and the Air Force, to gain expertise," he said. "And to gain expertise from the carrier makes a lot of sense when you're planning a major acquisition that would come from a carrier."

<http://www.navytimes.com/story/military/pentagon/2015/10/03/leaders-debate-next-steps-uclass-carrier-drones/73082618/>

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Report: Ship Availability May Delay Fire Scout Test Schedule

The Defense Department released a Compendium of Annual Program Manager Assessments for 2015, on Monday which included short memos from various program managers discussing program status and risk to maintaining cost, schedule and performance.

MQ-8C Fire Scout

The Fire Scout program has emerged from a reorganization as "a more stable and executable program," program manager Capt. Jeff Dodge wrote in his letter to Kendall, but concerns remain on contracting and shipboard integration.

"Since MQ-8C is currently only planned to deploy on [Littoral Combat Ships], that class is needed to support IOT&E. Current pressures on LCS schedules have made ship availability difficult. While we are working well with the Fleet and [Program Executive Office for LCS], I expect that IOT&E will be delayed from its planned Q4 FY 2015-Q1 FY 2016. At this time I do not expect major perturbations in [milestone] C or IOC (initial operational capability) dates."

Dodge also wrote that, as the program continues forward in procurement, shortages within Naval Air Systems Command of procuring contracting officers and contract specialists "have put us behind in contract awards and make it difficult to get sufficient contract input early in the procurement planning process," Dodge wrote.

"A second staffing concern is in program management. While current staffing is sufficient, continued pressure on government and [contract support services] manning levels makes me concerned that we will lose some of the billets needed to properly plan and monitor execution of our procurements."

<http://news.usni.org/2015/10/06/report-ship-availability-may-delay-fire-scout-test-schedule-inflation-rates-hurting-trident-ii-d-5>

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ARMY:

USAF:

Enlisted drone pilots? Decision expected early next year

For years, the Air Force has had an officer at the stick when one of its remotely piloted aircraft takes off.

Next year, all that could change. The Air Force is taking a serious look at whether to allow enlisted airmen — who until now have been limited to crew roles such as sensor operators — to fly its drones.

But is the Air Force ready for the massive cultural change that enlisted drone pilots could present?

Air Force Secretary Deborah Lee James and many other observers inside and out of the Air Force agree enlisted airmen are capable of flying drones, given the proper training. Having enlisted airmen at the controls would also open up a new source of potentially talented pilots, filling the Air Force's ravenous need for more intelligence, surveillance and reconnaissance capability and helping ease the burden on undermanned, overworked commissioned officers flying RPAs like the MQ-1 Predator and the MQ-9 Reaper. The Army allows enlisted soldiers to fly its drones. It could also save money by having lower-paid enlisted airmen doing jobs officers do today.

When asked about enlisted airmen flying manned aircraft, James said, "One step at a time."

And — in what could be the biggest stumbling block — having enlisted drone pilots release weapons in a combat zone could potentially present legal issues that have to be worked through.

Filling a need

The Air Force is struggling to keep up with the demand for drone pilots. Part of the problem is overwork. Fighter pilots fly an average of 250 hours per year, the Air Force said earlier this year, but drone pilots fly about 900 hours per year.

Some enlisted airmen are eager to take the controls of RPAs, and think it could provide a new way to serve their country — and also advance their careers, both in the military and civilian world.

Legal issues

But not everybody in the Air Force thinks it's time just yet to take that leap.

Bringing in a mission director or operations supervisor to provide officer authority would present its own problems, he said. First, it would slow down the "kill chain" in a life-and-death situation, he said.

Having one officer to oversee each NCO pilot could solve that problem, he said, but at that point it would be more efficient to have the officer fly the drone himself.

The drone pilot said that simply because the Air Force used to use enlisted pilots isn't enough of a reason to do it today. Most of the WWII pilots who started as enlisted — including legendary aviator Brig. Gen. Chuck Yeager — went on to earn their commissions, he said.

Welsh said that issues such as pay and supervision caused the Air Force to scrap its enlisted flying force decades ago. For that reason, the Air Force is considering holding a beta test to do "due diligence."

Precedent-setting?

If the Air Force allows enlisted to fly RPAs, the drone pilot said, it sets a precedent for allowing them to also fly manned aircraft — especially since the service has argued for years that RPA pilots are just as much aviators as manned pilots.

"This is Pandora's box," he said. "If you say, why can't they be on RPAs, a guy with stripes, why does it matter? Well, OK, why can't they be the pilot of a U-28? How about an MC-12? How about an F-16? F-22? Your prize of all things, F-35?"

<http://www.airforcetimes.com/story/military/careers/air-force/enlisted/2015/09/28/enlisted-drone-pilots-decision-expected-early-next-year/72806812/>

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Northrop wins U.S. Global Hawk drone contract

Northrop Grumman Corp (NOC.N) has won a contract worth up to \$3.2 billion for continued development, modernization and maintenance of all U.S. Air Force variants of the Global Hawk unmanned surveillance plane, the Pentagon said on Wednesday.

The umbrella contract will allow the Air Force to order parts and services as needed through Sept. 30, 2020, with all work to be completed by Sept. 30, 2025, the U.S. Defense Department said in its daily digest of major weapons contracts.

Northrop builds several variants of the high-altitude surveillance drone for the U.S. Air Force, and a maritime surveillance version for the U.S. Navy. Company officials were not immediately available to comment about the contract award.

A senior U.S. Air Force general this month said a new electro-optical sensor and other upgrades for the Global Hawk plane could cost as little as half the previous estimate of \$4 billion. It not immediately clear if the contract announced Wednesday would encompass those upgrades.

The contract was awarded two years after the Air Force sought unsuccessfully to retire most of the Global Hawk planes, citing their high cost. U.S. lawmakers rebuffed that attempt, as well as the Air Force's bid in last year's budget to start retiring the U-2 fleet in fiscal 2017.

Air Force officials said they opted for Global Hawk given sharp declines in its operating costs.

<http://www.reuters.com/article/2015/09/30/us-northrop-grumman-globalhawk-idUSKCN0RU2UT20150930>

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Northrop, Lockheed at odds over future of ISR

WASHINGTON — As the Pentagon looks to define a path forward for intelligence, surveillance and reconnaissance aircraft, two giants in the aerospace community are battling for a piece of the action.

Right now, the Air Force's plan of record is to replace Lockheed Martin's infamous U-2 spy plane with Northrop Grumman's RQ-4 Global Hawk, an unmanned, long-range surveillance platform. The Air Force recently pushed back the U-2s planned retirement date from 2016 to 2019, allowing more time to upgrade the Global Hawk before putting the U-2 to rest.

UAS in contested skies: A primer on survivability

It is not yet clear what updates this work will include, but one proposed upgrade is a universal payload adaptor, which would allow Global Hawk to carry a wider range of electro-optical//infrared sensors, as well as legacy systems such as the U-2's wet film optical bar camera.

But Lockheed insists it is more cost-effective to skip the Global Hawk upgrades and continue to operate both aircraft in their current form until the Air Force can transition to a new, as-yet-undefined ISR platform.

In addition to costs to operate and maintain the Global Hawk, the planned upgrades to that platform will add \$2 billion to \$4 billion to the total cost over the next five years, Austin estimated.

In the meantime, Lockheed is working on a U-2 replacement, a high-altitude, tactical reconnaissance plane called "TR-X." The company rolled out the TR-X, which leadership has not yet formally pitched to the Air Force, during the Air Force Association's annual air and space exposition last month.

TR-X will look very much like the U-2, taking advantage of the spy plane's General Electric F118 engine, and employing a similar modular payload capability. The concept is for a low-observable aircraft designed to fly at 70,000 feet. Lockheed is looking into increased power and cooling to accommodate new sensors, electronic warfare suites, and a more advanced communications system. The plan will also comply with the Air Force's Open Mission Systems standards to keep up with technology advances.

Lockheed sees a growing need for a next-generation ISR platform, Winstead said. The U-2 has doubled its flying time since the mid-1990s, from 8,000 hours per year to over 16,000 hours per year, he noted. As adversaries develop more technologically advanced weapons over the next 10 to 15 years, neither the U-2 nor the Global Hawk will be able to keep up with the threat, he emphasized.

<http://www.c4isrnet.com/story/military-tech/isr/2015/10/05/northrop-lockheed-odds-over-future-isr/73370728/>

<http://www.defensenews.com/story/defense/2015/10/05/northrop-lockheed-odds-over-future-isr/73365972/>

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RPA operators to Air Force: Fix this career field

Gen. Hawk Carlisle, the head of Air Combat Command, listened to remotely piloted aircraft pilots, sensor operators and other airmen in the career field for nearly four hours Friday as they laid out recommendations about how to fix problems that RPA operators deal with.

Those recommendations include putting a general officer in charge of the career field to implement long-term improvements, adding more bases for RPA operators and having commands develop a strategic plan for the career field, said Col. Troy “Rev” Jackson.

ACC will now work with Headquarters Air Force, Air Forces Special Operations Command, and the Air National Guard and Reserve about which of the recommendations can be implemented, Jackson said.

Carlisle seemed open to the idea of adding RPA bases, but he didn’t say it could be done within a year, Jackson said.

The Air Force has been struggling to stem attrition of RPA pilots, who are typically promoted less often than manned aircraft pilots and have fewer opportunities to become senior leaders in the Air Force.

The perception that RPA pilots are inferior airmen manifests itself in how RPA pilots are evaluated for promotion, Byrnes wrote.

Enlisted pilots? Even command chiefs disagree.

<http://www.c4isrnet.com/story/military-tech/uas-isr/2015/10/08/rpa-operators-air-force-fix-career-field/73597538/>

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KeyRadar product integration into an MQ-9 Reaper

A national defense company that has been growing its Dayton-area presence is breaking into some new territory with the Air Force.

The work includes getting the unmanned aerial system ready to demonstrate new applications in ISR — intelligence, surveillance and reconnaissance — and targeting.

Company officials say this is significant because being part of the MQ-9 program will allow it to support missions that are longer than would happen on manned aircraft. Additionally, KEYW will get a chance to prove its system is flexible as conflicts change and humanitarian and other needs arise.

KeyRadar combines multiple radar bands with sophisticated processing and target detection/recognition software. It's supposed to be a better way to find concealed targets in the most challenging places.

KEYW's Gross said the upside to their system is that the radar can be rapidly re-configured, which means it will be cheaper and faster to upgrade. The flexibility also means it can address many kinds of missions, including types that may not even exist yet.

<http://www.bizjournals.com/dayton/news/2015/10/08/defense-company-makes-inroads-on-air-force.html>

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NATIONAL AIR SPACE:

Small UAV Coalition group brings on first outside lobbyist

The Small UAV Coalition, which is pressing for relaxed regulations for the use of commercial drones, hired its first outside lobbyist this week.

The trade group, which counts members such as Google X and Amazon Prime Air, brought on lobbyist Robert Eplin <http://soprweb.senate.gov/index.cfm?event=getFilingDetails&filingID=1fcd3c85-0415-4c1d-a378-81454588ac9c&filingTypeID=1>, who recently started his own firm after splitting with the group founded by former House Majority Leader Dick Gephardt, Gephardt Government Affairs.

The drone trade group, which includes 20 members, started last year and is headed by Michael Drobac. In an email, Drobac said he expected more lobbying hires "as we continue to grow."

Many of the members have their own lobbying operations in place, which partly focuses on drone regulations. Google and Amazon, for example, spent nearly \$7 million in combined lobbying in the second quarter, partly focusing on the regulations.

Other members include GoPro, Parrot, Verizon Ventures and others.

The Federal Aviation Administration is currently developing regulations for the use of commercial drones. Under the draft rules, commercial drones that weigh 55 pounds or less would be able to fly within an operator's line of sight and no higher than 500 feet, among other things.

While the rules are being developed, the administration has handed out more than 1,700 exemptions to allow for limited commercial use.

The coalition and other fliers have pushed to relax those rules, as some businesses test out models of drone delivery service. The coalition has taken specific issue with the height limitations and the line-of-sight rules, which would severely limit the delivery business model.

The trade group has also pressed to write into the rules a section allowing companies to conduct drone testing on their own private property.

<http://thehill.com/policy/technology/255282-small-drone-group-brings-on-first-outside-lobbyist>

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1 Million Drones Will Be Sold This Christmas, and the FAA Is Terrified

That's a whole lotta airspace.

Any ideas what you'll be getting for the holidays? According to the FAA, about 1 million of you will be getting drones, whether that's a high-end quadcopter or low-end \$20 knockoffs from Walmart. Regardless, the FAA is very, very worried about what happens when 1 million new aircraft enter the airspace.

As reported by Aviation Week, the FAA's Rich Swayze put it this way while speaking at the Airlines for America (A4A) Commercial Aviation Industry Summit: "A lot of people who don't have a pilot background are operating these things in the airspace."

"UAVs a very serious issue and there's considerable concern that it's going to end in tears."

(Drone operators, of course, can and should register their flight plans with Flight Service Stations before taking off.)

Record-Breaking Drone Swarm Sees 50 UAVs Controlled...

Taser-Firing Cop Drones Aren't Coming For You

And if those million drones cause serious headaches? Some legislators would like to see hard limits placed on UAVs capabilities. According to Congressman Peter DeFazio of Oregon, (the head of the Transportation and Infrastructure Committee in Congress),"a lot of what pilots are seeing is irresponsible use of toys. The toys, in my opinion, should be set up so they can't be sold unless they're geo-fenced for altitude and perimeters."

In other words, that new drone you got for the holidays just may end up having some hard ceilings placed on it.

<http://www.popularmechanics.com/flight/drones/news/a17535/the-faa-is-terrified-that-1-million-drones-will-be-sold-this-christmas/>

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FAA looks to 2016 for drone rules

A three-year-old legislative deadline for integrating unmanned aerial systems (UAS) into U.S. commercial airspace passed without being met Sept. 30. The Federal Aviation Administration is closer to its goal, but significant work remains.

The deadline to develop a framework to integrate drones and control systems into the National Airspace System (NAS) was set by Congress in a 2012 aviation funding bill.

"In the 2012 FAA reauthorization legislation, Congress told the FAA to come up with a plan for 'safe integration' of UAS by September 30, 2015," says the FAA's UAS website. "Safe integration will be incremental," the agency acknowledged, but noted that it has issued draft rules for commercial drones that weigh under 55 pounds and other measures to help move the process along.

"We are finalizing our final rule for small unmanned aircraft and will have that out next year," an agency spokesperson told FCW. "Meanwhile, we've granted more than 1,700 exemptions to commercial operators through the Section 333 process. These operations are approved and authorized by the FAA so we can ensure the safety of the public. The FAA has successfully integrated new technologies in our aviation system for decades, and we're confident we'll do the same with unmanned aircraft."

The FAA Modernization and Reform Act of 2012 grants the secretary of Transportation the authority to determine whether an airworthiness certificate is required for a UAS to operate safely in NAS. Certificates allow commercial operators and other organizations to get individual approval for a particular application.

Despite the progress, congressional critics and industry organizations aren't happy about the missed deadline.

During a Sept. 10 hearing by the House Committee on the Judiciary Subcommittee on Courts, Intellectual Property, and the Internet, concerning commercial UAS and the deadline, Rep. Darrell Issa (R-Calif.) said the Obama administration had "essentially punted" on the rules.

UAS operators are also impatient. "The FAA has had more than three years to put a small UAS rule in place," Brian Wynne, president of the Association for Unmanned Vehicle Systems International, said at that hearing. "There's tremendous pent up demand for commercial UAS operations, yet the FAA isn't expected to meet this deadline."

"The current system of case-by-case approvals isn't a long-term solution for the many commercial operators wanting to fly," Wynn said. He noted that states are also moving to fill the regulatory gap, "at times with laws that they may not have the authority to enact."

<https://fcw.com/articles/2015/09/30/faa-drones.aspx>

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DIA takes aim at drone use around airport

Regional partnership will work to develop policies, enforcement related to unmanned aircraft

Unauthorized drones have been spotted on or near Denver International Airport seven times since June 19, flying as high as 3,660 feet and, in one instance, flying within 500 feet of an approaching aircraft.

And that has DIA officials working to prevent the worst-case scenario: a collision between a plane filled with people and an unmanned aerial vehicle.

DIA officials, along with the Federal Aviation Administration, local law enforcement agencies and regional airports, on Wednesday announced the formation of a working group to develop policies and enforcement approaches related to drones.

Under FAA regulations, recreational drones cannot be flown above 400 feet or within five miles of any airport without prior notification to air-traffic controllers. Penalties include fines of up to \$27,500 per violation as well as criminal charges that carry maximum penalties of 20 years in jail and a \$250,000 fine.

"The challenge we're facing is that many people who are flying model aircraft these days have little or no aviation experience and they don't belong to safety-conscious organizations such as the Academy of Model Aeronautics, or AMA, as it's commonly known," said Joe Morra, operations manager for the FAA's Office of Unmanned Aircraft Systems Integration.

Education is a primary component of the new group initiatives, Greene said, adding that he doubts the recent violations were intentional. (Police were unable to locate the operators of drones flying too close to DIA.)

The initiatives include:

- Asking the public to report unmanned aircraft systems operations on or near the airport by calling Denver Police dispatchers at DIA at 303-342-4211.
- Directing recreational drone operators to consult KnowBeforeYouFly.org and the related mobile app.
- Running a 10-second public service announcement on DIA's four 26-foot video towers in the terminal during the two weeks around Christmas.

