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

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NAVY/USMC:

Marines Corps general calls for optionally manned helicopter

The US Marine Corps’ portion of the future vertical lift program will be an optionally manned platform, the service’s deputy commandant for aviation says.

While many have forecasted unmanned aircraft as the future of aviation, Lt Gen Jon “Dog” Davis believes the next generation of medium-lift, long-range rotorcraft should still have a pilot in the cockpit for some missions.

The Defense Department entered into co-operative research agreements with four industry teams, including Boeing-Sikorsky, Bell, AVX and Karem for a demonstration phase. Bell’s V-280 Valor and Sikorsky’s SB-1 Defiant are expected to fly their prototypes, the only two for the program, by late 2017, FlightGlobal previously reported. Bell or Sikorsky should be able to put forth an unmanned version of the V-280 and SB-1, since both helicopters offer fly-by-wire control systems, Davis said.

An unmanned aircraft could also open the door to a successor to the K-MAX, Lockheed Martin and Kaman Aerospace’s single-seat, optionally piloted helicopter which the Marines deployed in Afghanistan from 2011 to 2014. Two K-MAX helicopters are stationed at Marine Corps Air Station Yuma in Arizona and the service is studying the option for that platform, Davis said. Still, Davis must make sure the requirements process guides the Marine Corps to an unmanned aircraft like the K-MAX.


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Marines Test UAVs for Artillery Calls for Fire, Close Air Support

POHAKULOA TRAINING AREA, ISLAND OF HAWAII – The RQ-7B Shadows of Marine Unmanned Aerial Vehicle Squadron (VMU) 3 are flying in the Hawaiian skies during the Rim of the Pacific exercise for the first time, bringing a new forward observer and artillery-calling capability to the amphibious force despite being built to support ground troops.

The Shadow is a 450-pound Group 3 unmanned aerial vehicle that, unlike its cousin, the RQ-21 Blackjack, cannot take off from or land on an amphibious ship at sea – rather, the Shadow system is transported via Humvee’s and requires a 710-foot runway on the ground. Still, the system has proven itself in combat in Iraq and Afghanistan and could play a significant role in disaster relief missions, so the newly operational VMU-3 was invited to join the RIMPAC 2016 amphibious exercise.

VMU-3 executive officer Maj. Jarrod Larson said from a remote air strip at the Pohakuloa Training Area on the island of Hawaii that the Shadow system is “designed to be able to move with that forward element on the battlefield – set up, fly, break down, pack up, load everything on our trucks, move to the next location, set up, fly.” That mobility, coupled with the amphibious force’s mobility in rapidly transporting those same Humvee’s from ship to shore via surface connectors and helicopters, makes the Shadow a flexible asset to supplement what the amphibious force wants to do once ashore.

“One of the things we’re designed for and we do really well is that forward observer role,” Larson said.

“So we can go very deep in the battle space and call for fire with either artillery, fires or with other aircraft, and relay those targets to either the ground controllers or actually control and observe those fires ourselves. ... We’re getting that deep battle space penetration without putting any actual Marines or soldiers or sailors in harm’s way. If they shoot this thing down, yeah it’s an asset lost and it’s not a good thing, but at the end of the day nobody’s hurt.”

To that end, the squadron rehearsed two main missions during RIMPAC. First is the artillery call for fires mission, with the UAV flying forward of the ground troops and spotting and adjusting follow-on rounds.

“Just like if we were on a hill somewhere with a set of binoculars sighting in on the target, we give them that full call for fire and we spot the rounds, so as the adjustment rounds come in we tell them left, right, add, drop, just like a ground observer would,” Larson explained, saying the UAV can also provide imagery for a battle damage assessment afterwards.

Larson said the Shadow system was used frequently and successfully by the Marine Corps and Army in Iraq and Afghanistan, but work in the Pacific presents new challenges – particularly the weather. The Shadow is not meant to fly through rain and the sensors cannot see through clouds, which somewhat limit operations at the high-altitude Hawaiian training area and at rainy Kaneohe Bay. The Shadow will not support sea-based operations – the Blackjack instead will be integration into the Marine Expeditionary Unit to sail aboard three-ship Amphibious Ready Groups – but Larson still called the Shadow a “very very capable system at the end of the day” and said there are further potential uses for it within the focus areas of RIMPAC.
For example, the first portion of RIMPAC revolves around a humanitarian assistance/disaster relief scenario. Larson said the Shadows did not participate in that portion this year but could be an important asset in real-life HA/DR missions.

“The reason why they use Hueys (for HA/DR missions) is they can go out and survey the damage, and they’re flying out of possibly unimproved places, places that are damaged, and they’re going to other places that are damaged that we don’t have good aerial intel,” he said.

With the Shadow UAVs, “I can stay airborne for nine hours and fly out to 60 nautical miles, so if I get a little piece of runway cleared where I can operate, now we can do that again without putting those human lives at risk. We can go out, we can stay airborne for a long time, we can do route surveys, survey the roads, survey trouble spots, get eyes on other potential external airfields – if we’ve lost all communication with this runway out there, we launch, go take a look at it. So huge, huge potential disaster relief applications.”

The human safety element is very real for Larson, who worked at 1st Marine Air Wing when it deployed to Nepal last spring after a 7.8-magnitude earthquake hit the mountainous country. A UH-1Y Huey crashed in the mountains during the HA/DR response, killing the six Americans and two Nepalese on board.

Larson said his UAVs would never replace manned helicopters in that scenario but could be used for particularly dangerous areas or missions.

“We will never replace the helicopters in that role specifically because I cannot carry supplies. In a disaster relief scenario, a huge portion of properly managing that scenario is keeping confidence in the people on the deck that help is coming – ‘people know that you’re in trouble and help is coming; stay calm, keep abiding by the rules, don’t turn into Lord of the Flies.’ I can’t reassure someone from this (UAV). A Huey comes in and a guy with a lot of shiny stuff on his collar or a civilian worker or the president comes in and starts shaking hands and says, ‘village elder or whoever, I know you’re in trouble, we have help coming, I just need you to hang on one more day.’ They can do that from a helicopter, we can’t.”

VMU-3 began its move to Kaneohe Bay in June 2015 and reach full operational capability in December 2015, Larson said. Its focus now is the Shadow UAV. Its East Coast counterpart, VMU-2 at Marine Corps Air Station Cherry Point in North Carolina, has the Shadow but is currently focused on bringing in the Blackjack system and integrating it into the MEU for future ship deployments. VMU-1 in Yuma, Ariz., will get the Blackjack next, and VMU-3 will be the last to integrate the second UAV system, Larson said.

https://news.usni.org/2016/08/01/rimpac-2016-includes-shadow-uavs-for-artillery-calls-for-fire-close-air-support

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Unmanned: The New Normal
There’s a growing realization that we must leverage the value of unmanned systems across the full range of naval missions – not to pursue “unmanned” for the sake of “unmanned” in a zeal to be more technologically advanced, but because it makes sense, taking us to the next level and beyond. As natural complements to our existing ships, aircraft, and submarines, unmanned systems bring the ability to efficiently increase both the capacity and capability of our force; there are missions where unmanned will bring comparative advantage over existing manned counterparts. In man – machine lash-ups, unmanned technology will take us even further.

Against the backdrop of an increasingly dangerous and volatile world, unmanned systems offer an opportunity to meet defense requirements at every level. Making this case, and making headway on mainstreaming unmanned across all warfare domains, begins with understanding the most fundamental aspects of warfare. Through this deconstruction, the value-added of unmanned becomes readily apparent, cutting through existing practices, communities, domains, and mission sets – all sources of friction when introducing disruptive technology. If we make this case effectively, our force and its many constituents will press to mainstream unmanned as expeditiously as possible. With bottom-up energy and creativity teamed with top-down leadership and fiscal support, we have the best chance to harness unmanned’s potential. This is an imperative in a world where competitors and adversaries already are moving out with unmanned technology.