By making hobbyists, the public and businesses aware of regulations, officials said they hope to eliminate the "background noise" and better enforce situations where intent might be less than innocent.

According to FAA data, 17 of the 765 unmanned aircraft encounters reported by pilots, air-traffic controllers and citizens nationwide from Nov. 13 through Aug. 20 were in Colorado.

http://www.denverpost.com/business/ci_28900366/dia-takes-aim-at-drone-use-around-airport?source=rss

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Drone rules coming as sales soar

Amid predictions of more than 1 million aerial drones being sold nationwide by the end of this year, Georgia lawmakers Wednesday opened a series of discussions aimed at legislation that could lead to privacy protections or other regulations on business and private use.

“There are some issues we need to look at pretty carefully,” state Rep. Kevin Tanner, R-Dawsonville, chair of the House study committee on the use of drones, said after an initial meeting at the Georgia Tech Research Institute.

They include privacy, what local communities can regulate, and what the state can do to attract players in the drone industry, he said.

About 20 Georgia firms have clearance from the Federal Aviation Administration to operate drones for commercial use, according to Georgia Tech research engineer Miles Thompson.

The clearance allows them to use drones for specific uses such as aerial photography, filmmaking, cell phone tower inspection, farming, forestry and other functions. Cox Media Group, which owns WSB-TV and The Atlanta Journal-Constitution, is among companies that has received FAA clearance. CNN is partnering with the FAA to research how drones can be used for news gathering in urban areas.

Researchers at Georgia Tech are studying how to develop autonomous drones and improve safety.

The FAA is in the process of developing a new rule for commercial use of small drones that is expected to ease the process. Although Congress had initially directed the FAA to integrate drones into the national airspace by September 2015, FAA unmanned aircraft program lead Mike Wilson said it will be next summer before the final rule is out. After that, it could be months before the rule takes effect.

<http://www.ajc.com/news/business/drone-rules-coming-as-sales-soar/nnrqg/>

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Preliminary Standards Released for Large Unmanned Aircraft – RTCA

The aviation standards organization supporting the FAA in developing the technical criteria for allowing large unmanned aircraft systems (UAS) to fly in civilian airspace has achieved a “significant milestone” in that effort. Preliminary requirements for airborne collision avoidance and communications with the ground have been completed, RTCA announced on October 2.

The “interim” documents establish minimum operational performance standards—or MOPS—for “detect and avoid” and command and control, core functions the FAA will require for unmanned aircraft

to fly with manned aircraft in unrestricted airspace. RTCA, formerly known as the Radio Technical Commission for Aeronautics, expects to produce final standards next summer after verification testing of the requirements.

Under RTCA's auspices, a committee of industry and government experts designated Special Committee 228 (SC-228) has been at work since 2013 developing detect-and-avoid and command and control, or C2, requirements for large unmanned aircraft—not the small drones that have been much in the news lately. The resulting interim documents “focus on an initial scenario: the operation of civil unmanned aircraft ‘to’ and ‘from’ Class A airspace” the layer of airspace above 18,000 feet, RTCA said.

“This is a historic milestone on the path to integrating UASs into the airspace in a safe and efficient manner,” RTCA president Margaret Jenny said of the preliminary standards. “It would not have been possible without the hard work and dedication of the leaders and participants of SC-228, as well as the guidance and support of the Department of Defense, FAA and NASA.”

“That ends that particular phase, but we’ve got some other work, both internally funded as well, that we’re going to continue to push,” said Bob Witwer, Honeywell Aerospace vice president for advanced technology. “I think both we and our customers are really excited about the product space that we’re targeting.”

<http://www.ainonline.com/aviation-news/aerospace/2015-10-02/preliminary-standards-released-large-unmanned-aircraft>

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FAA Levels Record \$1.9 Million Civil Penalty on Drone Operator SkyPan

The FAA announced today the largest civil penalty ever proposed against an unmanned aerial system – drone – operator for allegedly “endangering the safety of our airspace.” The FAA alleges that SkyPan International of Chicago, Illinois operated 65 drone flights between March 2012 and December 2014 over congested airspace and heavily populated cities when it was not authorized to do so. The FAA alleges that these flights were over New York City and Chicago, with 43 of these flights in what is known as Class B airspace. Class B airspace is the among the most restrictive civilian airspace and surrounds highly congested airports like LaGuardia and Kennedy Airports in New York City. Flying into Class B airspace requires approval from air traffic control prior to entering the airspace. In addition, operation in Class B airspace requires certain aircraft equipment, including a transponder, two-way radio and altimeter, not available on most consumer and prosumer drones operated today. The FAA alleges that no approval was received for these 43 flights and that the drones did not have the required equipment.

A representative of SkyPan told me that the only person who could comment was at the airport preparing to board a flight. A statement from FAA Administrator Michael Huerta said: “Flying unmanned aircraft in violation of the Federal Aviation Regulations is illegal and can be dangerous. We have the safest airspace in the world, and everyone who uses it must understand and observe our

comprehensive set of rules and regulations.” A request to the FAA for an actual copy of the civil penalty letter was not immediately responded to.

Of particular interest to drone operators will be whether the FAA in fact alleged that commercial operations without FAA approval formed a basis for the \$1.9 million civil penalty. The FAA’s statement appears to indicate that it does since it alleges operations without an airworthiness certificate or other FAA approval. Discussions on a number of drone forums have indicated that many commercial operators have continued to fly without FAA approval in part because of the lack of enforcement action by the FAA. It will be interesting to see what the fallout of this enforcement action will be.

<http://www.forbes.com/sites/johngoglia/2015/10/06/faa-issues-proposed-1-9-million-civil-penalty-to-drone-operator-skypan-intl/>

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FAA Criticized for Missing Deadline for Setting Drone Rules

In a joint letter to the FAA, 29 aviation groups criticize the agency's delays in getting the drone rules in place.

The Federal Aviation Administration is being harshly criticized by a coalition of 29 aviation groups, which argue in a joint letter that the agency is to blame for failing to meet a Sept. 30 Congressional deadline to get rules in place for commercial drone use in the United States.

The letter, from the Association for Unmanned Vehicle Systems International (AUVSI), the Aircraft Owners and Pilots Association (AOPA), the Academy of Model Aeronautics (AMA) and 26 other groups, asked Michael Huerta, the administrator of the Federal Aviation Administration to get to work quickly to finalize the rules for small unmanned aircraft systems so that businesses can safely use them in a wide variety of industries across the nation.

"While the FAA has hit some milestones in the integration process, it has yet to finalize small UAS rules, let alone facilitate the full integration of UAS that Congress contemplated in 2012," the letter stated.

"The increasing number of businesses applying for Section 333 exemptions demonstrates the pent-up demand for commercial UAS operations and the immediate need for a regulatory framework."

"On behalf of businesses across a wide range of industry sectors in the United States, we urge the FAA to use all available means to finalize the small UAS rules immediately without any further delays and move ahead with the next regulatory steps on the path for integrating all UAS into the National Air Space [system]," the letter continued. "Once this happens, we will have an established framework for UAS operations that will do away with the case-by-case system of approvals, reducing the barriers to commercial UAS operations. And importantly, having more trained commercial operators will create a culture of safety that helps deter careless and reckless behavior."

Brian Wynne, president and CEO of the AUVSI, one of the groups that sent the letter, said the FAA's continuing delays in issuing the drone rules for small UAS devices are uncalled for.

"What are we waiting for?" asked Wynne. "This is for under-55-pound [aircraft], flown by line of sight, under 500 feet [in altitude], daytime operations only, and away from people and airports. There is virtually no risk in that."

Such UAS uses include things like bridge inspections, wind mill inspections, agricultural applications and other low-risk activities, he said. Operators would have to take a rules-based test to operate the UAS vehicles.

In a statement to eWEEK, an FAA spokesman said that the final small UAS rules are now expected to be completed by next spring. The Sept. 30 deadline from Congress called for a safe integration to be completed incrementally, and the agency has reached several milestones along the way to accomplish parts of the integration, the spokesman said.

<http://www.eweek.com/mobile/faa-criticized-for-missing-deadline-for-setting-drone-rules.html>

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San Francisco bans drones during Fleet Week with a \$10,000 fine

Fly your drone at San Francisco's Fleet Week festivities, face a fine of up to \$10,000.

In other words, don't fly a drone at the Fleet Week.

The San Francisco Police Department and the FAA will establish a "No Drone Zone" within five nautical miles of the center point of the city's Fleet Week air show, reports the San Francisco Chronicle. The No Drone Zone will be established Thursday through Sunday during the day, with offenders facing a fine up to \$10,000.

The Fleet Week event celebrates the U.S.'s armed forces, with a three-day long air show as the centerpiece of the festivities. Drones — or perhaps more accurately, a small group of logic-challenged pilots and their drones — have made headlines recently for interfering dangerously with commercial airliners and forest fire fighting.

For San Francisco's Fleet Week, the best anyone can hope for is the massive fine scaring sense into otherwise senseless drone operators.

<http://mashable.com/2015/10/06/san-francisco-drone-ban-fleet-week/>

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FAA will evaluate technology to detect unmanned aerial vehicles (UAVs) near airports under a Pathfinder program with developer CACI International

Testifying before the House Subcommittee on Aviation <http://atwonline.com/regulation/congress-hears-solutions-illegal-incursions-uavs> Oct. 7, FAA deputy administrator Michael Whitaker said the technology will detect radio signals between the UAV and its operator within five miles of an airport.

Congressman Peter DeFazio said the CACI technology has been used by the military and can pinpoint the UAV operator. "It can force the drone to land and track it back to the operator." The system is to be tested at airports in Virginia, he said.

So far, FAA has not released details of the technology or where it will be tested. "This is an existing technology. We have not announced the location and time-frame, but will shortly," Whitaker said. "We will assess it in an operational environment without compromising safety."

Locating the operators of UAVs flying without permission <http://atwonline.com/government-affairs/congress-hold-uav-safety-hearing-oct-7> in airspace around airports "is the biggest challenge we face," Whitaker said. "Pilot reports cannot tell us where the operators are, unlike a laser strike when the pilot knows where it is coming from."

FAA is receiving more than 100 pilot reports of UAV sightings a month, a five-fold increase over 2014. While the agency acknowledges the majority of reports may not involve potentially hazardous near-misses, "the trend in the data is pretty obvious," he said.

Under the program the FAA is working with CNN on using UAVs for news-gathering in urban areas; PrecisionHawk on extended visual-line-of-sight operations in rural areas; and BNSF Railroad on beyond-line-of-sight flights to inspect railway infrastructure.

<http://m.atwonline.com/technology/faa-evaluate-uav-detection-technology>

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UK claims to be ahead of international UAV regulators

The UK's Department for Transport has claimed the country is pioneering ahead of European and international airspace regulators to rapidly look at integrating unmanned air vehicles into national airspace.

EASA and ICAO are both looking at higher level integration of UAVs, with EASA in particular looking at introducing a new proportionate ruling for UAVs in 2016, but the UK is striving to get ahead with the integration it believes is sluggish in being incorporated into everyday use.

"We are not going alone," Paul Cremin, head of UK aviation operational safety and emerging technologies at the DfT, says. "We're accelerating the pace, and if EASA and ICAO can keep up, then that's great, but we [the UK] are upping the pace."

Ways in which the UK is progressing include holding public dialogue sessions that will lead onto a public consultation and the release of a strategy/vision paper in 2016 that will cover a decade of planning for the UK. The ultimate aim is regular access for UAVs to controlled airspace by 2018, Cremin says.

The government identified "pathfinder" projects that will help lead to this, namely looking at the integration of UAVs in applications such as parcel delivery, agriculture/geo-mapping and national infrastructure monitoring markets.

Regarding the well-publicized parcel delivery market for UAVs, Cremin adds: "The UK is open for business, and we will work with you [industry] on this."

The government is also considering the possible development of low tracking/ATM systems for UAVs, as well as the creation of a UK register or a licensing requirement for UAVs. Under the UK's cross-government working group, a program office for UAVs is also expected to be established.

Furthermore, the Autonomous Systems Technology Related Airborne Evaluation and Assessment (ASTRAEA) program that was partly funded by the government's business division recently had its bid for more funding rejected, which is in line with the UK's new pioneering policy.

<https://www.flightglobal.com/news/articles/uk-claims-to-be-ahead-of-international-uav-regulator-417535/>

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Fly Your Drone Near an Airport, and the FAA May Hijack It

New technology from CACI can wrest control of civilian UAVs, lawmaker says.

The Federal Aviation Administration is testing military-grade technology to keep commercial and personal drones in the U.S. from getting near airports and other sensitive airspace.

The FAA is teaming up with CACI International — a federal IT, intelligence, and military contractor — to test "technology that identifies unmanned aircraft near airports," the agency's deputy administrator, Michael Whitaker, announced at a Wednesday congressional hearing.

The FAA's partnership with CACI is the latest in a series of escalating moves to try to keep drones from accessing restricted airspace. The FAA's least intrusive strategy is an education campaign: Through programs called "Know Before You Fly" and "No-Drone Zones," the agency is trying to raise awareness about where hobbyists and commercial drone operators are not allowed to go.

Some members of Congress have pushed the FAA to go further in restricting access to certain airspace, asking the agency to create mandatory geofences that would prevent drones from being flown where they shouldn't be. Sen. Chuck Schumer intends to introduce legislation to set up virtual fences around sensitive areas. Software baked into drones would keep them from entering the fenced-off areas. But Schumer's plan, which is backed by Rep. Adam Schiff in the House, is far from fool-proof, because geofencing software in drones is easily modified and disabled by a savvy user.

The FAA's rules for small commercial aircraft, which were due last month, have still not been finalized. Whitaker said his best estimate for when the rule will be complete is June 17, 2016.

“There are just so many of these now fly-ing that it’s al-most in-ev-it-able that we have a drone hit an air-craft, and there will be prob-ably in-jur-ies and hope-fully not fatal-it-ies,” he said.

<http://www.defenseone.com/threats/2015/10/fly-your-drone-near-airport-and-faa-may-hijack-it/122658/?oref=d-river>

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Dangerous UAV Events Increase, Raising Concerns

On Aug. 16, the pilot of an Allegiant Air flight filled with scores of passengers and approaching Los Angeles International Airport spotted a small drone just under the airliner's wing.

Pilots across the country are logging a fast-rising number of near misses with drones, 1 of 5 of those risky incidents happening in the skies above California. Those conclusions come from an analysis of federal data released Thursday by Sen. Dianne Feinstein (D-Calif.)

The data shows nearly 200 reports of close encounters involving drones reported in California since April 2014 — the most of any state.

But the trouble caused by dangerous drone flights is widespread. The FAA has received reports from 60 cities across the state. Most often the incidents involve smaller drones that have more resemblance to children's toys than aircraft.

On average, the FAA received 20 such reports each month this spring and summer, Feinstein's analysis found — up from just one a month in early 2014.

Currently, hobbyists flying drones have few federal legal restrictions, although they are warned not to fly within five miles of airports or above 400 feet. Drone operators can be fined if they endanger people or other aircraft, the FAA says.

"Safety is always the FAA's top priority, and we are concerned about the increasing number of instances where pilots have reported seeing unmanned aircraft flying nearby," Mike Whitaker, the agency's deputy administrator, told the House Transportation Committee's subcommittee on aviation Wednesday.

Nationwide, the FAA has received nearly 1,000 reports of near misses or other incidents involving drones since April 2014, Feinstein's analysis found.

The Assn. for Unmanned Vehicle Systems International, the drone industry's largest trade group, joined with the FAA and other organizations late last year in an effort to teach consumers how to operate drones safely in a campaign called "Know Before You Fly."

"Stricter enforcement will not only punish irresponsible operators," said Brian Wynne, the trade group's president, "but it will also serve as a deterrent to others who may misuse the technology."

<http://www.latimes.com/business/la-fi-drone-incidents-20151007-story.html>

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Is the FAA Moving Too Far Too Fast?

Many observers of the UAS industry have seen the FAA's willingness to approve Section 333 exemptions for the commercial operation of drones as step in the right direction. But is the FAA jeopardizing safety by moving ahead too quickly?

Many observers of the UAS industry have seen the FAA's willingness to approve Section 333 exemptions for the commercial operation of drones as step in the right direction. But is the FAA jeopardizing safety by moving ahead too quickly to satisfy commercial interests?

Christina Engh thinks so. She's the chief operating officer for the UASolutions Group, a consulting firm based in Florida. She also spent roughly three years in the FAA's UAS Integration Office, was involved with UAS military operations in Afghanistan while serving in the U.S. Army and is a former Blackhawk helicopter pilot.

With Measure's petition, Engh found that a quarter of the UAVs the company proposes to fly for commercial purposes are "duplicates, typos, or non-motorized items such as flight controllers." For example, the company received the FAA's permission to fly the Pixhawk, which is not a UAV, but a 3D Robotics autopilot system.

Engh concluded that it's now probably easier to receive a Section 333 exemption from the FAA than it is to adopt a dog. "It is as if the drones are flying the FAA instead of the other way around," she wrote.

Engh asks and answers the question: So how did this happen? She attributes it to two factors. One is that the FAA is simply overwhelmed and the other is that the UAS industry has become too preoccupied with undermining competitors. If Congress really wants UAS integrated into the national airspace quickly and safely, Engh believes it needs to provide the FAA with the resources to do it.

"Come on, industry," Engh implored. "We know the FAA is overwhelmed. So why are you giving them something that makes its job even more difficult?"

Clearly frustrated with Measure's approach, she exclaimed, "This isn't about having the most or breaking some world record. It should be about being the safest, not PR."

If the UAS industry is going to be successful in the U.S. and reach its potential, then the nation needs to reconsider the current path we're on. Now is not the time for cutthroat competition, and we can't afford to have the federal agency responsible for air safety cutting corners to appease political and business interests. Too much is at stake.

<http://uasmagazine.com/articles/1282/is-the-faa-moving-too-far-too-fast>

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ALPA Calls on Congress to Bolster FAA's Oversight of UAS Operations

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

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

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

Capt. Canoll emphasized that from a technological perspective, UAS must be equipped with active technologies that ensure it is capable of avoiding a collision with manned aircraft and virtually "fence off" UAS from operating in unauthorized locations. In order for this plan to work successfully, it is imperative that UAS pilots be properly trained and fully understand the consequences of exceeding the operating limitations and possible malfunctions.

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

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

See more at: <http://www.alpa.org/news-and-events/news-room/2015-10-07-bolster-faa-oversight-of-uas#sthash.U4fbyUXQ.dpuf>

<http://www.atn.aero/article.pl?mcateg=organisations&id=56551>

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PUBLIC SAFETY:

Drones used in search for missing in Central Texas flooding

CORPUS CHRISTI, Texas (AP) — Aerial drones from a Texas university proved useful in the search for bodies and mapping debris-strewn terrain following deadly flash flooding along the Blanco River this spring, according to the head of the university's unmanned aircraft program.

The Corpus Christi Caller-Times reported Friday that unmanned aircraft from Texas A&M University-Corpus Christi were used in the search efforts.

Experts have praised the drones that helped accurately map affected areas, some of which were impassable because of ground debris. Images shot by the drones showed washed out campsites caked in mud and acres of twisted brush and uprooted trees that were left in the flood's wake.

Jerry Hendrix, executive director of the university's Lone Star Unmanned Aircraft Systems Center, said the technology could be used in researching hurricanes and monitoring oil facilities and the U.S-Mexico border.

"Maybe one day we'll see Hurricane Hunters replaced by UAS technology," he said during a meeting with aviation experts and first responder.

The university's Lone Star Center was selected by the Federal Aviation Administration as one of six unmanned aircraft system test sites in late 2013.

Hunter said drones could become effective tools in gauging coastal erosion and monitoring water development, including desalination.

"You're seeing (the Coastal Bend) get on the cutting edge of educational excellence in technology," he said.

<http://kxan.com/2015/09/26/drones-used-in-search-for-missing-in-central-texas-flooding/>

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Quad-copters Weave a Rope Bridge

Using quadcopters and some rope, researchers have woven together a bridge strong enough to walk across. Made at the ETH Zurich Flying Machine Arena in Switzerland, the bridge joins two scaffolds, and is the first full-scale load-bearing structure autonomously built by flying machines. The feat represents one more step in the field of robotic aerial construction.

Except for the metal scaffolding at either end of the structure, the bridge itself consists exclusively of Dyneema rope, a tensile material with a low weight-to-strength ratio that makes it ideal for aerial construction. Weighing just 7 grams per meter, a 4 mm diameter Dyneema rope can sustain up to 1300 kg. The 7.4 m long bridge uses various rope techniques – knots, links and braids [3] – and has a total rope length of about 120 m.

How it works

Once the bridge itself is constructed, stabilizers are added to make it easier for a person to cross. Because there are no sensors to detect the rope's configuration, the locations of the narrow openings of the bridge must be measured and input to the system, which then adapts the quadcopters' trajectories in order to weave the stabilizers.

The team also developed a series of computational tools to help identify and design the kinds of novel structures that are buildable using flying robots. Using these tools, the researchers can simulate their designs, determine feasible construction sequences, and evaluate the structure before they begin building.

http://www.uasvision.com/2015/09/29/quadcopters-weave-a-rope-bridge/?utm_source=Newsletter&utm_campaign=737b527d08-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-737b527d08-297560805#sthash.F3reyBmY.dpuf

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Colorado Agricultural Aviation Association conducts unmanned aircraft research to protect plane pilots

LA JUNTA, Colo – Drones and unmanned aircraft systems are becoming more and more popular, and they are also causing problems for pilots in low-flying planes.

Now, the Colorado Agricultural Aviation Association is conducting experiments to come up with solutions.

The CAA teamed up with a company called Agribotix, a group that sells drones to people in the ag industry.

Together, they put together a program called Think Before You Launch to conduct research about drones and planes sharing the same airspace.

The group took to the air to find out just how hard it is for pilots to spot these small drones.

They said this research is the first of its kind, and that it's crucial they start finding solutions to help keep pilots safe.

The test is pretty simple. Several pilots fly over fields where drone operators are also flying their machines, and the pilots try to figure out how close they have to be to see the drones.

"These crop dusters are flying low all over the place, all over every field and we need to come up with some way to coordinate with them," Jimmy Underhill with Agribotix said.

"So the test right now will help us prove, 'can we see it in time to safely avoid it?'" Jessica Freeman with the CAAA said.

Freeman said there are 15 industries that use the airspace between zero and 400 feet, and drones cause dangerous situations for all of them.

“It’s a huge deal that we avoid mid-air collisions,” she said.

Even a three-pound bird can cause major damage when it hits a plane while flying. Now imagine what would happen if it were a chunk of metal.

“Everybody who flies one of these should be aware of airspace rules, what’s going around above them and they should inform themselves,” Underhill said.

But even if both parties are following the rules, they can still take each other by surprise.

That’s something this group hopes to prove, before anything bad happens.

“Education is huge, and then catching the attention of the FAA that this is a real problem that needs to be addressed and moving forward with research and solutions,” Freeman said.

Some of the solutions they’ve started to come up with include having large signs on the ground that say UAS to warn pilots that there’s a drone in the area.

They’ve also talked about better communication devices and high-tech sense-and-avoid technology.

<http://fox21news.com/2015/10/05/group-conducts-unmanned-aircraft-research-to-protect-plane-pilots/>

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Topcon Offers Rotary-Wing UAS for Data Collection

Topcon Positioning Group has added a rotary-wing unmanned aerial system (UAS) to its mass data-collection solutions line. The Falcon 8 — powered by Ascending Technologies — is designed for inspection and monitoring, as well as survey and mapping applications.

“Rotary-wing systems provide the perfect solutions for small-scale sites and projects for which flexibility of takeoff and landing or an oblique perspective is required,” said Charles Rihner, vice president of the Topcon Geo-positioning Solutions Group. “The Falcon 8 offers the flexibility to maneuver in small spaces and can cope with challenging environments often presented in inspection and monitoring. It is also well suited for smaller mapping or modeling projects up to 85 acres that require high-resolution imaging.”

<http://gpsworld.com/topcon-offers-rotary-wing-uas-for-data-collection/>

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Florida leads U.S. for FAA drone approval in real estate

One of a fast-growing number of drone operators to gain new federal exemptions, Clermont videographer Brandon Horgeshimer has shot aerials of everything from reality-show scenes to RV-park footage.

"I think the certificate is legitimizing the industry to companies who want to use this technology to help advertise, whether it's real estate or television stuff or movies," Horgeshimer said. "It's kind of like you hire a plumber and you'd like him to have a plumbing license."

Florida drone pilots have gotten 97 exemptions in the Federal Aviation Administration's first year of granting them, making the state second only to California. Uses include photography for events or more general use such as cityscapes; surveys of agricultural property and crops; and law enforcement searches and inspections, according to a new report.

Horgeshimer has fired up his DJI Phantom 3 to capture video for Lake Nona marketing materials. In addition, he has shot aerial video for television shows including "Tough Enough," "Landscape Disasters" and recent Central Florida footage for "Naked and Afraid." His company is working with an affiliate on what he said would be downtown Orlando's first commercial marketing project under FAA approval.

As the remote-controlled devices increasingly claim air space, they have also drawn the attention of homeowner associations and commercial pilots.

A recent newsletter from a homeowner association in Brevard County reads that drones "trespass by flying low over a person's property to interfere with the owner's reasonable use and enjoyment of their property." It went on to advise owners to call the Sheriff's Office to report any related problems.

Brandon Horgeshimer operates his drone at Full Sail University in Winter Park on Friday, October 2, 2015. (Stephen M. Dowell/Orlando Sentinel) (Stephen M. Dowell / Orlando Sentinel)

"Any time there's something new, there's always going to be some concern," Berger said. One association, she said, considered using a drone to investigate reports that a resident was storing chemicals on the balcony of her condo. Ultimately, it was just a discussion.

In addition to association concerns, pilots and airport officials have reported hundreds of sightings and incidents with drones in flight paths. Of 764 "encounters" reported to the FAA in a nine-month period ending in August, 93 occurred in Florida and 13 of those were in the Orlando area, according to a report by the federal agency.

"The FAA wants to send a clear message that operating drones around airplanes and helicopters is dangerous and illegal," the aviation regulation group stated in its report. "Unauthorized operators may be subject to stiff fines and criminal charges, including possible jail time."

To get an FAA exemption, operators must have a pilot's certificate, keep drones in their lines of sight and operate in daylight only. Drones can weigh no more than 55 pounds and fly no higher than 400 feet.

Orlando resident Carlos Pando, a manager at Orlando Aerial Videos, said he has mostly worked shooting construction sites' progress since his company gained its federal exemption about four months ago.

On real estate jobs, he said has to get written permission from real estate agents and submit monthly reports detailing every job he has shot.

<http://www.orlandosentinel.com/business/os-drone-photography-florida-20151003-story.html>

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Utah rescuers may start using drones to help find people

After a lot of negative buzz for interfering with wildfire operations, drones might soon have a place in another type of emergency response: search and rescue.

"In the emergency world, the interest in drones is swelling right now," said Joe Dougherty, spokesman for the Utah Division of Emergency Management. While Dougherty attended an annual, statewide public information conference in St. George this week, first responders were asking a lot of questions about drones' potential. "Agencies are looking at, 'How can we make this work?' "

In fact, the Utah County Sheriff's Office is getting ready to buy one. The office has already secured funding to purchase a drone, and is currently investigating which model would best suit its needs.

Heavy clouds sometimes make it unsafe for the sheriff's office helicopter or fixed-wing planes to fly around a mountain, but a drone can go up there without that kind of risk. Even on a clear day, a drone can get eyes on a hard-to-reach area that would take a ground team hours to hike to and assess the situation, Cannon said.

The unmanned fliers are a lot less expensive than sending in a helicopter, too. A Blackhawk helicopter costs \$4,000 an hour to use for firefighting, or search and rescue operations, Dougherty said.

Drones can also use thermal imaging to find people more easily at night than the human eye can, Dougherty said.

With such an idea in mind, the Utah Drone Imaging company announced this week that it hopes to mount an infrared camera on a drone to aid search and rescues, on a volunteer basis. The company launched a Kickstarter campaign this week to fund the project.

The Utah Division of Emergency Management has been using its drone to document disasters like the recent Hildale flood and last year's North Salt Lake landslide.

But with drones exploding in popularity among businesses and hobbyists the division is looking into whether it can create a network of "good, professional, safe" volunteer operators who can help during certain emergencies, Dougherty said.

That plan, though, is still "in its infancy," he added.

<http://www.sltrib.com/news/3014542-155/utah-rescuers-may-start-using-drones>

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R.A. Smith National gets green light to use commercial drones

R.A. Smith National, the Brookfield-based national civil and structural engineering and surveying firm, said Monday it has been granted a FAA exemption to use drones commercially.

The company plans to use the unmanned aircraft systems in surveying and construction monitoring work.

The action by the FAA is known as a "Section 333 exemption," R.A. Smith said in a statement. "This exemption, granted on a case-by-case basis, allows R.A. Smith National to use an unmanned aircraft system to operate commercially within the parameters and guidelines established by the FAA through an associated blanket COA (certificate of authorization)..."

Among other uses, the technology allows the company to use unmanned aircraft to map areas that may otherwise be difficult or unsafe to traverse, the company said.

<http://www.jsonline.com/business/ra-smith-national-gets-green-light-to-use-commercial-drones-b99590835z1-330775101.html>

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Local firms show off drones and bots for law enforcement

A Danvers-based drone maker has begun shipping a new kind of police surveillance aircraft that can stay aloft for days, because it never completely leaves the ground.

The Persistent Aerial Reconnaissance and Communications system or PARC from CyPhy Works uses a thin wire tether, 500 feet long, that connects the drone to its human operators. It can carry a payload of up to 4 pounds, enough for a variety of surveillance cameras. While standard battery-powered drones can barely stay aloft for 15 minutes before needing a recharge, the PARC can hover around the clock, keeping an area under constant surveillance.

PARC carries a backup battery with enough power to let the drone safely land itself if the tether breaks. And since PARC doesn't rely on radio, its transmissions can't be jammed by criminals or a military foe.

CyPhy was founded in 2008 by Helen Greiner, the former president and co-founder of iRobot Corp. of Bedford, a leading maker of consumer and military robots. Helsel said that CyPhy has sold the first of its PARC machines to a domestic law enforcement agency, though she declined to identify the customer. She also said that the system also has commercial applications. For instance, a PARC is capable of lifting

a 4G LTE transmitter, the kind used in cellular telephone systems. A network of such drones could quickly restore telephone service in a community ravaged by a hurricane, Hesel said.

<http://www.betaboston.com/news/2015/10/05/local-firms-show-off-drones-and-bots-for-law-enforcement/>

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Gov. Jerry Brown approves new limits on paparazzi drones

A drone with a camera is used to shoot scenes for a television show in California last month. Gov. Jerry Brown signed legislation Tuesday that would expand privacy protections to prevent paparazzi from using drones to take photos over private property.

After rejecting other limits on drone use, Gov. Jerry Brown signed legislation Tuesday to expand privacy protections to prevent paparazzi from flying drones over private property.

The bill, AB 856, changes the definition of a "physical invasion of privacy" to include sending a drone into the airspace above someone's land in order to make a recording or take a photo.

Brown has not welcomed other attempts to place limits on drone use. Brown vetoed a broader proposal last month that would have made flying a drone above someone's property without permission a trespassing violation.

"While well-intentioned," Brown wrote in a veto message, the bill "could expose the occasional hobbyist and the FAA-approved commercial user alike to burdensome litigation and new causes of action."

And last weekend the governor rejected three bills that would have prohibited civilians from flying aerial drones over wildfires, schools, prisons and jails. Some of the proposals were intended to prevent interference with firefighting aircraft -- a recurring problem, according to fire officials -- and prevent inmates from receiving airborne contraband.

The three drone-related bills were rejected along with six others that Brown disliked because they would create new crimes.

<http://www.latimes.com/local/political/la-pol-sac-brown-drones-paparazzi-20151006-story.html>

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Resident shoots down neighbor's drone, says wife felt like it was watching her

Owner says it was flying too high to be a problem

An Ascension Parish man hunting squirrels on his property Monday shot down a neighbor's drone that had been flying over his home for several months, making his wife feel as though she was being watched.

Vidrine said Hernandez has been flying the drone over his property for months.

Corporations turn to drones to help reduce accidents

Quadcopters straddle the line between drones and toys

LSU's band taking drones to the skies for guidance

Kentucky student charged with endangerment after drone crash before UL-Lafayette football game

Last week, he said, when his wife saw the drone flying above her, she rode her horse to the property line and told Hernandez to stop flying the machine over her property.

While there aren't state laws regulating drone hobbyists, Webre said, there are FAA guidelines.

"(The FAA) seriously recommends getting permission from the property owner" if you want to fly a drone over their property, Webre said.

The FAA says to "use good common sense and respect people's reasonable expectation of privacy," he said.

But Webre said that's as far as the state has gone. "There's no other state law regulating flying a hobby, recreational drone," he said.

<http://theadvocate.com/news/13641316-172/ascension-parish-resident-shoots-down>

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Drone bursts into flames on quiet Hamptons street

A drone crashed and exploded into flames this week on a quiet Hamptons street.

The flying object slammed into the top of the Sag Harbor Variety Store in Sag Harbor shortly after 6 p.m. Tuesday, officials said.

Flaming wreckage fell onto the street before a man at a nearby hardware store rushed out to douse it with a fire extinguisher.

A passing 11-year-old boy was clipped by the falling drone's propeller but wasn't seriously hurt.

Photographer Paul Callahan told the Sag Harbor Express he was hired to use the drone to take pictures of nearby condos when he lost control of the device.

No one was cited for the crash. Sag Harbor police said the investigation is ongoing.

<http://nypost.com/2015/10/08/drone-bursts-into-flames-on-quiet-hamptons-street/>

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The future of CAT modeling? Autonomous ocean robots provide real-time hurricane data

Information may revolutionize the way P&C providers use CAT modeling.

Wave Gliders connect the undersea world to air, space and shore through unprecedented monitoring, assessment and protection of the world's oceans. Wave Gliders connect the undersea world to air, space and shore through unprecedented monitoring, assessment and protection of the world's oceans.

Hurricanes are massive, complicated weather systems, due to their complexity and the difficulty of gathering data in some of the most extreme conditions on Earth. But advanced technology like Liquid Robotics' (LRI) Wave Glider®, an unmanned ocean robot capable of operating through even the most severe Category 5 storms, can continuously collect and transmit hurricane intensity data in real time. This is game changing.