To Understand – So What? ... Then What?

When we think about what we do in the realm of warfighting, it comes down to four essential elements: observing, orienting, deciding, and acting – the OODA loop. Air Force Colonel John Boyd crafted this concept in part from observations of air combat engagements in the 1950s, but its relevance is more broad, and scalable from the tactical to the strategic. In simplest form, we “observe” with sensors, we “orient and decide,” then we “act” with effectors. This process takes place across all domains and is iterative. Technology is both accelerating and fusing the steps, taking us to the point of forecasting.

Increasingly, it is not so much the “with what” (the province of things and the communities that employ them) and the “where” (the domains in which we operate), but rather the “how” and the “how fast.” The result is to understand and then take appropriate action, faster than the adversary and inside their OODA loop. Protecting one’s decision process while confronting the adversary’s is increasingly valued today; it is a foundation for both information warfare and the growing realm of electromagnetic maneuver warfare.

Unmanned brings game in each phase of the process, across all domains (traditional and nontraditional), and in doing so improves the speed of response and subsequent ability to adapt – faster than the adversary. Ultimately, the ability to see farther, understand more quickly, act faster, and adapt continuously become the essential elements of a winning team in today’s fast paced threat-filled environments. Unmanned systems are key elements in realizing a learning warfighting system that senses, evaluates, acts and, adapts continuously.

If we accept that the main thing is to understand – and to be able to take appropriate action, faster than the adversary – then we must plumb our system and processes to function as frictionless as possible,
and we must populate these systems with platforms, vehicles, and payloads that permit us to fight in constantly adaptive ways. The ability to adapt as rapidly as possible, with as little friction as possible, with systems and lash-ups that permit adaptability – by design – is essential to winning in today’s fast-paced battle environments. This concept is not new. The value of “plug-and-play” is well established in the consumer world as an efficient means to leverage rapidly evolving technology. Coupled with modularity and open architecture, these tools can be put together in adaptive, creative configurations producing new ways; and the tools themselves can be adapted, leveraging the best that technology offers, providing new means. This approach arms us to first survive, then operate, and ultimately prevail in an increasingly contested world.

Warfighting Toughness

Speed of action and agility are valued in a fight. Improved speed can be realized both in terms of executing faster and by executing differently, using the same things in new ways. A prime example is how we think about what it takes to execute successfully at the tactical level. Traditionally, it is a linear process progressing through “find, fix, finish” – the sequential steps to consummate full mission execution. Technology and the speed it offers bring nonlinear and cross-domain opportunity. The prospect of executing faster through increased connectivity and multipath solutions is here now.

Unmanned systems can be an efficient means to populate connection points. Increasing connection points – or nodes – both manned and unmanned, brings density and resilience to our warfighting architectures, whether they be systems, systems-of-systems, or services on demand, and with it the means to prevail in contested environments. Unmanned systems can populate nodes in an increasingly connected/connectable force, bringing the ability to adapt more rapidly to changing environments.

Unmanned systems also bring the possibility of disaggregating functionality for the larger purpose of enabling dispersed fleet operations over much larger areas – scalable and tailorable to ever-changing missions and threats. Over time, many, if not most, of our ships, submarines, and aircraft have evolved into multimission systems, highly capable but also concentrated and expensive. Disaggregating the functions of sensing, understanding, and effecting with unmanned systems brings the potential to more efficiently mass effects without massing force, increase reach, and present the adversary with operational dilemmas.

Value Added

Unmanned systems largely have evolved by matching warfighting need to emerging technology – a requirements pull. Whether as an immediate extension to an existing platform, to see over the hill, extend beyond the visible horizon, or augment existing sensors, they’ve expanded reach in a linear manner. The ability to distribute and net unmanned systems also has demonstrated great value, bringing with it improved spatial coverage, to include cross-domain opportunities and reach. This compounds the linear contribution even further. Ultimately, with improvements in autonomy comes the prospect of human – machine collaborative teaming, which may well equate to a step change improvement in capability and capacity when compared to forces composed of manned systems exclusively.
Together, these three aspects span the value-added proposition of unmanned systems, natural complements to our existing manned force vice outright replacements. Along this continuum of application is a corresponding relationship that shifts from human-assisted to human-supervised and ultimately to human–machine collaborative teaming. As unmanned systems’ use and reliability grow, so too will the confidence we place in them. Trust will drive the pace of man–machine teaming within the larger context of human command and increasing levels of machine control executing human intent.

Fighting At Machine Speed

The case for unmanned rests in how it brings value to existing capabilities. Ultimately, fighting at machine speed is to combine what humans and machines do best, to create a sum greater than the parts. Unmanned systems make this vision executable. Unmanned systems complement manned through a continuous process of cognition and execution, where machines and humans interact seamlessly—the essence of teaming.

The speed of calculation and raw processing power machines bring in a deterministic realm coupled with the skill, imagination, and wisdom of humans operating in chaotic environments results in better decisions faster. In the fights of today and into the future, the side that harnesses this lash-up most effectively will prevail. With our fusion of technology and talent, coupled with a warfighting philosophy that values initiative, we’re the best equipped force to reap these benefits. A well-trained fighting force armed with these ways and means becomes super-empowered down to the mission command level, a combination hard to beat.

Rear Admiral Bob Girrier currently serves as the U.S. Navy’s first Director of Unmanned Warfare Systems (OPNAV N99). Most recently, he served as Deputy Commander, U.S. Pacific Fleet, and Director of Operations (J3) for U.S. Pacific Command.

[https://blog.usni.org/2016/08/04/unmanned-the-new-normal](https://blog.usni.org/2016/08/04/unmanned-the-new-normal)

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**CBP Unmanned Aerial Vehicle operators host Navy’s new Triton squadron for ‘idea exchange’**

The U.S. Customs and Border Protection’s (CBP) National Air Security Operations Center in Jacksonville recently hosted 12 “Big Red” Sailors from Unmanned Patrol Squadron (VUP)-19, the Navy’s first MQ-4C Triton Unmanned Aerial System (UAS) squadron, for a half-day visit.

The tour was the second event in VUP-19’s “UAS Best Practices” series, monthly briefings or site visits. The best practice series is designed to ease the manned-to-unmanned aviation transition, broadly educate VUP-19 personnel about modern UAS operations, and promote innovative thinking.

Federal agent and aviator Shy Thorsen spearheaded the introductory briefing and tour across the CBP’s facility. Thorsen is a former Navy P-3 pilot who now operates both Customs P-3 aircraft and the Customs MQ-9 Guardian aircraft, a system based on the Air Force’s Predator UAS.
“For more than a decade, CBP has deployed remotely-piloted UAS like the Guardian in disaster relief, emergency response, and law enforcement operations all across the US, North America and the western hemisphere,” explained Agent Thorsen.

“Although the Navy’s Triton is planned to be a larger and more capable platform, our pilots and operators have years of valuable experience that we are able to share in a lot of common areas.”

For example, CBP partnered with the US Coast Guard to develop the maritime variant of the Predator UAS, which was originally an Air Force platform primarily designed for and utilized in over-land environments. Similarly, VUP-19 will be the first operational squadron to bring the MQ-4C Triton to the Fleet, a maritime version of the Air Force’s land-focused RQ-4 Global Hawk.

“At first it may seem like apples and oranges when comparing the CBP’s Guardian to the Navy’s Triton,” said Lt. Paddy Nichols, VUP-19 Aviation Safety Officer and future Triton pilot. “But during this visit it became clear that although they are very different aircraft, our squadron can learn a lot from the lessons CBP discovered as they employed the Guardian. There are important commonalities in both platforms and missions, including UAS training differences compared to manned aircraft, weather avoidance, satellite based communications, and crew resource management just to name a few.”

“Some of the most valuable moments of the visit were not the formal briefing presentations, but the one-on-one conversations between operators,” admitted Nichols. Some of the questions that Nichols asked the CBP operators were: “What is it like to operate an aircraft halfway around the world from here in Jacksonville? What are your big challenges integrating the UAS into manned aircraft operations? What would you have done differently in rolling out this new technology in hindsight? These are all great talking points that really only come up organically during a visit like this. We can't thank Agent Thorsen and his team enough for this chance to come over here.”

Operating a squadron and diverse aircrew from different locations will be an important lesson to learn for VUP-19. The squadron will be permanently divided between two main operating locations, with about half of the Sailors at NAS Jacksonville, and the other at Naval Base Ventura County/Point Mugu, Calif. The Triton is designed to eventually provide long-range, long-endurance maritime patrol coverage in strategic areas all over the world.

Future “UAS Best Practices” briefings are planned with an Air Force Global Hawk squadron, the Defense Advanced Research Projects Agency (DARPA), and private sector UAS-operating entities like Google and Amazon.


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ARMY:
Army puts battlefield robots to the test

The Army, which like other military services has been working to increase the effectiveness of deployed troops on expeditionary missions, recently demonstrated a couple new technologies that will play a big part in the future of battlefield operations: robotics.

At an exercise called PACMAN-I, held at Marine Corps Training Area Bellows, Hawaii, soldiers tested a palm-sized personal unmanned aerial system called the PD-100 and an unmanned ground vehicle called MUTT, for Multipurpose Unmanned Tactical Transport.

The purpose is not just to enhance battlefield performance but also to assist rescue efforts.

"When we go to a place where there may be the need for us to do reconnaissance type work in a disaster area...they'll be able to use these systems that way," Tollie Strode Jr., senior project officer at Maneuver Center of Excellence Maneuver Battle Lab at Fort Benning, Ga. said in an Army release. "That isn't trying to find someone to shoot, that's trying to find someone to save."

One device tested was the PD-100 pocket-sized UAS, which researchers at the Natick Soldier Research, Development and Engineering Center in Massachusetts have been working on for several years. Researchers started with a commercial system, the Prox Dynamics' PD-100 Black Hornet, and adapted it for military use under its Cargo Pocket Intelligence, Surveillance and Reconnaissance, or CP-ISR, program.

The device is intended to give soldiers the kind of ISR they’re used from larger systems, but in constrained environments where those larger UAS might not work, such as in areas with thick tree cover, inside buildings or in densely packed villages.

The other robotic device tested during the two-week exercise was the MUTT, made by General Dynamics, a four-wheeled vehicle that can navigate steep slopes, sand, mud and water while carrying about 600 pounds of supplies. What’s more it’s quiet, which is an advantage in the field (noise is one reason the Army and Marines gave up, at least temporarily, on their robotic, though loud, “pack mule.”)

Soldiers who used the MUTT said it was easy to operate, the Army said, although offered feedback on potential improvements,

"There are two different controls, one is used just by one hand and the other actually has a screen on it that controls the turret itself and the MUTT," said Spc. Cole Cumby. "I like working with it, there's a lot of good things about it, and there are things I'd change..."

The Army is hoping that tests such as PACMAN-I will not only help improve the products but also get them into the field more quickly. "We need to be making sure we're fielding new technology as quickly as we can," said Army Secretary Eric Fanning, who attended the exercises. "It doesn't do any good if we're just investing in great technology if we don't actually get it into the field for soldiers."
Large exercise tests Alaska soldiers with real-life scenario – UAS

ANCHORAGE – The largest training exercise in Alaska in 15 years is happening at the Donnelly Training Area, just outside Delta Junction. Five thousand soldiers and support personnel are participating in a war exercise that’s as realistic as possible.

The Alaska soldiers are playing the “good guys.” Among them is the Unmanned Aerial Vehicle (UAV) Platoon from Fort Wainwright.

The UAV acts as an eye in the sky, scouting for the “bad guys,” played by Iowa National Guardsmen.

“We know exactly where they’re located, how many there are, what they’re using so we can determine the best routes of attack,” Hervey said. Once the enemy is spotted, “We’ll maintain positive identification until friendly forces arrive and destroy them.”

“We can kind of use our own minds to think how we would defeat our own forces and then kind of make plans from there,” Cooper said. “We don’t necessarily have to go off U.S. Army doctrine.”

During battles, the soldiers use equipment similar to laser tag. A hit means a soldier is either killed or injured and is a way for each side to keep score. It’s a good learning experience for both sides and they say about as close to the real thing as they can get — whether it’s the soldiers fighting on the ground or the UAV in the sky, warning of danger ahead.

“It’s definitely a positive feeling knowing that you potentially saved many lives,” Hervey said.

Swarms of UAS Guided by Brain Waves

A team of researchers has developed technology that lets a human control multiple drones using their brain waves, and the group is now working on squadrons of drones that could perform complex operations.

Researchers at the Human-Oriented Robotics and Control (HORC) lab at Arizona State University have been working with the US army for the last two years.

‘One of the big novelties we are working on is how you can bridge that gap between humans and robots,’ said Professor Panagiotis Artemiadis, director of the lab.

‘Especially when you are talking about multiple robots.’
The Defense Advanced Research Projects Agency (DARPA) awarded the research group $860,000 (£652,602) to work on the technology in 2014.

Now the group has come up with a way for one person to control multiple robots.

The system works using one controller who watches the drones, while his thoughts are read using a computer.

The controller wears a skull cap fitted with 128 electrodes wired to a computer. The device records electrical brain activity. If the controller moves a hand or thinks of something, certain areas light up.

‘I can see that activity from outside,’ said Professor Artemiadis. ‘Our goal is to decode that activity to control variables for the robots.’

If the user is thinking about spreading the drones out, for example, ‘we know what part of the brain controls that thought,’ Professor Artemiadis said.

These thoughts are then communicated to the robots using Bluetooth.

‘We have a motion-capture system that knows where the quads are, and we change their distance, and that’s it,’ he said.

Up to four small robots, some of which fly, can be controlled with brain interfaces – something that could not be replicated using a joystick.

‘You can’t do something collectively’ with a joystick, Professor Artemiadis said. ‘If you want to swarm around an area and guard that area, you cannot do that.’

To make the drones move, the controller watches the monitor and pictures the drones performing various tasks.

‘During the last two to three decades there has been a lot of research on single brain/machine interface, where you control a single machine,’ he said.

But a recent trend in robotics and space exploration has been towards building many cheap machines, instead of one expensive one.

Professor Artemiadis took inspiration from this and had the idea to try controlling a lot of machines with one mind.

‘If you lose half of them, it doesn’t really matter,’ Professor Artemiadis said.

The next step for the research is to test multiple people controlling multiple robots.

He plans to move to a much larger experimental space to refine the proof of concept. In the future, he sees drone swarms performing complex operations, such as search-and-rescue missions.
‘The goal over the next couple of years is to have a hybrid team of ground vehicles, mobile vehicles and aerial vehicles,’ Professor Artemiadis said.


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**USAF:**

**Only half-ready for A2/AD, Air Force looks to unmanned**

One of the most common phrases heard from military officials is readiness must be improved. When discussing readiness challenges, Air Force Secretary Deborah Lee James wants to make sure it's clear what the term truly means.

“It’s always important when we talk about readiness to say ready for what,” she said at a Defense One event July 26. From an Air Force perspective, James said “you better believe” the force is prepared and ready to undertake current missions in the Middle East against ISIS.

However, when discussing readiness against higher-end threats such as major nation-state competitors, “the answer is, I get anyway, is 50 percent of our combat air forces have that degree of readiness,” she admitted. “That’s not good enough.”

Part of this is the anti-access/area-denial (A2/AD) environments established by more advanced nation-state adversaries. “I think we’re all frustrated that although we feel we’re putting the right amount of dollars in the right places in our budget, we’re not seeing a real movement of the needle towards higher levels of high-end readiness,” James said.