Wave Gliders connect the undersea world to air, space and shore through unprecedented monitoring, assessment and protection of the world's oceans. They have survived 17 hurricanes, cyclones and typhoons, and most recently tweeted their way through the 2014 hurricane season. They collect real-time data to aid meteorologists in better modeling and predicting hurricane intensity; a key to improving evacuation preparedness, reducing false alarms and saving lives.

Crucially important to the work of insurance providers, CAT models provide a reasonable estimation of the potential damage, strength, and trajectory of an incoming storm system. Historically, CAT models were used only by reinsurers and typically applied only to aggregate portfolios. Over the past 10 years, however, CAT models have been increasingly applied through risk-based assessment and analysis. But despite this rise in popularity, CAT models still suffer from a lack of accurate data.

Historically, data on hurricanes has been gathered by three methods: P-3 "hurricane hunters," planes flown directly above massive storms to collect data from 10,000 feet above the ocean's surface; moored weather buoys that often become inoperable during the violent storms; or satellites collecting data 250 miles above the surface of the ocean where collection of the intensity data occurs.

What's more, a fleet of Wave Gliders pre-positioned off the coast of the Atlantic and in the Gulf has the potential to save thousands of lives and billions of dollars by providing early warning data on storm intensity. As CEO of LRI, I know that the Wave Glider is a true game-changer for the actuarial models used by property and casualty insurers. Our technology should be part of every major Property & Casualty insurer's portfolio of tools to assist in making the underwriting process for catastrophes more reliable with real-time, accurate data. LRI is poised not only to help save lives and minimize property damage, we have the ability to also revolutionize and transform the economics of the insurance and reinsurance marketplace.

http://www.propertycasualty360.com/2015/09/01/the-future-of-cat-modeling-autonomous-ocean-robots?utm_source=hs_email&utm_medium=email&utm_content=22639759&hsenc=p2ANqtz-8IOPNWmeRiBhgqRIXSmgZ6B56cFwOR03iZJLx-zCaacIlcXCM0VLKZt5Izi0Ad1wnryN7YC5vTqmoEs14v6PU9qys4g&hsmi=22639759

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Science on the Sea

ECU craft listens and records vital ocean data

East Carolina University scientists have been sending a small craft to navigate the North Carolina coast studying underwater noise and keeping tabs on tagged marine life all to better understand the ocean environment.

Called an acoustic wave glider, the metal-and-composite device is an ocean-going robot that studies underwater noise; acoustically tagged fish such as tuna, flounder and sharks; whales, plankton and ocean environmental conditions. The device is manufactured by Liquid Robotics and was funded by a \$281,393 grant from the National Science Foundation. ECU researchers have nicknamed the craft “Blackbeard.”

Cruising along the surface, it’s about the size of an ironing board. ECU researchers launched and tested it in August near the Queen Anne’s Revenge shipwreck near Morehead City and Beaufort and deployed again this month in the same area. Part of its initial work has been surveying an artificial reef established by the N.C. Division of Marine Fisheries. Historically important feeding grounds for endangered species of right whales are in the area off Shackleford Banks, and ECU researchers hope to document the songs of northern right whales as they migrate past the coast, along with other fishes such as red drum, spotted seatrout and weakfish.

It also will provide valuable data on the potential effects of oil and gas exploration and wind turbine development in coastal waters.

The wave glider can act as a stationary platform or be propelled to specific points using GPS technology. A submarine unit with wings or fins generates forward motion by wave action. Two solar panels provide energy for sensors.

ECU expects to receive funding to support these wave glider surveys from the NSF, the Bureau of Ocean Energy Management, the Office of Naval Research and the National Oceanic and Atmospheric Administration to study the impacts on whales and fishes and their food supply. These agencies will use the data to minimize impacts to the ecosystem, while allowing some energy extraction in areas away from critical habitats.

Blackbeard is operated over an Internet connection via a satellite link and reports regularly on its location and sends data to shore. It can be at sea for one-month long missions.

The public may follow the wave glider's deployments and key findings at its Facebook group "Blackbeard Sails the Seas for Science."

http://www.ecu.edu/cs-admin/news/waveglider.cfm?utm_source=hs_email&utm_medium=email&utm_content=22639759&hsenc=p2ANqtz---2TEWynbdg57NXs7nkDxGzx5FgidkqYK6dUY60WDpKAPNCG-5m6EvO-o9lgWVcZfy95-GCPW4Wfd2RpDrNRjjGECfg&hsmi=22639759

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Sensor and data collection technologies advance

"This is the decade of big sensing."

In fact, the development of sensors and data collection technology has been so rapid in the past decade that some industry pundits say that it's now more of a matter of the market catching up.

The wave is coming

Micro-electromechanical systems (MEMS) sensors downhole

Today, interest in MEMS-based sensors is high in the oil and gas industry, due to small size, low cost, large-scale integration, and ability to operate under high temperatures and pressures. Applications range from seismic imaging to detection of gas leaks and monitoring and inspection tasks for increased safety.

MAST a division of Micromem Applied Sensor Technologies, with expertise in nanoparticle sensor technology, is developing a cement integrity sensor designed to prevent such incidents at new wells.

The sensors are mixed with the cement and remain permanently embedded in the structure. They measure temperature, moisture, and also listen acoustically to normal flow via expected interstitial micro-fractures in the cement. If these microfractures get larger, as in the case of the Deepwater Horizon accident, there would be more unacceptable hydrocarbon flow and more acoustical noise, which the sensors would detect and report via the well's wireless network in real time.

Drones in the air

The fact that oil companies operate in remote locations that are risky and costly to send humans into, actually turns out to be a good thing—from a drone's perspective.

One reason drones are making an easy transition to the oil and gas industry is the fact that they are based on proven military technology that has racked up hundreds of thousands of flight hours. "Other than making sure we comply with regulatory approvals to conduct unmanned aerial vehicle (UAV)

operations, there's really very little in the way of modifications, nothing particularly clever or unusual other than refining the suite of sensors," said Duggan.

As industry acceptance of drones as a productivity tool grows, Duggan views the technology as in a transition phase somewhere between experimental trials and real world operations. "Regulatory approvals to conduct UAV operations, which differ from country to country, are an impediment to quicker adoption rates. But progress is being made. Some companies are more advanced (and more forward leaning with this new technology) than others."

Robots at sea

Oil and gas companies are also experimenting with unmanned autonomous vehicles at sea. One example is the surfboard-shaped robots, called Wave Gliders, from Liquid Robotics, which use both wave-powered and stored solar energy to collect data acoustically from seabed instruments in challenging ocean conditions.

Raw data (via Iridium in SBD mode) is sent in near real time back to an operations center every five minutes. Data are also stored as well as high-resolution mode (as needed) on the glider for data retrieval at the end of a mission.

What's coming down the pipeline?

Many of the examples discussed are part of a managed service, whereby the supplier provides the sensing, communication, big data storage, analytics, and visualization. Some industry observers see this "sensing-as-a-service" as the biggest opportunity in sensor and data collection technologies; and customers are clamoring for such an offering.

Tips for selecting a sensor technology

- Focus on the results, not the specific technology.
- Measure what you really need to measure—and sometimes that means you will need to measure the property indirectly (i.e., corrosion).
- Ensure the sensor technology is functional in the environment where you need to take the measurement.
- Ensure that you can securely and reliably communicate the data back at the rates and in the timeframe required.
- Look for situations that have the potential to leave data stranded and eliminate them.
- Confirm that you can extract something useful and actionable from the data you collect.

<http://www.plantengineering.com/single-article/big-data-drilldown-part-2-sensor-and-data-collection-technologies->

advance/6cdaf5594325ce7fb78831b63ab30830.html?utm_source=hs_email&utm_medium=email&utm_content=22639759&hsenc=p2ANqtz--AJeD175z4ekevAhFt3jhm8p4kmYw2rM2mU_3by62PGDYr_Qv-1nSDDOcaSch1x-4lBqu24xdOiqT4x1I2wTul9ldJgg&hsmi=22639759

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Drones are providing film and TV viewers a new perspective on the action

A dazed and bloodied student who had just been mugged stumbled down a darkened alleyway in a slum. He lifted his shirt, revealing a gaping wound, before collapsing on the ground as curious onlookers gathered around.

Buzzing some 20 feet above the crowd of extras was a drone, its whirling blades humming like a swarm of bees. The aircraft carried a digital camera that captured the action for an upcoming episode of "Criminal Minds: Beyond Borders."

"We're getting shots you wouldn't get any other way," said Tony Carmean, a co-founder of Aerial MOB, the San Diego company that supplied the drone for the "Criminal Minds" shoot.

A year after the Federal Aviation Administration cleared the way for their use by the film and television industry, unmanned aircraft systems are becoming popular tools for directors and cinematographers.

Drones aren't yet ubiquitous — less than 10% of all productions use them. But demand is growing rapidly on film sets because they allow for more nimble filmmaking — and save money. A camera drone and crew costs as little as \$5,000 a day, compared with at least \$25,000 a day for a helicopter shoot.

The city and the county of Los Angeles have issued nearly 60 permits for drones on film and TV sets in the last year, according to data from FilmL.A., the nonprofit group that handles permits for the L.A. region.

Until recently, the FAA allowed only public agencies such as fire departments to use drones for such things as tracking wildfires.

The agency effectively banned their use for commercial purposes because they were viewed as potential aviation safety hazards and threats to national security.

Of course, drones can still be dangerous.

Drones also have limitations, especially when it comes to filming high-speed action scenes, said Dylan Goss, partner in Team5 Aerial Systems, a Van Nuys company that supplies film equipment for helicopters and recently launched its own drones division.

Under the new FAA rules, drones can be used only on sets that are closed to the public and cannot be operated at night.

Operators must hold a recreational or sports pilot certificate, keep the drones within their line of sight and below an altitude of 400 feet.

At least two people are required to operate the drones: one to pilot the craft with a controller and a second who operates the camera and acts as spotter to watch the drone in flight.

Applications for drone waivers have flooded the FAA, which has authorized more than 200 companies and individuals to operate drones for film production, according to the agency's website.

Among them was Aerial MOB. The company builds its own drones, which cost as much as \$30,000 to make. The drones weigh up to 30 pounds and rent for \$5,000 to \$14,000 a day, depending on their weight and size of the camera.

<http://www.latimes.com/entertainment/envelope/cotown/la-et-ct-drones-hollywood-20151008-story.html>

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UAS Insurance Association Founded

Mission Statement: The mission of the UAS Insurance Association is to assist the insurance industry in establishing and maintaining practices and procedures focused on the growing world of UASs in commercial operations and insuring that the unique interests and perspectives of the insurance industry associated with UAS are identified and effectively managed through insurance and other techniques of risk mitigation.

Additionally, it is to, where appropriate, educate the drone industry on all aspects of insurance and, as necessary, act as an advocate on behalf of the insurance industry.

The UAS Insurance Association, (UASIA), is an industry group focused on all aspects of insurance, risk management and safety which involve manufacturers, operators and users of drones/unmanned aircraft systems in the National Airspace System for commercial purposes.

As this rapidly growing industry continues to develop, both on the commercial and regulatory fronts, it is evident that the interests and concerns of the insurance industry grow as well. This includes not only hull or liability insurance coverages, the development of underwriting standards, claims management processes and risk mitigation strategies. Regulatory uncertainties, the absence of the risk based body of experience and the ever increasing concerns about the collision between a drone and manned aircraft, present to the insurance industry a set of issues which are of concern. The UAS Insurance Association provides a voice for those concerns and a vehicle to act on them.

In addition to bringing together interested insurers, brokers and others involved in the insurance area with a unified voice, the UASIA will provide to its members:

☒regular “insider” briefings from, among others, Jim Williams, Co-Chair of the Dentons UAS Practice Group and former Manager of the FAA’s UAS Integration Office.

☒input into state level legislative activities targeting drones/UASs.

☒contracts and contract wordings that can be used to buy or sell UAS services in a way so as to maximize the management of the risks.

☒real-time alerts summarizing developments in the UAS world

☒effective access to UAS decision-makers both in the industry, the FAA and on Capitol Hill ☒advocacy on issues of concern and a single source for “all things” related to this burgeoning industry.

If your company is interested in joining with its colleagues in the insurance industry and joining UASIA as a Founding Member, please contact Barbara Butler at barbara.butler@dentons.com or (703) 336-8704.

http://www.uasvision.com/2015/10/05/uas-insurance-association-founded/?utm_source=Newsletter&utm_campaign=3add01bb80-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-3add01bb80-297560805

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NMSU PSL flight center does testing for nation

Established in 2007, the New Mexico State University Physical Science Laboratory’s Unmanned Aircraft Systems Flight Test Center is the first of its kind. In the last eight years, NMSU’s UAS FTC has become the most accomplished and most experienced Federal Aviation Administration-approved UAS test facility in the country.

NMSU’s UAS FTC provides direct access to more than 15,000 square miles of airspace, and was the first civil UAS test facility that provided direct, available access to restricted airspace – a must for testing developmental aircraft or multi-aircraft scenarios.

In May 2015, the FAA announced that the Alliance for System Safety of UAS through Research Excellence (ASSURE) would operate a new National Center of Excellence for UAS. NMSU is a core member-university on a team, which is comprised of 15 universities and six affiliates.

As a core university of ASSURE, NMSU is helping lead the partnership of academic and industry members that will begin a new era of commercial unmanned aircraft research, development and integration into the nation’s airspace. Dallas Brooks, NMSU UAS research and development strategic manager, is the principle investigator on the ASSURE project and co-chairs the Federal UAS Science and Research Panel, which oversees and coordinates UAS research conducted by the FAA, NASA, the Department of Defense, and the Department of Homeland Security.

The center of excellence will supply research to the FAA and UAS industry to increase the potential uses of unmanned systems with minimal changes to the current system regulating manned aircraft.

The center of excellence research areas will include: detect and avoid technology; low-altitude operations safety; control and communications; spectrum management; human factors; compatibility with air traffic control operations; and training and certification of UAS pilots and other crew-members.

“The detect and avoid research area focuses on issues related to the detection of potential threats to remain well clear and avoid collisions. It explores sensors, the data produced from sensors, the management and use of that data, and the operational outcome that is considered safe and acceptable,” he said.

In this research area, NMSU is evaluating the requirements for an airborne or ground-based Detect and Avoid system compatible with small UAS (55 pounds and less) operating in limited portions of the National Air Space to comply with the regulations and not increase the risk to other aircraft or people on the ground, beyond what is currently in effect. Additionally, NMSU is accessing the requirements for software along with what are the most feasible airborne or ground-based sensors.

“Each of those universities has specific skills and abilities, and the idea is to marry all of the technical expertise to provide real research answers for flight safety in the National Air Space,” Cathey said.

<http://www.lcsun-news.com/story/news/education/nmsu/2015/10/11/nmsu-psl-flight-center-does-testing-nation/73784130/>

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SENSORS/APPLICATIONS:

World's Smallest Solar-Powered Unmanned Air Vehicle

The National Science Foundation has awarded a grant of \$1,525,000 to a UMN team led by Prof. Nikos Papanikolopoulos to develop the world's smallest solar-powered unmanned air vehicle (UAV) capable of multi-day flight. Equipped with environmental sensors, the solar powered UAV will facilitate optimal energy production by wind, maximal crop yield on agricultural landscapes, and safe aquatic ecosystems for recreation and water supply uses. Specific research activities that will be enabled by a solar UAV include renewable energy, atmospheric turbulence in wind farms, food production/precision agriculture, and environmental conservation/detection of harmful algal blooms. In each of these cases the small scale and long duration flight capability of the solar UAV are what make them practical concepts.

<https://www.cs.umn.edu/news/umn-develop-worlds-smallest-solar-powered-unmanned-air-vehicle>

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Plextek Develops New UAS Technologies for Urban Environments

Under the Defence Science and Technology Laboratory's (DSTL) three-year Autonomous Systems Underpinning Research (ASUR) programme, which aims to develop key technologies for unmanned systems, Plextek is developing sense-and-avoid, communications and camouflage systems that are compact and power-efficient enough to be used on small UAVs. The nature of urban environments means that data cannot be transferred via line of sight because buildings cause obstructions, so Plextek is exploring the possibility of reflecting beams off structures to enable the UAV to communicate with its ground station. "Video is increasingly required from UAVs, and there is a demand for more resolution," Nicholas Hill, director of defence and security at the company, says. "We are looking at how to transmit high-resolution, reliable data in a congested environment." Using four flat, patch antennas that each adjust by 90 degrees, Plextek is developing a small form factor 60GHz system that will be able to transmit beams to find the best route back to the ground control station over an approximate 1km range. Plextek is also exploring developing a radar that can fit into a small UAV. While Hill says that the sensor of choice for a UAV is typically a camera, a small scanning radar could work alongside, assuming there is enough bandwidth available to transmit both data feeds to the ground. The company is therefore considering the integration of radar technology into the same casing as the indirect beam communication system, which would ultimately be a sense-and-avoid system for small UAVs. The radar is in phase 1 under the ASUR effort, while the communications system is in the second development phase, including assembly of a prototype, and Plextek is in discussions with DSTL regarding a possible third phase of development. Another phase 1 ASUR project has Plextek working on adaptive camouflage for UAVs. Derived from the electronic paper technology that is used in e-readers, the colours in panels on a UAV can change shade, within a certain spectrum, and DSTL is exploring the full integration of this technology into a platform's wings. "Changing the appearance of the camouflage at the touch of a button is, arbitrarily, how to think of it," Hill says. Plextek may collaborate with the University of Southampton for the integration effort.

http://www.uasvision.com/2015/09/23/plextek-develops-new-uas-technologies-for-urban-environments/?utm_source=Newsletter&utm_campaign=71bf07ef6a-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-71bf07ef6a-297560805

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FLIR Launches Professional-grade Thermal Imaging Camera for UAVs

Earlier this year, FLIR Systems Inc. introduced the FLIR Vue thermal imaging camera—a compact, affordable thermal imaging solution designed for use on small unmanned aerial vehicles. Now, FLIR has made a new, professional-grade version of the camera available, featuring expanded capabilities.