For the Air Force, part of the difficulty will be transitioning heavily invested and successful unmanned aircraft – including the MQ-1 Predator, MQ-9 Reaper and RQ-4 Global Hawk – from the permissive environments of southwest Asia counterterrorism missions against technologically inferior groups to future conflicts against near-peers competitors with radar and anti-aircraft missiles.

Despite the fact these platforms have excelled against terrorists, both for near-persistent intelligence, surveillance and reconnaissance and strike capability for Reapers and Predators, they are slow-moving and easy targets for advanced radar and anti-aircraft batteries.

While these platforms undoubtedly have a future in the force – the Air Force is purchasing an additional 24 Reapers and the Global Hawk will transition to take over for the manned U-2 spy plane once it is phased out – it is unclear how they will be used or transitioned to a more contested environment. To some degree, the Air Force and the Defense Department writ large is still figuring this out.
“I think we’re still sort of learning -- how do you take the advantages that you’ve achieved in this network, in the permissive [environment of southwest Asia], and sort of be able to take it into the non-permissive?” said Maj. Gen. Jeffery Newell, the Air Force’s director of strategy, concepts and assessments and deputy chief of staff for strategic plans and requirements. “I’m not sure that I have great answers for you other than we see the value of it, we see that it is forever a part of how our Air Force operates, and I think you’re going to see that us [exploiting] the advantages of a persistent ISR network and [applying] it to an A2/AD environment will be a challenge for us that will continue.”

New challenges, new solutions

Part of how the Air Force and DoD seeks to get around these so-called A2/AD problems is through the Defense Department’s third offset strategy, described in its simplest terms as using man-machine teaming to undercut adversarial advancements. Several other initiatives have fallen under the third offset’s umbrella and include leveraging new technologies and approaches to solve complex problems at the rapid pace of technological innovation today.

Hypersonics are one example for how the force can penetrate these environments.

Additionally, unmanned fighter jets, what Strategic Capabilities Office Director William Roper described as unmanned fourth-generation fighters serving as avatars of manned fifth-generation systems -- because fifth-generation pilots will be able to control the unmanned fourth-generation fighters mid-air -- can serve as missile trucks for the limited payloads of fifth-generation fighters.

The Air Force also recently released a small UAS flight plan in May, which, among other tasks, outlines concepts for using small, inexpensive devices to swarm adversary systems. The goal: overwhelm enemy systems to allow other larger, more vulnerable assets to move in behind.

“The long-term vision for SUAS focuses on access to and survivability in the A2AD environment,” the document stated. “SUAS characteristics such as size, weight and low cost per unit create a cost-capability dynamic that better addresses counter-A2AD concept development than does our legacy manned and unmanned systems.”

At the Sea Air Space symposium in May, Peter Singer, strategist and senior fellow at the New America Foundation noted that such aircraft could either be carrying weapons, or the disposability of the aircraft could lend itself as a weapon. Singer described how Israelis used unmanned systems to overwhelm Syrian air defenses in the 1980s, when their goal was for aircraft to be shot down to force the Syrians to turn on their radars and waste missiles shooting down disposable systems.

Air Force officials admit that there is no single silver bullet and defeating A2/AD environments will likely involve a combination of capabilities in the physical and digital space, including cyber capabilities.

“A mix of capabilities to penetrate the highly contested environment as well as deliver effects from stand-off ranges offers a balanced approach to counter the A2/AD strategy,” stated the Air Force’s Air Superiority Flight Plan 2030, released in May. The plan lists kinetic and non-kinetic concepts to achieve
this, which include long-range strike capabilities, penetrating counter-air capabilities and electronic warfare, among others.

While these technological approaches will undoubtedly help, there is the underlying problem of the force itself. “Part of it is we’re so small and our people are so engaged we literally can’t free them up enough time to go through the rotational training to practice against these high-end threats,” James said. “So that’s another reason why I say, number one, we have got to grow our Air Force.”

James: Crawl, walk, run on enlisted pilots flying UAS

Recently, the Air Force for the first time adopted a new plan to allow enlisted service members to fly the RQ-4 Global Hawk, an unarmed, high-altitude, long-endurance unmanned surveillance aircraft. Now the service’s secretary is offering a cautious approach but noted more could come.

“What we’re doing is we’re opening up to the enlisted force the world of piloting for the Global Hawk. At the moment, that’s our focus because it’s something new and when you try something new, I’m a believer in crawl, walk run — do it, learn your lessons, do it well and then look at expanding down the line,” Air Force Secretary Deborah Lee James said at a July 26 Washington event hosted by Defense One.

Enlisted airmen one step closer to flying UAVs

However, while the current approach is only focused on these large, non-weaponized aircraft, James said there could be opportunities to expand in the future depending on how successful the initiative is.

“I absolutely do see possibilities for further expansion beyond Global Hawk but again I think it’s prudent when you start something new to start with something, what I call crawl, walk, run,” James said.

Currently, the force’s weaponized unmanned aircraft – the MQ-1 Predator and MQ-9 Reaper – are piloted by officers, and will be for the foreseeable future. As part of the Air Force’s so-called "get well plan" to help alleviate a force strained by growing demand for global intelligence, surveillance and reconnaissance, contractors will take control of 10 daily combat air patrol sorties. The Air Force has been clear that the contractors will not operate weaponized aircraft, something James reiterated July 26.
New Air Force courses to target RPA connectivity threats

While the Air Force’s remotely piloted aircraft have been a boon for operations with persistent intelligence, surveillance and reconnaissance combined with strike capability, their reliance on remote communications links lend inherent vulnerabilities. From their operational inception, platforms both large and small have been hacked, allowing adversaries to view full motion video feeds and in extreme cases, commandeering control of the aircraft.

The Air Force has now created a new course designed to address connectivity concerns. The MQ-1 Predator and MQ-9 Reaper Electronic Combat Officers course will train personnel that integrate with affected MQ-1/9 aircrews to mitigate signal disruptions, according to an Air Force release.

“We’ve been working for the last year and a half or so to build the ECO course for the RPA community,” said Capt. Craig, a 26th Weapons Squadron MQ-9 pilot and ECO course creator. “It’s very fulfilling to see it’s finally coming into fruition.” Craig said he never envisioned this idea developing into a full Air Combat Command course.

Airmen will return to their units following course completion with knowledge and training in RPA use of the electromagnetic spectrum that includes area of operation non-kinetic threats, radio communications, GPS, remote-split operations, satcom and Link 16, the Air Force said.

“It came to a point where I felt that we will no longer be fighting in a permissive war and it couldn’t just be me that knows how to fight against it, so I drafted up a syllabus on how I would train an ECO to fight a threat,” Craig said. “At the same time the 556th Test and Evaluation Squadron was testing how to fight against satcom-contested threats. I was just at the right place at the right time.”

As the Air Force notes, RPAs require reliable satellite signals to operate. While they can be disrupted by natural events, the Air Force faces monopoly erosion in the air domain, and the service is coming to grips with protecting assets that rely on vulnerable space and cyber systems.

“A period of monopoly has seduced the United States into thinking about conflict in the air, land, and maritime domains without recognizing the fundamental strength it has been leveraging: information advantage delivered through space and cyber operations," a report from the Mitchell Institute published in April asserted. "To operate at a disadvantage in these domains is not to retrograde to industrial age warfare...but far worse. ... Absent advantage in space and cyberspace, the United States does not retrograde to industrial-age war, but rather is completely denied operations in its chosen way of war: at the point where domains overlie.”

As military officials have declared space and its assets -- communications and navigation satellites -- exists in a contested environment, “it is therefore critical to recognize the primacy of information, and cyberspace and space as its conduits, in the U.S. way of war. Air, land and maritime operations are largely dependent upon the passage of information,” the Mitchell report said. “To succeed in future operations against a peer means that the Air Force must establish the requisite advantage in cyber and
space, geographically and temporally, in order to attain advantage in the air. Subsequently, the service can exploit advantage in air and space, and through cyberspace, to meet the demands of the joint force.”

“There’s a clear recognition that our service needs an organic cyber capability to get after much of what Cyber Command...just doesn’t have the bandwidth to do or simply is not in their charter, and it’s critical [to the] Air Force,” Air Force CIO Lt. Gen. William Bender said at a July Defense Writer’s Group breakfast. Organic capabilities specific to the Air Force involve assurance of aerial refueling, assigning crews to planes, ensuring planes take off on time and they deliver their payload or complete their mission. All these tasks, Bender said, are dependent on cyber-vulnerable systems.

From the Air Force, a call to operationalize the CIO

The Air Force’s new ECO course will be three-phased; academics teaching students to plan and prepare against jamming threats, integrating RPA with satcom during simulated flights, and culminating with a hands-on portion where students execute tactics, techniques and procedures to support RPA flights


USAF pilots add electronic warfare mission capability to UAV training


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NATIONAL AIR SPACE:

Why California may not see statewide rules on the use of drones anytime soon

The last time state lawmakers tried to place limits on drones in the skies above California, they were met with the veto of Gov. Jerry Brown, who said he did not want to create new crimes to enforce bans on the use of such devices.

This year, the pushback to new rules is coming not from the governor but through the lobbying efforts of a budding industry that hopes to influence policy at the state Capitol and nationwide.

As drones multiply in number and category, cities and states want to set boundaries. But drone manufacturers and associations this legislative session boosted their politicking, successfully beating back several bills they said would create a patchwork of laws that vary by state and hinder innovation.
“We want to solve problems and address concerns, but to do it in a way that is constantly clear across the country,” said Brendan Schulman, vice president of policy and legal affairs for DJI Technology Co., the world’s largest drone maker. “Otherwise, it will be too confusing for commercial users and consumers to understand what the rules are when they travel from place to place.”

The Consumer Technology Assn. expects 2.4 million drones to be sold nationwide this year, up from 1.1 million in 2015.

California has been home to some of the most innovative uses of the technology and is now also a central battleground over industry policy as it has become more commercialized.

Farmers are employing unmanned machines to spray pesticides over vineyards, first responders are using them to train for chemical spills, and Realtors are sending them into the air to capture aerial photos of homes and businesses.

But cities are seeking to pass their own rules and ordinances to prevent hobbyists from wreaking havoc. Just this month, a Placer County man was arrested on suspicion of flying a drone into a firefighting effort northeast of Sacramento.

Brown last year signed a bill prohibiting the use of drones to record audio or video on private property. But he stopped short of signing bills that would have made it illegal to use drones over wildfires, schools, prisons and jails.

Industry opposition this year has helped block two sweeping pieces of California legislation: One would have outlined drone regulations for law enforcement and another sought to drastically reduce the space in which the devices can be flown near power lines and critical infrastructure, private property and parklands and wildlife refuges.

Sen. Hannah-Beth Jackson, a Santa Barbara Democrat who authored the latter bill, said she had spent months working on an approach that would balance the need to protect privacy, public safety and parkland with promoting the benefits of the technology.

“The rules should be clear,” she said. “The rules should be fair. The rules should be a coordinated effort by all the stakeholders, but until we get the tech industry to sit down and participate, we are going to have to go at it alone.”

Opponents of the bill contended it would have required drone operators to obtain insurance, though there is no data that accurately reflects the danger the drones pose. And they said it created “inconsistencies and contradictions” that undermined federal law regarding aircraft operations.

Debate has raged in recent years over just where federal authority begins and ends. Lawyers with the Federal Aviation Administration have said their agency has jurisdiction over any airspace above a blade of grass, though it has typically only regulated spaces at least 500 feet above the ground. The agency has also been slow to release regulations, revealing its latest set of rules for commercial users only late last month.
In Washington, major firms with an eye toward drone delivery services, among the most aggressive of which has been Amazon, have poured millions of dollars into lobbying Congress as a way of pushing the FAA along. Major drone manufacturers have even created their own industry advocacy group, the Drone Manufacturers Alliance, focused on the consumer market.

But industry experts say the battles with the highest stakes could play out at the state level, where lawmakers are trying to balance the needs of cities with those of drone operators.

In California, DJI Technology Co. and GoPro, a body-wearable camera maker working on its own drone, doled out more than $125,000 for the first time this session to hire lobbying firms. And even Google and Amazon have added the unmanned machines to their lobbying priorities in Sacramento.

The opposition helped stall another bill by Assemblyman Bill Quirk (D-Hayward) that would have required law enforcement to issue policies and obtain a search warrant before using drones. It has remained on the Senate floor since last year but is expected to be withdrawn.

Of the five remaining proposals in the Legislature, criticized by some as piecemeal solutions, two of the most significant bills would ban the use of drones in state parks without permission and would hold that emergency responders and volunteers who damage a drone are not subject to liability.

Another would mandate that the devices must be sold with a copy of FAA rules and that those with GPS technology must turn off near airports, sensitive infrastructure or fires.

Jackson, whose drone legislation was vetoed by the governor last year, said she will try to pass statewide regulations for the third time next session. Cities are already moving forward, she said — with or without the state.

http://www.latimes.com/politics/

Commercial drone use takes off

The federal government soon will relax its rules on aerial drones, a move that should open the skies to commercial operators who have been eager to get in on the game but in many cases shied away over the long process and high costs associated with getting airborne.

Starting late next month, the Federal Aviation Administration will scrap rules that required drone pilots to secure a special waiver from the agency and have a valid pilot’s license. Going forward, the agency will require only a background check and a remote pilot certificate.

“That is really going to change the landscape for commercial-drone operators,” said Tom McMahon, a spokesman for the Association for Unmanned Vehicle Systems International.
Though the FAA’s upcoming rules apply only to daylight operation of drones weighing 55 pounds or less and require pilots to keep the craft below 400 feet in the air at speeds below 100 mph, the move is viewed as an important first step toward fully integrating unmanned aircraft into the nation’s airspace.

Hart, a public relations and advertising agency, was one of the first firms in the Toledo-area to receive an exemption under the FAA’s old guidelines that required a licensed pilot at the controls.

“With the new regulations it’s going to be much cheaper and much easier to get pretty much everybody on our video team certified to fly it,” Mr. Geib said. “That’s going to be very helpful.”

A number of other area companies are closely watching the upcoming rules. Walbridge-based contractor the Rudolph Libbe Group has been monitoring the situation. Both Owens Corning and Marathon Petroleum Corp. sought and received exemptions from the FAA and are exploring potential uses.

Relaxing restrictions on commercial drones could open up more opportunities for OC, Mr. Hartlage added.

Rudolph Libbe hasn’t used drones yet, but spokesman June Remley said clearly there are opportunities.

“We’ve been using aerial photography shot from a plane for years with great results, but a drone can give a contractor tighter views of a project. It can be used in building inspections, and it can be used inside a structure,” she said.

Rudolph Libbe officials have talked to vendors and studied regulations for some time, and Ms. Remley said the upcoming FAA changes make it more likely they will move forward.

The Consumer Technology Association forecasts drone sales to more than double this year to 2.4 million.

Ken Porter, who sells drones at the Hobby Town USA store in Holland, said the store sells out of its most popular model almost every week.

“Some people like to do it for sport and recreation; a lot of people like to do it for photography and videography. You can get some really great landscape photos. You can also look at your fields. We’ve got farmers checking to see if we’ve got anything that can do that,” he said.

Though drone technology advancement rapidly has made the devices cheaper, more capable, and easier to use, the commercial applications — at least, legal ones — have been limited. In the roughly two years the FAA has been making exemptions for commercial usage, only about 5,500 exemptions were granted.

As it becomes easier to get airborne, the number of companies using drones is expected to rise significantly. Even with the relatively small drones that the upcoming FAA rules will cover, the number of possible applications are huge.
In an examination of the first 300 exemptions granted by the FAA, the Association for Unmanned Vehicle Systems International found nearly 40 uses. Mr. McMahon said drones are proving particularly useful in the real estate, construction, and utility industries.