Like the standard FLIR Vue, the Vue Pro camera is available in two models: a 640 x 512 and a 336 x 256, both of which feature an uncooled VOx microbolometer thermal imager and a spectral band of 7.5 to

13.5 µm. The new model, however, records digital thermal video— which can be recorded in either MJPEG or H.264 format— along with 14-bit thermal still images, to an on-board micro-SD card.

An Accessory Port gives users direct control of camera functions such as changing the image’s color palettes, starting and stopping recording, and the camera’s e-zoom. With MAVLink compatibility, the Vue Pro interfaces with the standard flight control systems used for mapping, survey, and precision agriculture missions, and can be configured to automatically capture images and annotate each image with the aircraft’s position and other critical flight information. Additionally, Vue Pro comes with a built-in Bluetooth module, allowing users to configure camera options with iOS or Android apps before takeoff.

“Building on the pioneering of the original FLIR Vue, the FLIR Vue Pro puts even more thermal imaging functionality and greater flexibility in the hands of sUAS operators,” said Jeff Frank, FLIR’s Senior Vice President for Product Strategy. “The Vue Pro enables commercial drone operators to provide clients with the actionable, temperature-based data to increase efficiency and improve critical business decisions.”

http://www.uasvision.com/2015/09/28/flir-launches-professional-grade-thermal-imaging-camera-for-uavs/?utm_source=Newsletter&utm_campaign=7de295d851-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-7de295d851-297560805#sthash.jkvCVOu8.dpuf

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GNSS Receiver Manufacturers Thwart Jamming, Spoofing

With customers demanding greater security against hackers and jamming, GNSS receiver manufacturers are incorporating a widening array of techniques to thwart interference both natural and nefarious.

But sometimes security-related innovations take a while to catch on.

In 2011 NovAtel developed an antenna with a null steering element able to deal with three jammers, said Sandy Kennedy, chief engineer for the company and its director of GNSS cards. Although prospective customers thought the unit was a really good idea, Kennedy said, it wasn’t until November 2014 that demand for the unit coalesced after the Organization for Security and Co-operation in Europe ran into jamming over Ukraine.

“They had an unarmed Camcopter there, that was just monitoring — that was its sole reason for being out there. And it was jammed and grounded,” Kennedy said. They installed Novatel’s GAJT-AE and were able to resume flights and their mission despite the jamming.

“Autonomous vehicles are a big challenge,” stressed Daniel Ammann, co-founder of u-blox, adding that intentional perturbations like jamming and spoofing are “much harder” to solve than the more numerous, naturally occurring problems such as tree canopies. Among the threats, he said, are man-in-

the-middle attacks with “somebody cutting the wire and injecting a signal with the wrong position output.”

The reason for taking this approach was to get better performance in the urban canyons of big cities, he told the audience at the Institute of Navigation’s ION GNSS+ conference earlier this month. Even so, he added, he received a call from someone involved in jamming exercises who said his phone continued to work despite the signal degradation.

Innovation could be hampered if certifications were established, the majority of those representing manufacturing firms said.

Riley said that, while certification is needed for safety-of-life applications such as aviation, market forces drive security far better than setting receiver standards or certification requirements.

“I suspect the people making standards don’t know all the things that we’re doing,” said van Diggelen. The latest work is not public, he explained, and as a result, regulators may set requirements based on old technology.

Certification would be “a large help,” agreed Andrew Bach, vice president and chief architect for financial services at Juniper Networks, but research would be necessary to ensure standards reflect the way receivers actually are used.

While standards would offer common definitions that could be very useful when testing and comparing receivers, said Kennedy, setting specific requirements would effectively curtail innovation to the span of that new, legal yardstick.

“In a highly regulated industry,” he said, “I’m going to go back to certification. You are only as good as you’re certified to be — although we may find out the limitations of that. What is it Warren Buffett says? ‘You find out who doesn’t have a swimming suit when the tide goes out.’”

<http://www.insidegnss.com/node/4684>

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Joint Experimentation for Autonomy for Adaptive Collaborative Sensing (AACS) Program

MUSCATATUCK URBAN TRAINING CENTER, Ind. – A small unmanned aerial vehicle, or UAV, circles overhead at over 2,000 feet, looking for survivors following a natural disaster. That aircraft spots something moving and cues a lower flying multi-rotor aircraft, much like a camera drone you can buy online, to get in for a closer view. After confirming that the movement is or could be a human being, the hovering aircraft cues a ground robot that can get under rubble and in places that the flying robots can’t to find the victim and let human rescuers know exactly where to go. All of this is done with no human needing to tell the robots what to do.

Sound like the future? At Muscatatuck Urban Training Center in southern Indiana, the Air Force, Army, and Naval Research Labs have come together for a joint experimentation exercise with the Autonomy for Adaptive Collaborative Sensing (AACS) Program.

“Autonomy is simply allowing a piece of equipment to react to its environment without needing human intervention,” explained Todd Jenkins, the Small Unmanned Systems Exploitation (SUSEX) program manager and a member of the Air Force Research Laboratory’s Sensors Directorate. “Different platforms from different disciplines should be able to communicate and work together seamlessly to assist human operators during their missions, whether it be a rescue mission or searching for a single person.”

The lofty goal, according to Jenkins, is to have a single operator controlling all of the air and ground robotics platforms at once while crucial information is fed back to the operator to parse. For the engineers, such as Tom Apker, an Autonomy Engineer with the Naval Research Laboratory, this brings on a whole new set of challenges.

All of these assets are owned by the different military agencies and this is the first time that they have all been brought together for a single exercise, creating a hodge-podge of technologies, coding languages, and even differing service languages in one synchronized event.

When these systems are used in a laboratory environment, results can be tweaked on the spot and engineers can make assumptions about what will happen to their robots.

“This is a really positive story about how robots can collaborate to help survivors in disasters,” Maholtra says. “We think that with these assets in the immediate aftermath of a disaster, we’ll be able to give situational awareness to the forward air controllers and the folks responding to the disaster, including the NGOs [non-governmental organizations such as the Red Cross] and the non-military people.”

“I call Muscatatuck the Disney World for first responders and disaster relief,” Jenkins concluded. “There was a lot of appeal for all three teams to come here knowing what an exciting urban environment this would be. We had imagined that a hurricane had come through, a tornado, or an earthquake, of sorts, and that we would have our system helping in that type of scenario. This was just ideal for that.”

<https://www.dvidshub.net/news/177761/muscatatuck-hosts-military-research-labs#.VhFHk5fzdnm>

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Flying IEDs: The Next Evolution in Warfare

Over the course of the ongoing wars in Iraq and Afghanistan, roadside Improvised Explosive Devices have become the scourge of the United States military’s ordinance disposal units. The IED is a staple weapon of asymmetric warfare tactics, providing an inexpensive, easy to build and difficult to detect weapon capable of inflicting painful losses on a technologically and numerically superior enemy. With the evolution and proliferation of drone technology, ordinance disposal units are now facing a new and worrisome threat, the Flying IED.

If the White House radar system could not detect this small device, it is unlikely military radar systems protecting military installations would detect a weaponized drone. Even though the White House incident was declared an accident and not a threatening situation, military officials are concerned by the possibility that civilian and military targets could be vulnerable to drone attacks. The U.S. Central Command announced recently that it had attacked a remotely piloted aircraft described as a model planes in the possession of operatives for the Islamic State as it was being loaded into the trunk of a car. How operatives planned to use this miniature aircraft is unknown but it is speculated that its use was either for surveillance or as a weapon.

There is significant concern within the defense community that forces unfriendly to the United States can easily acquire these types of flying vehicles. The small drones are readily available and it is highly probable that existing technology would allow unfriendly forces to retrofit them, giving the aircraft the ability to deliver weaponized explosives or hazardous materials.

The United States relies on superior technology to protect itself from such attacks in recent years but Leverich cautions that this strategy may no longer be foolproof as a deterrent. "Right now," Leverich explained, "we are in a period of tremendous uncertainty and trying to determine what the singular threat is going to be is a significant challenge." He added that "a \$100 device [such as a quad-copter or model airplane], currently being used for surveillance can be quickly adapted for lightweight explosives."

<http://science.dodlive.mil/2015/10/03/flying-ieds-the-next-evolution-in-warfare/?source=GovDelivery>

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Hacking Wireless Printers with Phones on Drone

You might think that working on a secured floor in a 30-story office tower puts you out of reach of Wi-Fi hackers out to steal your confidential documents.

But researchers in Singapore have demonstrated how attackers using a drone plus a mobile phone could easily intercept documents sent to a seemingly inaccessible Wi-Fi printer. The method they devised is actually intended to help organizations determine cheaply and easily if they have vulnerable open Wi-Fi devices that can be accessed from the sky. But the same technique could also be used by corporate spies intent on economic espionage.

The drone is simply the transport used to ferry a mobile phone that contains two different apps the researchers designed. One, which they call Cybersecurity Patrol, detects open Wi-Fi printers and can be used for defensive purposes to uncover vulnerable devices and notify organizations that they're open to attack. The second app performs the same detection activity, but for purposes of attack. Once it detects an open wireless printer, the app uses the phone to establish a fake access point that mimics the printer and intercept documents intended for the real device.

A drone hovering outside an office building isn't likely to be missed, so using this method for an attack has obvious downsides. But the aim of their research was to show primarily that adversaries themselves don't need to be positioned close to a Wi-Fi device to steal data. A hacker could be controlling a drone from half a mile away or, in the case of autonomous drones, be nowhere near the building at all.

As for how close the drone would need to be to do the initial scan to detect vulnerable devices in a building, that depends on the specific printer, or other device's, Wi-Fi signal. Typically the range of a printer is about 30 meters, Elovici notes.

Turning their mobile phone into a fake printer was not trivial, however.

Any organizations that are more interested in uncovering vulnerable devices than attacking them can simply install the Cybersecurity Patrol app on a phone and attach it to a drone to scan their buildings for unsecured printers and other wireless devices. A drone isn't essential for this, however. As the researchers show in their demo video (above), a phone containing their app can also be attached to a robot vacuum cleaner and set loose inside an office to scan for vulnerable devices as it cleans a company's floors.

"The main point [of the research] was to develop a mechanism to try to patrol the perimeter of the organization and find open printers from outside the organization," Elovici says. "It's dramatically cheaper than a conventional pen test."

<http://www.wired.com/2015/10/drones-robot-vacuums-can-spy-office-printer/>

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3D Integrated Imaging to Tackle Landmine Detection

Using dual tomography imaging techniques, the University of Bath hopes to develop a new 3D subsurface camera system capable of detecting landmines underground.

The three-year research project lead by Dr. Manuchehr Soleimani at the Engineering Tomography Lab of the University of Bath aims to provide technology that can differentiate between images of plastic and metallic elements within a single explosive device, at depths of up to 10 cm underground on varied terrain.

"The UN estimates that it would take more than 1,100 years to clear the estimated 110 million landmines situated in 70 countries," said Charlton. "As a charity, we are determined to find a practicable technology solution that can bring an end to this humanitarian tragedy."

While ground-penetrating detection techniques such as radar or metal detectors may be more mature, anti-personnel landmines manufacturers have moved to using plastic instead of metal, both for economical and stealth reasons, which makes their detection increasingly difficult.

Further work is required to profile the surrounding ground properties in which landmines can be buried, so the sensors can better distinguish the explosive devices. What remains is the typical trade-off between sensor array size, complexity, and imaging speed. One would want to cover a reasonable area in one scan, probably with sensor arrays mounted on a rover robot arm.

“We aim to develop an integrated technology to detect both metallic and non-metallic landmines and to improve the speed and reliability of this process,” Soleimani said.

These landmines can cost little to manufacture, while the cost of finding and clearing an individual mine can cost up to \$1,000, according to the University of Bath.

The research project, which will take place over the next three years, aims to not only to develop a detector that will work for all landmines across all terrain, but one that can also be produced relatively cheaply, thus helping to reduce the overall cost of clearing minefields.

<http://science.dodlive.mil/2015/10/05/3d-integrated-imaging-to-tackle-landmine-detection/?source=GovDelivery>

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Pairing a robot with a forward-scouting UAV

Even with a sure-stepping robot like DARPA's Big Dog <http://www.engadget.com/2013/12/14/google-bought-boston-dynamics-its-over-for-humans/>, there is still plenty of terrain <http://www.engadget.com/2015/06/08/the-machines-that-rose-to-darpas-robotics-challenge/> that today's robo-mules simply can't handle. That's why a team of researchers from ETH Zurich's Autonomous Systems Lab <https://www.youtube.com/watch?v=9PprNdIKRaw> has devised a way to ensure these robots never get bogged down by impassible terrain: pair that robot with a forward-scouting UAV.

<https://www.youtube.com/watch?v=9PprNdIKRaw#action=share>

The mechanical pair are designed to cooperate with one another to map and navigate changing terrain. The UAV first flies ahead and creates a rough map of the area, including relative elevations. It then shares that data with the walking robot, which determines the most efficient route to take. The legged robot also employs a laser rangefinder to continually update its elevation map and ensure that every step it takes is sure-footed. The team's study, "Collaborative Navigation for Flying and Walking Robots" is currently under peer review ahead of the 2016 IEEE International Conference on Robotics and Automation.

<http://www.engadget.com/2015/10/05/four-legged-bot-uses-drone-sidekick-to-avoid-rough-terrain/>

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New UAV sensor technologies using spectral radiation for improved surveillance systems

MOSCOW, Oct. 5 (UPI) -- A Russian company is creating new payloads for unmanned aerial vehicles to improve surveillance using the spectral radiation emitted by objects.

"The technology we created can process hyper-spectral data streams, leading to the creation of an 'all-seeing eye' that allows our drones to look beyond the usual boundaries of the human eye's electromagnetic spectrum," Rostec quoted Sergey Skokov, deputy chief executive officer of UIMC.

Skokov said the equipment can identify anything in its field of view. It not only assembles pixels to form a picture but pixels with a unique spectrum.

"This technology can also distinguish natural from man-made objects, such as camouflage nets from real grass, or fake from real element," according to UIMC.

The system can automatically detect military equipment, including camouflaged and hidden objects and independently identify targets using a database of hyper-spectral characteristics of different objects and materials.

The technology also has civilian uses -- assessing the state of forests, their species composition, or to measure the effects of wildfires and pests, for example.

http://www.upi.com/Business_News/Security-Industry/2015/10/05/Russian-firm-creating-new-UAV-sensor-technologies/5931444070463/

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NASA Digs This Idea for Robots to Build Igloos on Mars

Well before NASA announced that liquid water exists on Mars, a team of designers from Clouds Architecture Office and Space Exploration Architecture (SEArch) toiled to figure out how we could use ice—so, in essence, water—as shelter on the Red Planet. It's a simple idea, really. We've known for some time that Mars is home to large quantities of water ice, and that this ice could serve as a locally sourced building material. Ice is also translucent, and all homes need a little natural light.

The team of eight ultimately came up with the Mars Ice House, a sloping, triangular structure that would be autonomously built by robots using additive manufacturing techniques. For their idea, NASA recently awarded them first place in a design competition for 3-D printed habitats made for future human inhabitants of Mars.

From the beginning, "we were pretty clear that we weren't going to do a dome and we didn't want to do something opaque," says Ostap Rudakevych, from Clouds. They settled instead on a double-walled structure—a shell within a shell that would create a more intimate dwelling space surrounded by what the SEArch/Clouds AO calls a "contemplative yard" area. As you move from the center of the habitat towards the outer walls, there's more and more light. That pocket of space is meant to feel like the

outdoors, which, Morris says, will help preserve astronauts' psychological health. "We don't want to give someone a potential problem by denying them Circadian rhythms, because it's very similar to earth—there's a 25-hour day, and they do have seasons," he says. "On Earth, we take things for granted. We don't think about the air we breathe. In extreme environments, you have to consider every element of being human."

Two types of robots will build the Ice Houses. One will collect ice from underneath the planet's surface of regolith (although that could change, given NASA's water-on-Mars news) and another will deposit the ice, layer by layer, into the structure of the home. Doing this would require pressurizing the ice to turn it into water, then printing it in an environment that's so cold, it'll re-freeze. A theoretical lander—different from the Phoenix Mars Lander that touched down on the planet back in 2008—would supply the energy needed. Rudakevych says these robots play into the team's vision of an autonomous civilization, one built without humans, so it's scalable before astronauts even arrive. "You could print villages, with large scale settlements," he says.

<http://www.wired.com/2015/10/nasa-digs-idea-robots-build-igloos-mars/>

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Mail sent to Pulau Ubin by drone

The 2-kilometer test flight from Lorong Halus to the island off Singapore's north-eastern coast took 5 minutes, and carried a payload of a letter as well as T-shirt in a packet, SingPost said.

SINGAPORE: Mail delivered in flight, with not a postman in sight? The first step toward making this a daily reality was taken after Singapore Post successfully trialled a mail run from mainland Singapore to Pulau Ubin. SingPost said this is the first time in the world a postal service has successfully used an Unmanned Aerial Vehicle for point-to-point recipient-authenticated mail delivery.