FirstEnergy Corp., which delivers electricity across the Toledo area, already has found uses for unmanned aerial vehicles. Company spokesman Chris Eck said FirstEnergy contracted a drone operator to inspect power plants, including a recent inspection of a natural-gas-fired plant near Pittsburgh.

“We figured conducting the inspection by drone saved us two days and $12,000,” Mr. Eck said. “We will continue to use them to inspect lines, stations, and power plants. They can get in close without any structure coming up from the ground.”

Just last week, FirstEnergy conducted its first drone inspections of transmission lines, something generally done either from the ground or by helicopter.

Experts believe drone use is on the cusp of ‘something big’.

The Association for Unmanned Vehicle Systems International estimates drones could contribute $82 billion to the nation’s economy and create 100,000 jobs by 2025.

While other estimates are more conservative, there’s no doubt that professional drones may make a big impact in a lot of industries.

Stelios Kotakis, an analyst with IHS Markit, said one area of particular potential is agriculture.

“There are already lots of specialized products and services for this industry in the market, and the fact that it is a rural activity makes the drone use easier,” he said.

IHS expects the global market for professional drones to be worth almost $1 billion by 2017, with $322 million coming from the Americas.

“I would say here that it looks very promising for businesses, despite the fact that some corporations will not be happy with the absence of the possibility for beyond visual line operation,” Mr. Kotakis said.

One of the FAA’s rules remains that no one may operate a drone beyond the vision of the pilot or a spotter in constant communication with the pilot. That effectively prevents companies such as Amazon.com from using drones to deliver packages.

Still, experts and businesses say the FAA generally has done a good job developing rules that both serve and protect the public.

“We want to keep our national airspace safe, and yet the job of the FAA ... is to promote commerce between the states,” said Jason Lorenzon, a northeast Ohio attorney who specializes in aviation law.

Mr. Lorenzon, a licensed pilot too, said most drones on the market today are so technologically advanced that they’re relatively easy to use and have built-in safety features. Still, he said there need to be guidelines.
“That’s not necessarily to make it restrictive. It’s to make it safe.”


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New Commitments to Accelerate the Safe Integration of UAS

WASHINGTON, DC - Since President Obama took office in 2009, developments in aviation, sensing, and software technology have powered a revolution in unmanned flight. In the next decade, the burgeoning commercial drone industry is projected to generate more than $82 billion for the U.S. economy and, by 2025, could support as many as 100,000 new jobs.

Today, the White House Office of Science and Technology Policy (OSTP) is announcing new steps, sustained by public and private support, to promote the safe integration and innovative adoption of unmanned aircraft systems across the United States. These announcements build on the Administration’s efforts over the past seven and a half years to support the safe integration of unmanned aircraft into the highly-complex network that comprises the National Airspace System, including: air navigation and air traffic control facilities, airports, technology, and the appropriate rules and regulations. Most notably, these announcements expand on the Department of Transportation and the Federal Aviation Administration (FAA)’s “Small UAS” rule announced earlier this summer to provide national guidelines for the operation of non-recreational unmanned aircraft under 55 pounds.

Key actions announced today include:

$35 million in research funding by the National Science Foundation (NSF) over the next five years to accelerate the understanding of how to intelligently and effectively design, control, and apply UAS to beneficial applications. This will include areas such as monitoring and inspection of physical infrastructure, smart disaster response, agricultural monitoring, the study of severe storms, and more; A broad range of actions by the U.S. Department of the Interior (DOI) to use UAS to support search and rescue operations, to augment manned aircraft operations, and improve government processes around technological adoption; A $5 million down-payment by the state of New York to support the growth of the emerging unmanned aircraft systems industry across New York; and A collective commitment made by UAS industry associations to implement a broad educational effort around privacy best practices for users of UAS technology, among other private-sector commitments to support UAS technologies.

These announcements are being highlighted as part of today’s White House OSTP Workshop on Drones and the Future of Aviation to advance and celebrate the potential of unmanned aircraft systems.

BACKGROUND

As a result of rapid innovation, unmanned aircraft systems (UAS), or drones, are now commercially available on a large scale. This new technology has already helped government, the research community, and industry carry out their work more efficiently and safely. UAS will also enable high-
impact research, create new jobs and industries, save lives, and provide scientific, economic, and social benefits that public and private entities are only beginning to explore.

The announcements released today include actions that expand the Federal Government’s capacity to use unmanned aircraft operations to advance agency and department missions and accelerate research discoveries related to airspace integration, and private actions to enhance mobility, expand participation, and promulgate privacy best practices. In addition, these efforts will enable advances in inspection of critical infrastructure, protection of endangered species and habitats, delivery operations that will increase accessibility to remote communities, suppression of wildfires, enhanced emergency response operations, and ever-more capable UAS platforms to gather critical data to help protect and further explore the world.

In addition to opening up the airspace for small UAS flight, in February of 2015, the President issued a Presidential Memorandum titled: Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems. In May 2016, FAA Administrator Michael Huerta announced the FAA’s Drone Advisory Committee—a broad-based, long-term advisory committee that will provide the FAA with advice on key unmanned aircraft integration issues by helping to identify challenges and prioritize improvements related to this emergent technology. And in June 2016, OSTP announced the White House Future of Artificial Intelligence initiative—assisted by the National Economic Council and the Council of Economic Advisors—to ensure smart policymaking on emergent technologies like unmanned aircraft systems and other intelligent platforms.

EXECUTIVE ACTIONS ENABLING EXPANDED UAS OPERATIONS

Enabling additional UAS operations through rulemaking: The FAA is working on the next regulatory steps for safely integrating UAS in the airspace. The proposed rule for Operations of Small Unmanned Aircraft Over People is scheduled to be published for public comment by this winter. This proposed regulation will become the framework for beneficial uses of drones near crowds, such as aerial photography or videography for newsgathering; for certain types of infrastructure inspection; and other applications. This proposed rule will be based on the recommendations developed by an industry stakeholder committee earlier this year. Chartering a UAS Safety Team: To address safety issues related to the increasing number of unmanned aircraft systems operations, the FAA will work with UAS industry stakeholders to charter an Unmanned Aircraft Safety Team (UAST). Similar to the existing Commercial Aviation Safety Team, the UAST will consist of government and industry stakeholders who will use a data-driven, consensus-based approach to analyze safety data and develop non-regulatory interventions to mitigate potential causes of accidents involving unmanned aircraft. Supporting Fundamental Research: The National Science Foundation (NSF) is committing $35 million in research funding over the next five years to accelerate understanding of how to intelligently and effectively design, control, and apply UAS to beneficial applications in areas such as monitoring and inspection of physical infrastructure, prevention of airport bird strikes, smart disaster response, agricultural monitoring, and study of severe storms. These advances are being made possible through NSF’s fundamental investments in theoretical principles of UAS, intelligent sensing, control, and perception;
Enabling the safe integration of unmanned aircraft systems through standards-generation and interagency collaboration: The National Aeronautics and Space Administration (NASA) is supporting the research needed to safely integrate unmanned aircraft in the National Airspace System. NASA is working closely with the FAA, the FAA UAS Test Sites, and the UAS community to ensure that safety functions for unmanned aircraft are defined and validated to inform development of UAS-related standards and regulations. In addition to this ongoing work, today NASA is announcing:

Initiating new research to inform development of standards for Detect and Avoid and Command and Control for UAS: NASA’s Aeronautics Research Mission Directorate will initiate new research in FY 2017 to inform development of new standards for detect and avoid and command and control technologies. This research, planned for completion by FY 2020, will include simulations and human-in-the-loop tests. The tests will occur in coordination with the RTCA and industry and government partners. Launching a joint NASA and FAA data exchange working group: NASA and the FAA are launching a data exchange working group under the UAS Traffic Management (UTM) Research Transition Team (RTT) to address the challenge of coordinating information between operators, entities that use UTM to perform services, and the FAA. This group will develop a consistent format for data to be shared across the affected parties with recommendations slated for release in FY 2017. The specifications will increase operational safety by providing information to the operators and FAA air traffic management systems consistently and quickly. Expanding existing capabilities through enhanced technology and training: The Department of the Interior (DOI), which manages one-fifth of all land in the United States, has used unmanned aircraft systems since 2009 to conduct wildlife and vegetation surveys, to protect endangered populations, perform archeological studies, assist in emergency response, conduct wildfire management on a 24-hour-a-day basis, and more. Today, DOI is committing to: Using unmanned aircraft systems for search-and-rescue operations: DOI will develop and maintain a training program for the use of UAS in Search and Rescue (SAR) by October 2018. This program will allow DOI first responders to rapidly deploy unmanned aircraft technology in critical search-and-rescue situations. Developing UAS for augmenting manned aircraft missions: By December 2017, DOI will develop payloads that have traditionally been carried aboard manned aircraft for UAS. This will augment the manned aircraft fleet and result in cost-savings and reduced risk to departmental personnel. Rapidly prototyping and approval of new UAS payloads: DOI will develop a process for the rapid prototyping and approval of new UAS payloads for its fleet by January 2018. This will allow for quick access to new sensor technology for users in the field as technology advances. Implementing rapid data processing capabilities: UAS-collected data often requires post-mission processing before it can be used directly by the end user. DOI will find innovative solutions for rapid processing of data into usable products for scientists, first responders, and land managers. By FY 2019, DOI will have in place procedures for rapid data processing of UAS-acquired data using the cloud. This will dramatically reduce the time needed to process imagery at a local office. Increasing data sharing of wildland fire locations: DOI will share near-real-time fire location information with the public by July 2017 as part of a multi-faceted effort to prevent unauthorized drone incursions over active wildfires. Building upon DOI’s 2016 prototype wildland fire location data sharing initiative with three volunteer industry partners, this expanded data sharing initiative will further reduce the risk of drone incursions that jeopardize the safety of wildland firefighters. Helping U.S. citizens and businesses stay informed and able to make critical decisions: The National Oceanic and Atmospheric
Administration (NOAA) provides environmental intelligence for the Nation through science, service, and stewardship. One of NOAA’s observational infrastructure investments has been the research, development, demonstration, and evaluation of new observing strategies using unmanned aircraft systems to fill critical data gaps or improve observing services. Today, NOAA is committing to: Using unmanned aircraft for precise gravity measurements: By 2017, NOAA will begin collecting precise gravity measurements from an aircraft that can be flown remotely from a ground control station or as a traditional aircraft. These new gravity measurements will be added to other gravity data collected by traditional manned aircraft to improve how surface elevations are calculated over the entire United States. NOAA will create a new vertical elevation reference system that will improve flood plain mapping and help mitigate risks for coastal communities from tsunamis, hurricanes, and storm surges.

Augmenting observing capabilities from ships: By 2017, NOAA will begin investigating how to add UAS observing capabilities to the NOAA fleet of ships. Effective shipboard UAS operations will significantly expand observational capabilities for critical weather, air quality and ocean monitoring, and management of marine resources, including endangered species. Exploring the public’s views on using unmanned aircraft for the delivery of mail or packages: Technological innovation is rapidly transforming what is possible in the world of delivery. One of the innovations that is gaining extensive attention is delivery by unmanned aircraft, but to date little research has been done on public support for the concept. Today, the United States Postal Service Office of Inspector General is announcing its intention to publish new findings and analysis on the public’s rapidly-evolving opinion of drone delivery as a potential future logistics technology. Several topics are covered in the study, including the opinion of survey respondents to unmanned aircraft delivery’s overall appeal, its most and least compelling applications, the believability of claims about its potential benefits, the public’s expected time-frame for implementation of operations, potential downsides of the proposed technology, and how the public would view drone delivery if it were offered by the U.S. Postal Service and a small collection of other interested organizations.

STATE INVESTMENTS TO SUPPORT THE GROWTH OF THE UNMANNED AIRCRAFT SYSTEMS INDUSTRY

Launching an initiative to grow the UAS industry: Today, Empire State Development, New York State’s chief economic development agency, announced a significant commitment to support the growth of the emerging unmanned aircraft systems (UAS) industry in New York State, specifically in the Upstate region. Through an initial investment of $5 million, New York will strengthen the ongoing efforts to create a hub for UAS innovation and manufacturing. This early investment will support the planning and design of next generation Unmanned Aerial Traffic Management (UTM) infrastructure, national UAS standardized testing and rating facilities, and an innovation district dedicated to unmanned systems in a corridor between the cities of Syracuse and Rome, New York.

This $5 million investment is part of New York State’s commitment to growing the UAS industry through the strategies outlined in the Central New York Rising plan, which was awarded $500 million through Governor Andrew Cuomo’s $1.5 billion Upstate Revitalization Initiative. Educational institutions, such as Syracuse University and Mohawk Valley Community College, are aligning training curriculum and research efforts around issues related to UAS and the growing needs of this sector. New York State has also launched the largest business accelerator program in the country, called GENIUS NY, with awards of
up to $1 million targeted on unmanned systems startup companies. Expanding UAS testing: The Northern Plains UAS Test Site in North Dakota will conduct beyond visual line of sight UAS flights from the Grand Sky business and aviation park, an innovative Enhanced Use Lease between Grand Forks Air Force Base and Grand Forks County that has enabled private developers to open the Nation’s first drone business park of its kind. Pending FAA airspace authorization, these flights will go from the surface to 29,000 feet without a chase aircraft and support the integration of heavier, faster UAS that can operate at higher altitudes.

PRIVATE SECTOR COMMITMENTS TO EXPAND TECHNOLOGICAL CAPABILITIES AND APPLICATIONS

Delivering Critical Mobility to Communities in Need

Using unmanned aircraft to deliver critical medical supplies to improve health access in hard-to-reach areas: Zipline International, with the support of Ellumen, ASD Healthcare, and the nonprofit Bloodworks Northwest, will demonstrate the viability of unmanned aircraft technology in disseminating critical care supplies to remote communities in the United States. The demonstrations will deliver lifesaving blood, medicine, and medical products to remote communities in the states of Maryland, Nevada, and Washington, including in Indian reservations and their surrounding communities, within six months of regulatory approval. The preliminary missions identified include: Crisfield Clinic, Crisfield; Maryland to Smith Island, Maryland; Reno ASD Healthcare Distribution Center to Pyramid Lake Tribal Health Clinic and/or VA Sierra Nevada Health Care System, Nevada; and Bloodworks Northwest Bellingham Facility or Lummi Reservation to San Juan Islands, Washington. Empowering health workers with delivery tools to reach remote communities: Flirtey, a retail drone delivery startup, is partnering with nonprofit International Medical Corps to focus efforts on humanitarian applications for drone delivery technology. The partnership will collaborate to develop lightweight, temperature-managed payload containers for medicines and vaccines for aerial delivery in remote and low-resource settings around the world. This effort will help humanitarian aid workers tackle complex logistical challenges that can make deliveries of crucial supplies for health clinics and hospitals nearly impossible. This partnership will move the humanitarian community one step closer to safe and effective real-time deliveries of lifesaving medical supplies. Informing the public about UAS integration: Today, the Commercial Drone Alliance pledges to lead a broad effort to educate the American public on the integration of UAS into the National Airspace System. The Alliance will host town hall meetings and educational workshops in communities across the country, and will partner with humanitarian organizations to encourage expanded drone use for disaster response and more. The Alliance and its members plan to work with the end-user community, NASA, and UAS Traffic Management (UTM) collaborators to further enable the acceptance of autonomy and UAS technology.