The last-mile mail and packet drone delivery from Lorong Halus to Pulau Ubin trial was successfully completed as part of a joint development between SingPost and the Infocomm Development Authority of Singapore (IDA), the postal service provider announced on Oct 8 (Thursday).

The drone was built upon the Pixhawk Steadidrone platform by IDA Labs, and is tailored for use in a challenging environment like Singapore, SingPost said in a press release. The drone is equipped with enhanced safety features, and comes with a prototype app designed with security and verification features to ensure mail reaches its intended recipient.

It has the capacity to carry a payload of up to half a kilogramme, fly at a height of up to 45 metres and travel for 2.3km. The focus of the flight was to test the drone technology and safety boundaries.

"LITERALLY AIMING FOR THE SKY"

The multi-agency Unmanned Aircraft Systems (UAS) Committee facilitated this trial. Said its Chairman, Permanent Secretary of the Ministry of Transport Pang Kin Keong: "The UAS Committee has been

encouraging and discussing with public and private sector organisations on innovative uses of UAS, and facilitating such trials. The technology opens up numerous exciting possibilities which could help us enhance operational productivity, efficiency and effectiveness.”

SingPost said the trial drone flight was conducted with permissions and cooperation from IDA, the Ministry of Transport, Civil Aviation Authority of Singapore, Maritime and Port Authority of Singapore, Republic of Singapore Air Force as well as the Singapore Police Force.

Finland's postal service also started trials for parcel delivery for drones last month. However, SingPost said other drone trials conducted around the world do not authenticate recipients.

"For our trial, there is a mobile app that allows the postman in Pulau Ubin to verify that he is the intended recipient before he is able to receive the mail and packet," SingPost said.

<http://www.channelnewsasia.com/news/singapore/mail-sent-to-pulau-ubin/2177406.html>

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Collision-Avoidance Radar for Small UAS

SPRINGVILLE, Utah, Oct. 7, 2015 /PRNewswire/ -- IMSAR LLC is developing a family of extremely small collision-avoidance radar systems targeted for small Unmanned Aircraft Systems (UASs) and is on track to perform airborne demonstrations of its first prototype systems by the end of 2015. The family of radar systems will provide collision-avoidance capabilities to small UASs, also known as drones or Unmanned Aerial Vehicles (UAVs), ranging from package-delivery quad-copters to military Intelligence, Surveillance, and Reconnaissance (ISR) platforms, such as AAI's Shadow and Insitu's ScanEagle. IMSAR is designing the collision-avoidance radar systems based on its current 1-lb NanoSAR and is planning to offer them at a cost in line with small UASs. The initial model of IMSAR's collision-avoidance radar should be available for sale in late 2016.

According to Dr. Britton Quist, Lead of IMSAR's collision-avoidance development, "Radar is ideally suited for the sense-and-avoid problem because it can operate effectively at night and in low-visibility conditions, such as clouds, fog, smoke, and precipitation. This is a capability unmatched by optical, acoustic, infrared, or LiDAR sensors."

The Federal Aviation Administration (FAA) of the United States currently requires an aircraft operating in civil airspace to be able to "see and avoid" other aircraft. Collision-avoidance systems seek to meet this requirement by allowing UASs to detect other airborne objects, predict potential midair collisions, and automatically maneuver the UAS to avoid catastrophes. This capability is often referred to as "sense and avoid" or "detect and avoid." A radar-based, sense-and-avoid solution for small UASs was previously not viable due to the high cost, the low weight, and the complex technology and algorithms required for such a system, but IMSAR's solution addresses those concerns. IMSAR's family of collision avoidance systems will enable small UASs to avoid midair collisions as well as manned aircraft, which will pave the way for the integration of UASs into civil airspace around the world.

<http://www.virtual-strategy.com/2015/10/07/imsars-collision-avoidance-radar-small-uas-expected-be-available-late-2016#axzz3nw3VjRs1>

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When Military Robots Can Predict Your Next Move

New research may enable robotic armed guards — or just help self-driving cars get through a four-way stop.

The algorithm, by two University of Illinois researchers, opens the door to software that can guess where a person is headed—reaching for a gun, steering a car into armored gate—milliseconds before the act plays out. Researchers, Justin Horowitz and James Patton undertook the work under a National Institutes of Health Grant, as described in “I Meant to Do That: Determining the Intentions of Action in the Face of Disturbances” in the journal PLOS ONE. The idea was to help robots help humans — by taking the steering wheel when a driver makes a bad decision, or perhaps activating an exoskeleton when a patient with a weak arm reaches for an object. But the algorithm, broadly speaking, might also help fly a plane or anticipate the next move by a suicide bomber or gunman.

To test the algorithm, they gave a joystick to five men and three women between the ages of 24 and 30. The subjects were instructed to reach out with the joystick 730 times under various conditions, including ones that obstructed their motion. The tests proved the algorithm’s ability to infer, within tenths of a second, where the subject was headed.

The Pentagon is also on the lookout for software that could help fly aircraft, such as DARPA’s Aircrew Labor In-Cockpit Automation System, or ALIAS.

Self-driving cars, which draw upon data from the cloud and 3D topographical maps 64 layers deep, have a lot more information to bring to the task of driving than do we, with our limited human brains. Yet we can outperform artificial intelligence in our ability to process what Thrun calls “momentary perceptual input.”

Four-way stops can stump a self-driving car, including the Google one back in 2012. There are strict rules for who should go first at such an intersection, but ultimately, a four-way stop with people is a game of chicken. Drivers decide who goes first on the basis of very subtle, somewhat primal, signals about strength, weakness, and intent. To succeed in this task, a self-driving car had to learn to nudge forward when faced with the prospect of being cut off at an intersection.

When robots can detect your intent in the same way that it took us millions of years to evolve the ability to do, they may save your life, or at least give you the right-of-way

<http://www.defenseone.com/technology/2015/10/when-military-robots-can-predict-your-next-move/122681/?oref=d-river>

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Curved Artificial Compound Eyes for UAS

Artificial vision systems inspired upon the insect compound eye will be a radically different alternative to conventional cameras and will provide more efficient visual abilities for embedded applications that require motion analysis in low-power and small packages; artificial compound eyes could also adapt to different shapes and curvatures to fit the application requirements. However, the design of artificial compound eyes presents several technological and scientific challenges because it drastically departs from the design of conventional cameras for what concerns the components, fabrication procedures, packaging, and visual processing.

The grand goal of this project is the design, prototyping, programming, and validation of fully functional artificial compound eyes, which will be composed of micro-lens arrays integrated with adaptive photoreceptors made of analog Very-Large-Scale-Integration (aVLSI, cf. Liu et al., 2003) circuits on flexible electronic substrates. The output of the artificial compound eyes will be processed by vision filters implemented in encapsulated programmable devices, such as microcontrollers or Field Programmable Gate Arrays (FPGA) for fast extraction of motion-related information. We call these integrated vision sensors CURVed Artificial Compound Eyes (CURVACE).

Compared to conventional cameras, the proposed CURVACE will offer much larger field-of-view, nearly infinite depth-of-field (no focusing needed), higher sensitivity, no image blurring and off-axis aberrations because the distance between the optical surface and the photoreceptors will be constant over the entire fieldofview and because each optical channel will work under perpendicular light incidence for its individual viewing direction. In comparison with classical cameras where focal length, spatial resolution and field of view are intimately coupled, a curved compound eye allows the use of different focal length for the same field of view. Furthermore, the curved shape of the artificial compound eyes will offer space within the convexity for embedding processing units, battery, wireless communication, and inertial sensors, such as accelerometers and rate gyroscopes, which will be used for motion-related computation. Instead, in conventional cameras these components must be packaged separately because the space between the convex lens and the planar image sensor must be transparent.

<http://www.curvace.org/>

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A Call for Disappearing Delivery Vehicles

It sounds like an engineering fantasy, or maybe an episode from Mission Impossible: A flock of small, single-use, unpowered delivery vehicles dropped from an aircraft, each of which literally vanishes after landing and delivering food or medical supplies to an isolated village during an epidemic or disaster. And it would be nothing more than a fantasy, were it not that the principle behind disappearing materials has already been proven.

Building on recent innovations in its two-year-old Vanishing Programmable Resources (VAPR) program, which has developed self-destructing electronic components, DARPA today launched ICARUS, a program

driven by a vision of vanishing air vehicles that can make precise deliveries of critical supplies and then vaporize into thin air.

From those deliberations emerged ICARUS, the mythology-alluding acronym for Inbound, Controlled, Air-Releasable, Unrecoverable Systems. Described today in a Broad Agency Announcement (DARPA-BAA-16-03, published on October 9, 2015, is available on FedBizOpps: <http://go.usa.gov/3uJJd>), the two-phase program is slated to last 26 months with total funding of about \$8 million.

The millennia-old Icarus story ends badly when the protagonist, soaring with youthful abandon on wings of feather and wax, flies too close to the sun and then falls and drowns in the ocean as his wings disintegrate. DARPA's new ICARUS program aims to mimic the material transience that led to Icarus' demise, but leverages that capacity in scenarios with more uplifting endings.

In a military context, access to small, unmanned delivery systems whose structural and avionics components were made with transient materials could ease the provision of, say, water, batteries or emergency medical supplies without adding to a unit's pack-out-burden.

"Vanishing delivery vehicles could extend military and civilian operational capabilities in extenuating circumstances where currently there is no means to provide additional support," said Olsson, adding that he is optimistic the program will attract talented and created partners because it involves such interesting science and engineering. "Inventing transient materials, devising ways of scaling up their production, and combining those challenges with the hard control and aerodynamic requirements to reach the precision and soft-landing specs we need here makes for a challenging and compelling engineering problem."

<http://www.darpa.mil/news-events/2015-10-09>

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SATCOM with NSR Analyst Brad Grady - UAS

Northern Sky Research released the 12th edition of its Government and Military Satellite Communications report late last month. The annual report is the the longest-running on the government & military satellite communications market, providing a much anticipated view of the drivers, regional trends, and capacity demands of the market through 2024.

NSR Senior Analyst Brad Grady kindly agreed to the following Q&A, giving SatCom Frontier readers a

Q: You talk about "COM-SAT" vs. "GOVSAT" in your report. What exactly do you mean by that?

In government and military communications markets, there are really two different 'types' of capacity available to government and military end-users; either commercially owned capacity that is from Providers such as Intelsat (COMSATCOM), and government-owned satellite communications capacity (GOVSAT, aka MILSATCOM) from the likes of WGS or MUOS. Both systems have their place in the overall

suite of government and military connectivity, but there are debates within government and commercial circles as to 'who's better' or 'what's cheaper'.

Although the U.S. Government in particular has always relied on commercial partners, leasing capacity really took off during the conflicts in Iraq and Afghanistan where there simply wasn't enough government-owned capacity to connect the ever-increasing need for data on the battlefield. With those conflicts winding down (or at least the US's role in those conflicts), the market for "bulk leasing" (acquisition of commercial capacity by government end-users) has likewise seen a reduction in demand.

Q: Is there a UAS bandwidth market beyond U.S./NATO use? Are there opportunities for new government use of UAS?

Definitely, but the question is really 'how much'. Outside US/NATO, Israel tends to be another large market for UAS applications and we can expect other countries in the region to continue to explore how UAS fit into their domestic security policies. The US and NATO will continue to be significant consumers of UAS services, but as the costs and technical barriers for large UAS operations reduce, we will continue to see demand emerge outside of these traditional markets.

One area we are paying careful attention to, are the smaller UAS platforms – and, it is definitely an area where we could see significant growth rates. As terminal form factors continue to shrink and become lighter it will open up these previously terrestrially-connected UAS air-frames to satcom.

Outside of the military, border security is probably the second most-likely application. Leveraging all of the sensors and air-frames of the military markets, it will be the 'next big market' of UAS connectivity. However, just as on the commercial side, we are only scratching the surface of potential UAS applications – everything from enhanced wildfire monitoring in California to search and rescue applications off the coast of Florida are being discussed, so it will only be a matter of time to see which applications become viable.

Overall, we will see a net-decline in FSS capacity leasing for the next couple of years as the market adjusts to the 'new normal' of budgets and deployment paradigms, however, HTS in both GEO and Non-GEO, alongside FSS capacity for mobility applications will drive capacity growth in the government and military markets over the next ten years.

<http://www.satprnews.com/2015/10/11/talking-government-satcom-with-nsr-analyst-brad-grady/>

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Stanford Interactive Tool for Quadrotor Camera Shots

Cameras attached to small quadrotor aircraft are rapidly becoming a ubiquitous tool for cinematographers, enabling dynamic camera movements through 3D environments. Currently, professionals use these cameras by flying quadrotors manually, a process which requires much skill and dexterity.

In this paper, we investigate the needs of quadrotor cinematographers, and build a tool to support video capture using quadrotor-based camera systems. We begin by conducting semi-structured interviews with professional photographers and videographers, from which we extract a set of design principles.

We present a tool based on these principles for designing and autonomously executing quadrotor-based camera shots. Our tool enables users to: (1) specify shots visually using keyframes; (2) preview the resulting shots in a virtual environment; (3) precisely control the timing of shots using easing curves; and (4) capture the resulting shots in the real world with a single button click using commercially available quadrotors.

We evaluate our tool in a user study with novice and expert cinematographers. We show that our tool makes it possible for novices and experts to design compelling and challenging shots, and capture them fully autonomously.

Source: Stanford University

http://www.uasvision.com/2015/10/06/stanford-interactive-tool-for-quadrotor-camera-shots/?utm_source=Newsletter&utm_campaign=3c0c8a61a4-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_799756aeb7-3c0c8a61a4-297560805

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COUNTER UAS:

Finmeccanica-Selex ES releases anti-UAV system

The company describes Falcon Shield as having a multispectral sensing capability as well as the ability to take over an intruding UAV and land it safely.

"This response introduces a capability to take control of a remotely piloted drone and land it safely (a command-link control intervention capability) prior to the need to defeat the threat by simple jamming or kinetic solutions," Finmeccanica-Selex said. "Consequently, the potential for undesired collateral effects is greatly minimized."

<http://www.c4isrnet.com/story/military-tech/uas-isr/2015/10/05/finmeccanica-selex-es-anti-uav-system/73385580/>

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Army Engineers Demonstrate Anti-Drone Technology

Army engineers, who are seeking to adapt ongoing research to counter aerial systems that could threaten soldiers, successfully shot down two aircraft as part of their final technology demonstration.

Although the research project began with the objective to counter rockets, artillery and mortars, the project scope was expanded to include threats from unmanned aerial threats, sometime called drones, whose use has expanded rapidly.

Luciano is the project officer for the Enhanced Area Protection and Survivability, or EAPS, Army Technology Objective. The technology is being developed by the U.S. Army Armament Research, Development and Engineering Center, or ARDEC, at Picatinny Arsenal. Funding for development and testing was provided by the ARDEC Technology Office.

The UAS challenge has increased exponentially in the last decade as the world's inventory of unmanned aircraft systems has grown from approximately 20 system types and 800 aircraft in 1999, to more than 200 system types and approximately 10,000 unmanned aircraft in 2010, said Nancy Elliott, a spokeswoman with the U.S. Army Fires Center of Excellence at Fort Sill, Oklahoma.

The first shoot-down at the kilometer range was a replication of the test performed April 22, in which the EAPS technology first successfully intercepted a loitering UAS. Some fire-control improvements were made after the April 22 tests, and were validated during the Aug. 19 testing. The second shoot down was executed at a 50 percent greater range and exceeded the EAPS demonstration objectives.

The EAPS ARDEC gun alternative to area protection envisions a 50mm cannon to launch command guided interceptors. The system uses a precision tracking radar interferometer as a sensor, a fire control computer, and a radio frequency transmitter and receiver to launch the projectile into an engagement "basket."

The Picatinny area-protection system tracks both the incoming threat and interceptor, then computes an ideal trajectory correction for the interceptor to maximize probability of mission success. A thruster on the interceptor/projectile is used for course correction. The ground station uplinks the maneuver and detonation commands, while receiving downlinked assessment data.

The EAPS Integrated Product Team was led by ARDEC's Munitions Systems and Technology Directorate at Picatinny Arsenal.

<http://science.dodlive.mil/2015/10/07/army-engineers-demonstrate-anti-drone-technology/?source=GovDelivery>

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The 'death ray' that can knock out drones from up to a mile away using radio waves

Technology developed by three British firms to combat rising drone threat

Now being sold in the US and targeted at airports and homeland security

It could be the answer to the rising threat of drones - a 'death ray' that uses radio waves to disable them from up to a mile away.

It uses high powered radio waves to disable drones, effectively blocking their communication and switching them off in midair.

The AUDS system uses high powered 'RF inhibitor' to create radio waves to disable drones, effectively blocking their communication and switching them off in midair.

The AUDS system uses high powered 'RF inhibitor' to create radio waves to disable drones, effectively blocking their communication and switching them off in midair.

HOW IT WORKS

The Blighter AUDS system combines electronic scanning radar target detection, electro-optical tracking/classification and directional RF inhibition capability.

It uses a high powered 'RF inhibitor' to create radio waves to disable drones, effectively blocking their communication and switching them off in midair.

'If I can see it, I can kill it,' said Rick Sondag, executive vice-president of Liteye Systems, which sells the device, and who debuted it at the Commercial Unmanned Aerial Vehicle (UAV) Expo in Las Vegas this week, according to the Guardian.

Sondag hopes to sell the system to airports and other places where national security is an issue.

'The US government, like everyone else, has critical infrastructure and if they don't feel like they can protect it, they'll pass laws that will hamper progress and hamper current use,' Sondag said.

<http://www.dailymail.co.uk/sciencetech/article-3264166/The-drone-death-ray-knock-UAVs-mile-away-using-radio-waves.html>

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Surveillance system will detect, track drones

NEC has developed a surveillance system that can spot drones from up to a kilometer away. The system is intended to be used around places like sports stadiums, nuclear power stations and government buildings, and can detect drones in several ways.

At the heart of the system are two cameras: an ultra-sensitive camera that sees in the visible part of the spectrum and an infrared camera.

But it also includes acoustic sensors that can listen for the sounds made by drones, and a radio detection finder that first attempts to identify drone communication signals and then uses triangulation to determine a location.

The range of each of the sensors differs, but the visible light camera is said to be good to up to 1 kilometer, the thermal camera up to 120 meters, acoustic sensors to 100 meters and the radio detection finding to 1 km.

<http://www.cio.com/article/2990522/necs-surveillance-system-will-detect-track-drones.html>

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Lockheed Martin Demonstrates Solution to Respond to Threats from UAS

"The U.S. government is seeing an increase in the use of commercially available UAS platforms for surveillance and weaponization," said Deon Viergutz, vice president of Cyber Solutions for Lockheed Martin. "What Lockheed Martin has developed in ICARUS is a system that can detect, recognize and counteract these systems with pinpoint accuracy."

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

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

<http://www.marketwatch.com/story/lockheed-martin-demonstrates-solution-to-respond-to-threats-from-unmanned-aerial-systems-2015-10-12>

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British Companies Build Jamming System to Take Down Drones

Security through good cameras and bad signals

The United Kingdom is ready for robot-on-robot warfare. A new anti-drone weapon system called the "Anti UAV Defense System," which was developed by Blighter Surveillance Systems, Chess Dynamics, and Enterprise Control Systems Ltd, is a combination radar, camera, and jamming system all built into device.

Here's how it works. First, the radar identifies and tracks the flying drone. Then, once the drone is within camera range, the electro-optical camera follows the drone, keeping it in focus at all times. Finally, the jamming device attacks it: Three antennas send out a radio frequency signal to the targeted drone, trying to cut it off from its original controller. In seconds, the jammed drone stops in the air and then crashes to the ground. Like this:

The radar can find drones up to five miles away, even ones as small as 15 square inches. This is good, because the system seems to mostly work on small, commercial drones, and not the high-flying Predator-types used by militaries. A brochure about the system says it “may be used in remote or urban areas to prevent UAVs being used for terrorist attacks, espionage, or other malicious activities against sites with critical infrastructure.”

If the system works, maybe the White House should invest in one. Another drone crashed nearby earlier today.

<http://www.popsci.com/british-companies-build-anti-drone-jamming-system>

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COMMENTARY:

Drone-for-Hire Business Makes Big Bet on Industry

Drones have increasingly attracted attention as entrepreneurs rush to figure out new applications for the devices — and push the boundaries of government rules over their use.

The business of drones has ascended into the stratosphere, as investors have poured hundreds of millions of dollars into the tiny unmanned aircraft in hopes of turning them into big business.

Now Robert Wolf, the financier who is a confidant of President Obama, is raising his bet on an industry that has already drawn names like Amazon and GoPro and top venture capital firms like Accel Partners and Kleiner Perkins Caufield & Byers.

Mr. Wolf’s advisory firm plans to announce on Wednesday that it is spinning off its drone-services arm into a separate company. The business, Measure, is betting that its ability to fly the devices to take pictures of farmland and oil rigs will draw interest, and dollars, from a potentially huge number of customers.

Nearly two years ago, Mr. Wolf’s 32 Advisors set up Measure to capture that opportunity. Rather than focus on making the drones or the accessories and software that power them, he has banked on creating a fleet of aircraft that can be flown on behalf of customers. For Measure, it is “drones as a service.”

Drones have increasingly attracted attention as entrepreneurs rush to figure out new applications for the devices — and push the boundaries of government rules over their use.

Drone start-ups raised \$107 million last year. By June of this year, however, such companies had already surpassed that with \$172 million raised, according to data from CB Insights. (By comparison, fewer than five venture financing deals for drones were struck between 2010 and 2012.)

In May, Accel poured \$75 million into DJI in one of its biggest-ever investments — at an eye-popping valuation of roughly \$8 billion. And Kleiner Perkins helped pump \$40 million into Airware, which focuses on creating a software platform for drones.

For now, some applications are obvious, according to Mike Abbott, a partner at Kleiner Perkins. Drones can be used to survey tracts of land for farms or disaster areas for insurance companies at a fraction of the cost of helicopters. And they can replace human inspections for structures like cellphone towers, greatly reducing the risk to workers.

Later on, Mr. Abbott added, drones could be used for even more ambitious roles, like companions for police departments or emergency aircraft on cruise ships.

And Measure has teamed with the American Farm Bureau Federation on a tool to calculate how much farmers can save by using drones to scout crops, map terrain and quantify insurance.

At the same time, Mr. Wolf and Mr. Declet have persistently lobbied the Federal Aviation Administration to expand its drone guidelines, particularly for the sort of broad business use that Measure envisions. In August, the two succeeded, winning what they call the biggest exemption yet granted by the F.A.A., gaining permission to fly 324 different aircraft for a variety of business uses.

Still, many more regulatory hurdles need to be cleared, according to investors. Among them is to let operators fly drones out of their field of vision, a big stumbling block for transforming drones into the airborne autonomous helpers of science fiction.

<http://www.nytimes.com/2015/09/30/business/drone-for-hire-business-makes-big-bet-on-industry.html>

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Nevada's drone industry taking tentative first steps

The state's fledgling unmanned aerial vehicle industry is taking baby steps in development, a somewhat surprising turn considering how enthusiastic state leaders were when the Federal Aviation Administration named Nevada one of six test sites for unmanned aerial vehicles — "UAVs" in industry parlance and "drones" to most of the public — in late 2013.

Tens of thousands of high-paying high-tech jobs are expected as the industry grows, and Nevada figured to be one of the leading beneficiaries since it is the acknowledged birthplace of the industry in the United States, thanks to the military's presence in the state.

Nevada has more drone pilots and tech experts per capita than any state in the country.

The FAA's selection of Nevada as a test site was a no-brainer. It was the only applicant with a state sponsor, and state leaders used the state's geographic and climatic diversity as a key piece of its

application. There are four designated test sites in the state, with Boulder City Municipal Airport the closest one to the Las Vegas Valley.

With the resources of UAV fliers and tech support experts at Creech and Nellis air force bases and Naval Air Station Fallon readily available, Bowhead got out of the gates quickly.

It implemented programs, explored new ideas and worked closely with the FAA toward the ultimate goal of integrating UAVs into the national airspace.

Within a year of being named a test site, Nevada's drone experts were pressing to get things done faster than the FAA could manage.

CATCHING ON WITH PUBLIC

When Congress directed the FAA to integrate drones into the airspace, it did so without giving the agency any additional funding or manpower.

Suddenly, real estate professionals were contemplating how a drones-eye view of a house made the property more marketable.

Entrepreneurs came up with plans to use drones to carry advertising messages, and photographers and videographers found ways to provide images from events that were exciting and new.

Hobbyists, eager to capitalize on the craze, traded in their radio-controlled airplanes for quad-copters with GPS guidance systems.

The number of drone sightings by commercial pilots and near misses with aircraft were on the rise.

Durscher said he feared the irresponsible flying of unmanned aircraft near airports could lead to the overregulation of a U.S. industry that already trails the rest of the world.

The FAA opted to draft regulations for small drones, those weighing 55 pounds or less, as a first step. A public comment period on those regulations ended this summer and now the agency will process and respond to more than 4,500 comments before approving and publishing its regulations early next year.

With demand to fly drones increasing, the FAA also implemented a process by which pilots of small drones could get regulatory exemptions that would enable them to pilot commercial drone flights. As part of Section 333 of the FAA Modernization and Reform Act of 2012, the requests are simply referred to as "Section 333 exemptions."

Under such an exemption, a pilot can fly below 200 feet with an aircraft weighing 55 pounds or less during daylight hours and within a visual line of sight. They also are required to stay at least five miles away from an airport or helipad.

Since the program began in March, the FAA has received more than 3,000 exemption requests and granted 1,500 of them.

SMALL DRONES TOP PRIORITY

The FAA believes it has good reason for addressing the small drone issue first. Since small drones are so popular and there are more of them, the agency believes it must address their operation first because of its prime mission to keep skies safe.

In December 2014, Nevada became the first state — and is still the only state — to have a designated airworthiness representative on staff. That means a company could get a certificate of airworthiness on an aircraft from the state and applicants won't have to wait in the longer FAA line.

Several drone companies have set up shop in Nevada and are on the cutting edge of the industry. Reno-based Drone America was one of the first and is one of the largest drone manufacturers in the state. ArrowData in Las Vegas uses drone-mounted cameras to enhance entertainment experiences and is working to expand the use of drones for journalism. Several companies are exploring applications to monitor pipelines, collect data for agriculture and assist in search-and-rescue operations.

The six test site states recently received a broad area operating certificate that enables the state's unmanned aerial system partners to fly large data collection flights under 200 feet high anywhere in the country if it advances a public purpose. That means Nevada partners will be able to fly their aircraft under the new certificate to collect data for projects like agriculture production, wildlife management and for research projects undertaken by UNLV and UNR.

NEW ERA ON TAP

The state has hired its first in-house director, but Wilzcek said he is grateful that Bowhead led the way in the state's effort to enter the UAV industry. The institute recently announced the hiring of Chris Wallace as technical director of the office and Mark Barker, who will start Monday as business development director.

Now if only things could move just a little faster.

<http://www.reviewjournal.com/business/nevadas-drone-industry-taking-tentative-first-steps>

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'Coalition of UAS Professionals' Created to Represent the Voice of Small Business within the Drone Industry

DENVER - The Coalition of UAS Professionals (UAS Coalition) was founded to serve as the voice of small business within the unmanned aerial systems (UAS) industry. Primed for dramatic growth, much of the multi-billion dollar UAS market will be driven by small to mid-sized organizations. The UAS Coalition provides a suite of free tools to help these burgeoning companies excel in the quickly evolving unmanned aerial vehicle (UAV) arena. In addition, the 501(c)3 non-profit provides members a venue to discuss developments that specifically impact growing businesses, as well as a means to work collectively for the overall good of the UAS industry.

UAS Coalition resources include legislative/regulatory tracking (state and federal levels), small business support, continuing education, and a repository of white papers from subject matter experts and market leaders (e.g. How to obtain the best UAV insurance, Marketing your UAS company in a digital world, FAA 333 exemption trends, etc.). Online forums allow members to share best practices, experience, and new ideas for the good of the industry. To help direct its efforts, the UAS Coalition conducts quarterly surveys to gain perspective about what's top of mind with UAS operators, businesses and key industry stakeholders. Finally, the UAS Coalition works proactively to help manage the public image of "drones" onto the good work being accomplished around the country.

"The ability to stay up-to-date on rules, regulations and bills that affect the UAS industry will be essential as this market matures," said UAS Coalition Executive Director Nathan Ruff. "We provide a way to easily keep current and knowledgeable about pending and enacted UAS legislation, along with the regulations that these new laws create. Our members are recognized as operating at the pinnacle of professionalism through safe, legal, and responsible flying, which is the only way the UAS industry will be able to realize its tremendous potential."

UAS Coalition members represent commercial operators from a wide range of industries, such as GIS, precision agriculture, forensic aerial investigation, oil & gas, mining, emergency services, real estate, wildlife management, cinematography, and more.

The UAS Coalition will make its national debut in conjunction with the Commercial UAV Expo in Las Vegas October 5-7, 2015 at Caesars Palace. Join today: <http://uascoalition.org/contact/>

<http://cts.businesswire.com/ct/CT?id=smartlink&url=http%3A%2F%2Fuascoalition.org%2Fcontact%2F&esheet=51192497&newsitemid=20151001005513&lan=en-US&anchor=http%3A%2F%2Fuascoalition.org%2Fcontact%2F&index=1&md5=68b23264958309c25abf432550ef5a12>

Please visit UAS Coalition at:

Website: uascoalition.org

<http://cts.businesswire.com/ct/CT?id=smartlink&url=http%3A%2F%2Fuascoalition.org%2F&esheet=51192497&newsitemid=20151001005513&lan=en-US&anchor=uascoalition.org&index=2&md5=a460677ed63a6be987db6f40efbd3e82>

<http://www.businesswire.com/news/home/20151001005513/en/%E2%80%98Coalition-UAS-Professionals%E2%80%99-Created-Represent-Voice-Small#.Vg1R6pfzdnk>

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The War on Drones by Jonathan Downey

As a commercial and private pilot, I'm increasingly concerned about a new danger to our national airspace: reckless use of consumer drones. Though thousands of hobbyists utilize the skies responsibly everyday, the dangerous behavior of a small minority requires immediate action. While a two-pound quadcopter may only cut your hand when you're standing nearby, the same machine sucked into the jet engine could lead to casualties on the ground and in the air.

Unfortunately, in their quest to ensure safety, lawmakers have focused on restricting drone usage across the board. Instead of legislation, states and the FAA together should penalize the bad actors and impose proven technology safeguards onboard all drones to ensure safer operations.

The California Senate Bill 142 was one example of such mob mentality, as it would have created inconsistencies with federal law and created no exemptions for commercial, research and educational uses. Such arbitrary laws could threaten an entire commercial drone ecosystem just realizing its potential. Governor Brown appropriately vetoed this bill saying it would expose "the FAA-approved commercial user to burdensome litigation and new causes of action." Operators within the commercial drone space – who use drones to collect data for industries like agriculture, power and search & rescue – are well-trained and incentivized to be safe operators.

We must reject systems that punish an entire industry, especially when there are common sense solutions available. Public education efforts are helpful for the majority of responsible drone hobbyists, but more direct action is required to stop bad actors. Here are four actions regulators can quickly take to ensure drones are used safely.

Increase enforcement of existing laws for violators

Require registration of consumer drones

Require consumer drone insurance

Require consumer drone software to enforce no fly zones

Drones can now be used in almost every industry to capture data that was previously slow, inaccurate, costly or dangerous to collect. Imagine if we destroyed other technologies that fought early battles against fear: cars, GPS, the sharing economy, even the Internet. I believe that safety and innovation can co-exist. Let's work together to ensure drones are used for social good, business impact and the enjoyment of the skies. Seek out the information you need to contact your local representatives. The survival of an industry depends on it.

<http://thehill.com/blogs/congress-blog/technology/255334-the-war-on-drones>

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Is This the Warship of the Future?

Laser-armed battleships that print their own drones will have to survive anti-ship missiles plummeting from space.

If you thought the battleship era faded after World War II, just wait a few decades. A group of British designers with the Startpoint group have revealed concept art for a future warship called Dreadnought 2050, the product of an open-thought experiment at the informal request of the U.K. Ministry of Defense.

The captain and crew steer and fight the ship by interacting with elaborate holograms, which, of course, looks cool. But Startpoint says the futuristic interface will allow the ship to operate with a total complement of about 100 sailors or less, including just five in the ops room.

The ship is armed with an electromagnetic railgun, not so different from the one that the Office of Naval Research is building, but with 200-kilometer range, plus microwave guns to keep small enemy boats at bay. Its supercavitating torpedoes can reach speeds of 300 knots. The cherry on top is a drone that launches from where the mast should be, connected to the hull via a cryogenically cooled, carbon-nanotube tether. It's an extension cord to power the drone's advanced sensors and, of course, its menacing laser.

"The process of ensuring survivability was simplified, in these early battleships, by the predictability of the threat," Farley wrote. "The most likely vector of attack in the late 1890s came from large naval artillery carried by other ships, and consequently protective schemes could concentrate on that threat."

<http://www.defenseone.com/technology/2015/08/warship-future-royal-navy/119930/>

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Military drone market to hit \$10 billion by 2024

The market for military drones is expected to almost double by 2024 to beyond \$10 billion (8.9 billion euros), according to a report published Friday by specialist defense publication IHS Jane's Intelligence Review.

"The global defense and security market for Unmanned Aerial Vehicles (UAVs) will expand at 5.5 percent per year over this decade, from the current figure of \$6.4 billion," according to the analysis.

"These systems are well established, combat proven and are an essential and expanding element of future operations across the globe."

Israel was the top exporter of UAVs last year, but is set to be overtaken by the United States through sales of General Atomics Predator series and Northrop Grumman Global Hawk, said the report.

However, it also faces competition from China, Russia, India, South Korea and Japan, whose combined sales are predicted to reach \$3.4 billion by 2024.

“Operators are now moving to expand their mission sets beyond visual surveillance and reconnaissance, and are introducing sophisticated intelligence and electronic warfare systems, as well as a wider range of munitions,” said Huw Williams, unmanned systems editor for IHS Jane’s.

“These will feature ‘stealthy’ characteristics and advanced payloads and weaponry. They will operate alongside manned aircraft and eventually even replace them in many roles.”

<http://english.alarabiya.net/en/business/markets/2015/10/03/Drone-market-to-hit-10-billion-by-2024-experts.html>

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What a Business Aviation Flight Department Needs to Know About UAVs –

A lengthy article with lots of content – Below is only a partial synopsis.....

There’s a revolution in unmanned aviation afoot . . . or rather, aloft.

The 24-hr. news cycle and the Internet are full of news about “drones” — public vernacular for unmanned aerial vehicles (UAVs) or, alternately, unmanned aerial systems (UASs). Sooner or later, as the recognized “aviation experts” in their companies, aviation department managers and chief pilots are likely to be asked about them by management, either because of concerns over safety, or a genuine interest in the technology for internal exploitation, or as potential product lines.

Of course, in this context, we’re not talking about the “big” UAVs like the military’s Predator, Reaper and Global Hawk now being operated in civil airspace. The drones that are at the basis of this fast-breaking revolution are the small ones — “micros” — under 55 lb. gross weight, with the vast majority of those being multi-rotored helicopters measuring approximately 22 in. diagonally and tipping the scales at less than 3 lb. fully equipped with high-def video and still cameras on sophisticated, controllable gimbals. And they’re in our skies (and invading controlled airspace) by the thousands. In just 24 months the nascent industry producing these mini flying robots has burgeoned — exploded, really — into a phenomenon.

Programmable autonomous functions include, for example, being able to send the mini-aircraft to several lat/long locations, or operator-designated waypoints, with instructions to, say, take photos, then return to the controller’s position, and land. Or to take off, fly to a cultivated field and perform an infrared scan of the crop in a predetermined pattern and altitude. Or record a video inspection of a stretch of power lines. Some of the newer drones can even be set up to identify and follow a user — down a ski slope, for example, or while engaged in some sort of extreme sports mania — making them the ultimate “selfie” taker.

Aerial photography, videography and moviemaking.

Real estate: land/house inspection and photography.

Agriculture: crop survey, disease tracking using infrared and other sensors, and irrigation mapping.

Surveying and cartography.

Forestry: arboreal health surveys, firefighting and wildfire prevention (using infrared cameras to detect smoldering beneath leaf cover, spontaneous combustion or simply to determine the potential for fires).

Railroads, governments, utilities and telecommunication companies: track, highway, pipeline, wire, and cellphone tower patrol and inspection.

Construction: site inspection and progress reporting.

Insurance: allowing field agents to inspect roofs and other difficult-to-reach places.

Natural resource and environmental protection.

Surface mining site surveying.

Archeology: viewing sites from aloft or even finding outlines of ruins buried by time.

Package delivery: perhaps a long shot, but the Internet's largest retailer, Amazon, has proposed using small drones to deliver packages to purchasers or collection centers.

Disaster aftermath and recovery: searching for survivors, assessing damage, delivering emergency medicine and equipment.

Law enforcement: surveillance, tracking suspects, inspecting buildings where dangerous suspects may be hiding, monitoring demonstrations, etc.

Firefighting: assessing the spread of a fire to determine where to place water, planning safe entries for firefighters and locating occupants for rescue.

Search and rescue: In one case where two boys were hung up in a raft on a flood-swollen river, a multi-rotor drone was used to carry a line to the raft. The line was then used by one of the boys to pull a larger rope to the raft so they could be pulled to shore.

Disruptive Technology

It's obvious that most of the traditional aviation community — the FAA included — was caught off guard by the speed and exponential growth of the UAV onslaught. And it's only just begun.

In the U.S., 3D Robotics, which competes tooth and nail with DJI and is also privately held, has raised \$85 million in venture capital to date, \$50 million in February alone, and is expected by analysts to gross \$50 million in sales this year. The company has been working with BNSF Railroad on a plan to use its Spectre professional drones to inspect 30,000 mi. of track, the Berkeley company's first foray into an industrial application.

The FAA defines two categories of civilian small drone operators, commercial and recreational, with the latter constituting the largest number by far. And with the civil UAS regime only provisionally regulated while users and the industry await the formulation of applicable FARs, it is likely that the majority of small drone operators performing flights for compensation are unaware that they are acting illegally. Because an NTSB law judge has ruled that unmanned aerial vehicles — including the small ones — are actually “aircraft,” the FAA is now within its jurisdiction to go after any operators engaging in “commercial activities.”

The agency’s definition of a commercial operation is “holding out,” which simply means, if you sell your aviation services or otherwise accept money for them (outside of sharing expenses for a flight), you’re a commercial operator and subject to all the burdens and responsibilities elucidated in FAR Part 135 and applicable Transportation Department rules, e.g., the requirement to hold an Air Operator Certificate (AOC).

With the Section 333 exemption only an interim stopgap for legal commercial operations and with the user community growing in leaps and bounds, the need for definitive regulation applying to flying civil drones in the National Airspace System (NAS) has been obvious, especially since the Reform Act mandated “a comprehensive plan” by Sept. 15, 2015.

It seems likely that the FAA has distinguished between small and large drones because it could regulate those 55 lb. and heavier with existing rules for manned aircraft, requiring them to have Airworthiness Certificates (ACs) and granting their operators Certificates of Authorization (COAs) to operate them in specific blocks of airspace. Also, it was recognized that the small UASs would be deployed in a completely different operating regime than the full-size ones and in much larger numbers.

Whither the Regs?

Whether the FAA can have a small drone rule in the field by next June remains to be seen, and until then it’s likely the 333 exemption will remain in effect. In early August, the agency reported that it had granted more than 1,000 Section 333 approvals for commercial operations in the U.S. of unmanned aircraft of all sizes. By the end of the month, 200 more had been added. According to the online newsletter “sUAS News,” at that time, DJI drones accounted for 45.5% of FAA-registered small UASs.

To apply for a Section 333 exemption, the operator must essentially provide a business plan to the FAA showing how and for what purpose the drone would be used, then identify those provisions of FAR Part 61 that do not apply to operation of an unmanned vehicle, e.g., all the mentions of “pilots” and other requirements to which the operator would be unable to comply simply due to the nature of a small UAS. These, then, are the “exemptions” that the FAA will grant the applicant.

The process can be tedious and time consuming. However, there are aviation law firms specializing in drone issues that can prepare the application on behalf of the operator for fees ranging between \$5,000 and \$8,000 and accelerate the process of approval.

Among the rules applying to commercial operations once the Section 333 exemption is awarded are the following:

A drone's N-number must be displayed in characters as large as reasonably possible for the aircraft.

The drone pilot must hold at least a Private Pilot Certificate and a current Class III Medical Certificate; the pilot need not be the operator holding the 333 exemption but must be familiar with small drone operating rules, and multiple qualified pilots may be hired by the operator.

Operations are restricted to daylight hours; no night flying is permitted. Ever.

The pilot, operator or a designated observer must maintain visual line of sight (VLOS) of the sUAS at all times; no flying behind buildings or natural features and definitely not beyond the horizon.

Pilots must assure their drones are airworthy prior to flight.

Small drones may not be operated in restricted, prohibited or temporary flight restriction (TFR) areas, or controlled airspace and no closer than 5 nm to an airport with an operating control tower. They also must yield right of way to other aircraft.

Maximum speed at which a small UAV can be operated is 87 kt. (100 mph).

Maximum altitude of 400 ft. must be maintained over populated areas. However, in March, the FAA chose to confer "blanket" COAs on all Section 333 holders allowing ops below 200 ft. anywhere in the U.S. except in the restricted or prohibited airspace already described and in any major city where FAA and law-enforcement agencies have prohibited such operations for security reasons. Previously, operators had to apply for COAs for specific blocks of airspace, a process that could take months.

And, naturally, no careless or reckless operations are permitted, and pilots cannot fly under the influence of drugs or alcohol.

The 197-page NPRM and its accompanying summary chart on sUASs contain some noteworthy deviations from the Section 333 requirements, including:

A maximum altitude of 500 ft.

A minimum visibility requirement of 3 sm from the control station.

No operations allowed in Class A airspace, but ops in Classes B, C, D and E may be conducted with permission of ATC, and flights in Class G airspace may proceed without ATC permission.

While a conventional pilot certificate is waived, drone pilots must be at least 17 years of age and obtain an "unmanned aircraft operator certificate with a small UAS rating," pass an initial aeronautical knowledge test at an FAA-approved "knowledge testing center," and be vetted by the TSA. The aeronautical knowledge exam must be retaken with a passing score every 24 months.

Unregulated Use and the Drone Safety Hazard

When it became obvious that anyone without experience or knowledge of aviation and its protocols could purchase a sophisticated sUAS, and essentially fly it right out of the box, the FAA partnered with several industry associations, principal among them the Academy of Model Aeronautics (AMA), to develop the “Know Before You Fly” campaign to educate the public on safe operation of drones.

The guidelines essentially mimic the rules in the Section 333 exemption for commercial ops, e.g., 400 ft. and below, maintain VLOS, stay clear of other aircraft, remain 5 sm from airports, etc., but are entirely voluntary. Because the FAA has no mandate to regulate noncommercial small drone operators — and even if it did, the sheer numbers of such drones would overwhelm the agency’s finite number of field inspectors — the limitation of the campaign is obvious.

Another problem has been nuisance operation by irresponsible drone operators who pilot their UASs over accident sites to observe or photograph the action, often impeding the operation of law enforcement or emergency medical service (EMS) helicopters.

Nuisance flying can have real consequences, as when a flock of multi-rotors shows up over brush or forest fires to take videos for personal use or to sell (usually illegally) to news media outlets. During a drought-ravaged fire season in the western U.S. this year, small drone flights over fire zones prevented firefighting air tankers and helicopters from making retardant and water drops.

“Sightseeing” photo/video flights over natural wonders or urban landmarks can also present a nuisance or even endanger people on the ground. For example, in San Francisco an ongoing hazard has been presented by operators insisting on flying their UASs over the Golden Gate Bridge, where one clipped a cable and crashed on the road surface, narrowly missing a car.

It’s no surprise that the U.S. Interior Department has banned drone flying in national parks. Then there’s the case of the inebriated DJI Phantom operator — allegedly a federal employee — who flew his drone over the White House one night last January and crashed it on the boss’s lawn within probably the best-known prohibited area in the country.

The FAA’s Secret Count

Equally concerning has been a trend by the FAA to withhold details of the danger’s full magnitude. In an investigative report by the Washington Post published on Aug. 20, the newspaper revealed that nearly 700 of these incidents had been reported to the FAA as of that date this year — triple the number reported for all of 2014. In documents obtained by the Post, reporters learned of 12 undisclosed near-collision incidents across the country reported by pilots on Aug. 16 alone.

The feature’s obvious limitation, however, is that (a) operators receiving the geo-fencing update may choose not to install it, or (b) those purchasing a new Phantom may hack into its operating system and disable it.

The FAA has stepped up to assist small drone operators, particularly the recreational ones, with a no-fly zone map of the U.S. and a smartphone app called B4UFly, the latter scheduled for release around now. Using it, pilots can check to see if the site where they plan to fly is restricted and even connect them

with nearby airports to ensure they are sufficiently far away. Check on both the no-fly map and how to download the B4UFLy app by logging onto the UAS and model aircraft pages on the FAA website.

The Terror Threat

The issue of using small drones for terrorist acts is also a concern to the government and general population. In a July intelligence bulletin, the Department of Homeland Security (DHS) claimed it had recorded more than 500 cases since 2012 in which “unauthorized drones” had loitered over “sensitive sites and critical installations” including military bases.

Reportedly, the DHS has been working with state and local law enforcement agencies to develop systems to track and repel rogue drone incursions, including a microwave device intended to corrupt a UAS’s operating system and send the vehicle back to its operator. Last New Year’s Eve, the New York City Police Department tested one with mixed results, but the system is believed to have potential.

Law enforcement agencies’ biggest fear is the potential for “weaponizing” small drones, and using them for malicious activity or terrorism. And just to prove that it can be done, a Connecticut teenager has installed a firearm on what appears to be a racing quadcopter chassis and successfully fired it repeatedly in a wooded area as demonstrated in “Flying Gun,” a video post on YouTube.

Technology is available and capable of interfering with drones’ electronics for security purposes, Weisman continued, “but there are hazards of also interfering with legitimate aircraft operations, as in a situation close to an airport or controlled airspace. Here you have something that’s programmable, there are software updates, you send it out using GPS references, and so forth. I think that manufacturers will need to educate themselves on their drones’ vulnerability and interference from malicious signals, hacking attacks, malware. All that stuff that’s threatening your computer can affect these drones. Once again here’s a job for the flight department — how are the devices in the aircraft protected?”

Brave New World

That’s the good and bad of it: a new, paradigm-changing segment of the aviation industry combining sophisticated software, robotics and miniaturization. It’s a technology that can be used to serve society or terrorize it — just as flying machines have done for the 112 years that powered aviation has existed.

Powerful new players like Amazon and Google that have thrived on so-called disruptive technology are not only embracing it but also are now pressurizing the FAA to affect a complete reorganization of airspace to accommodate the swarms of small commercial drones they intend to release.

One wonders what Orville and Wilbur — or perhaps even electricity and computing pioneers Edison, Tesla and Turing — would have thought were they to see what science, engineering, innovation and commerce have wrought in the 21st century.

<http://aviationweek.com/business-aviation/what-business-aviation-flight-department-needs-know-about-uavs>

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Drone Project Lacks Pentagon Orders Needed to Stay Aloft

Long-endurance unmanned aircraft Orion can fly for three days, versus one day for some faster rivals

The Orion surveillance drone last year set a world flight-endurance record for an unmanned aircraft.

Aurora Flight Sciences Corp., of Manassas, Va., has spent five years working on the lumbering Orion—with two engines producing a normal cruising speed below 90 miles an hour—and last year the drone won the world flight-endurance record for an unmanned aircraft by staying aloft for 80 hours.

A 132-foot wingspan and lightweight construction mean Orion, developed with 50% Pentagon funding, can fly more than 1,500 miles, spend nearly three days circling over a designated area, and still have enough fuel to return to base.

Versions of Reaper drones built by General Atomics Aeronautical Systems Inc., an affiliate of closely held General Atomics, powered by a single turboprop engine in the rear, can fly roughly twice as fast and climb to 50,000 feet, versus Orion's 30,000-foot operational limit. They can fire missiles, but can't remain airborne for much more than a day.

Northrop Grumman Corp.'s jet-powered Global Hawk unmanned vehicle, by contrast, cruises at more than 350 miles an hour and flies higher than nearly all manned aircraft. Aurora manufactures the fuselage and distinctive V-shaped tail of the Global Hawk and some of its variants.

Ultimately, solar-powered aircraft will probably give the Pentagon even months-long surveillance options. But for now, Aurora believes Orion can fill an important gap between current, relatively short-duration drones and those ambitious future goals.

Various Pentagon studies over the years have highlighted the benefits of longer-range drones, sometimes identifying them as an important budding technology and emerging battlefield need. Aurora also argues that its models would be less expensive to operate than much of the Pentagon's current unmanned fleet.

The Air Force has little appetite for Orion owing to financial and operational concerns, according to defense analyst Jim McAleese. In an interview Saturday, he said the service's roughly \$550 million annual budget for so-called unmanned aerial systems already is squeezed by competing acquisition costs for new fighters and tankers.

"The leasing option is a way to make everybody win," Mr. Langford said, because it puts Orion "into the field a lot faster," than with traditional purchases.

http://www.wsj.com/article_email/drone-project-faces-lack-of-pentagon-orders-needed-to-stay-aloft-1444520267-1MyQjAxMTI1NDE5MTQxODExWj

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AUVSI President talks FAA, missed sUAS rule

After the deadline to issue the rules for small unmanned aircraft systems expired at the end of September, we caught up with the Association for Unmanned Vehicle Systems International President Brian Wynne. Shortly after the deadline came and went, AUVSI issued a letter to FAA signed by 28 other UAS-related entities.

Explain why issuing this letter to the FAA is important for the UAS industry to know about?

It is important for the UAS industry to understand that it is being held back by the failure of the FAA to meet the congressionally mandated deadline for integration of UAS into the National Airspace System (NAS). The FAA has had more than three years to meet the Sept. 30, 2015 deadline for full integration, yet the agency hasn't even completed the small UAS rules. This letter raises awareness of the impact that delay is having on the progress of the UAS industry and highlights the need for the FAA to proceed with integration without any further delays.

In regards to the small UAV rule, what are the main hurdles remaining for the FAA to clear before the rule can be issued?

You will need to ask the FAA what is holding up the process for the agency to finalize the rules. The FAA released its draft small UAS rules in February 2015 – eight months ago. The FAA solicited feedback during a notice and comment period that closed in April of this year. All that remains is for the FAA to review the comments and issue a final rule. The agency has had six months so far to go through the comments, and yet we still don't have a regulatory framework in place. We want to see the integration of UAS into the NAS proceed without any further delays.

Following the issuance of the rule, what type of reaction or activity does AUVSI expect from the greater UAS industry?

Once a regulatory framework is in place and integration into the national airspace is achieved, the growth of businesses within the UAS industry, and in other industries using the technology, will be enormous. Whether it is assisting first responders with search and rescue missions, advancing scientific research or helping farmers more efficiently survey their crops, the applications of UAS are virtually limitless and enable public agencies and businesses to perform tasks more safely, efficiently and cost effectively. UAS technology also has the potential to create a significant number of jobs and stimulate the U.S. economy. According to an AUVSI economic study, UAS will contribute an estimated 100,000 jobs and \$82 billion in economic impact during the first decade following integration.

<http://uasmagazine.com/articles/1278/qa-auvsi-pres-talks-faa-missed-suas-rule>

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