Expanding and Promoting Safe Operations

Educating the public about safe unmanned aircraft operations: Sinclair Broadcast Group, in collaboration with the Association for Unmanned Vehicle Systems International (AUVSI) and the Academy of Model Aeronautics (AMA), will develop and broadcast drone safety Public Service Announcements (PSAs) across its stations. These PSAs will help educate the general public about the resources they should
familiarize themselves with before operating a UAS. This effort is part of the “Know Before You Fly” safety campaign, developed by industry associations together with the FAA. Operational deployment of Project Wing in an experimental context for evidence-driven policy-making and safe operation: Project Wing will conduct an operational research study at one of the six FAA UAS Test Sites to gain full operational experience of its delivery service in a safe testing environment. Data gathered will be shared with government partners to help regulators answer critical safety and human factors questions for UAV cargo delivery operations. Project Wing is planning for the testing to include operations with external cargo loads and to build towards beyond line of sight (BLOS) capabilities. The company will also begin to develop and deploy an open-interface, airspace management solution for safe low-altitude small UAS (sUAS) operations using existing low cost, scalable communication and information technologies. The work, which will focus on encouraging good citizenship in operation and collaboration between and across industry and government, will help ensure safe integration of sUAS in the layer of airspace under 400 feet. Developing safety solutions for drone racing operations: The Drone Racing League (DRL) is releasing best practices for the drone racing industry, including event guidelines, organization, and safety measures. As drone use has grown exponentially over the last year, the sport of drone racing has exploded in popularity. DRL has developed best-practice guidelines for event organization and safety based on extensive research, which today it is making open-source for use by the general public and racing operators. DRL has also made its drone event safety checklists and Emergency Action Plans publicly available to enhance safety at all racing events. DRL is also launching a new website to provide pilots, event organizers, and hobbyists with a practical, easily accessible guide to drone racing safety. Releasing test results to improve safety: PrecisionHawk is announcing its Phase I Pathfinder results demonstrating the safety of extended visual line of sight (EVLOS) operations for drones in rural areas. EVLOS provides societal benefits through expanded commercial applications and greater flexibility in operations. Under the Pathfinder program, an FAA-led initiative to facilitate the early introduction of low-altitude operations for small, unmanned aircraft systems into the National Airspace System, PrecisionHawk quantified the EVLOS distance at 2-3 nautical miles for non-technology assisted drone operations.

Expanding Participation

Supporting greater participation of women and girls in aerial robotics and the drone industry: Today, the Women of Commercial Drones organization and the Commercial Drone Alliance announce their collaboration to advance women’s participation in the UAS industry. Encouraging and mentoring women and young girls at an early age to become part of the UAS industry is one of the main goals of Women of Commercial Drones. Together, both groups will kick off a mentorship program aimed at supporting career development for women in the UAS industry and achieving success in leadership roles.

Encouraging STEM youth engagement through unmanned aircraft systems: Drone manufacturer DJI is supporting 4-H’s National Youth Science Day in October of 2016. This year’s theme is “Drone Discovery,” to inspire kids and young adults to explore science, technology and engineering in more depth. Over 100,000 students will participate in a hands-on challenge during the National Youth Science Day to explore the science behind drones and how this technology is being used to solve real-world problems. Participants will learn about flight dynamics, safety and regulations, remote sensing, and
flight control. Enabling job placement for Veterans with free drone pilot training: DroneBase and Drones & Good are announcing a partnership to provide transitioning military Veterans with training programs and apprenticeships to start a career in the commercial drone industry. DroneBase is a Veteran-founded provider of commercial drone services to real estate, construction, insurance, and other sectors. Drones & Good pairs military veterans with trained drone pilots who accompany them in the field. Through this partnership, DroneBase will provide Drones & Good-qualified Veterans with 10 hours of free in-person and remote training in basic and advanced commercial drone tasks on the most commonly used unmanned aircraft systems, and will commit to providing each Drones & Good team with one real-world commercial job in their area with waived fees.

Establishing and Prioritizing Privacy Best Practices

In conjunction with the announcement of the Small UAS rule in June, the Administration announced several important steps to advance efforts around privacy protections as use of unmanned aircraft expands. In May 2016, the National Telecommunications and Information Administration (NTIA) and a diverse group of stakeholders—including privacy advocates, UAS industry organizations, companies, and academia—gathered to discuss best practices to help organizations protect individuals’ privacy when operating UAS. The Administration put out a call for private sector and nonprofit organizations to share commitments for new technologies or business practices that will protect privacy during UAS operations. The following actions build on these best practices to ensure that privacy is a fundamental component of every unmanned aircraft operation:

Raising public awareness about privacy best practices: Building off the NTIA-led multi stakeholder process, The Commercial Drone Alliance, Association of Unmanned Vehicle Systems International, Small UAV Coalition, U.S. Chamber of Commerce, CTIA, National Association of Realtors, National Society of Professional Surveyors, and MAPPS are announcing a broad educational effort to raise awareness for users of UAS technology around privacy best practices and some of the ways they can be incorporated into various operations. Disseminating information on industry privacy safeguards: Today, in response to the Administration’s call-to-action on privacy protections related to UAS operations, the Future of Privacy Forum, Intel, and PrecisionHawk released a report entitled "Drones and Privacy by Design: Embedding Privacy Enhancing Technology in Unmanned Aircraft," detailing how leading drone companies are building privacy safeguards into their technologies and services. The report highlights technologies and practices that help drone operators minimize the collection and retention of personal data, obfuscate images of individuals collected from the air, and secure personally identifiable information. The widespread adoption of geo-fencing and other technologies is enabling drones to reduce privacy risks while tackling important, often life-saving missions.


White House Unveils Drone-Boosting Plan

The White House is taking a raft of actions to boost the integration of drones into daily life and commerce, including advancing privacy protections through various voluntary efforts.

The White House Office of Science and Technology Policy said the steps build on the Federal Aviation Administration’s Small UAS (Unmanned Aircraft Systems) rule announced earlier this year for drones under 55 pounds. The rules do not deal with privacy, but the FAA and DOT strongly encourage UAS pilots to check local and state laws before gathering info via remote sensing or photography.

The National Telecommunications & Information Administration, the White House's chief telecom policy advisor, also developed privacy recommended best practices, in association with stakeholders, which included a carve-out for journalists.

Among the practices that apply to other users — including TV and film producers that are increasingly using the technology — include making reasonable efforts to provide prior notice; limiting the collection, use and storage of data covered by the guidelines; protecting the collected data; and monitoring and complying with state laws.

TV news, sports and entertainment operations are increasingly using drones to get close to the action or capture the right shot remotely.

The White House said Tuesday (Aug. 2) that CTIA: The Wireless Association, the U.S. Chamber of Commerce, The Commercial Drone Alliance and others are launching a "broad educational effort into privacy best practices, including holding town hall meetings and workshops across the country.

In addition, the Future of Privacy Forum, Intel, and PrecisionHawk released a new report, "Drones and Privacy by Design: Embedding Privacy Enhancing Technology in Unmanned Aircraft." The White House said one of the takeaways from that report is: "The widespread adoption of geo-fencing and other technologies is enabling drones to reduce privacy risks while tackling important, often life-saving missions."

Among the other key actions being taken are: 1) $35 million in funding for a five-year study by the National Science Foundation on beneficial applications of drones including the study of severe weather, infrastructure inspection; 2) deploying drones in search and rescue operations by the Department of the Interior; 3) using drones to encourage STEM education; 4) the Post Office is also planning to publish new findings on using drones for package delivery.
The announcement is part of a White House workshop on drones and the future of aviation. The White House says the commercial drone industry is expected to generate upwards of $82 billion for the U.S. economy and as many as 100,000 new jobs by 2025.


http://fortune.com/2016/08/02/white-house-alphabet-drone-delivery-google/

The FAA said that over half a million drones have been registered in just 8 months

At a conference at the White House today (Aug. 2) on the future uses of drones in US airspace, Federal Aviation Administration director Michael Huerta told the gathered crowd that more than consumer 500,000 drones had been registered with the agency since December.

At the end of last year, the FAA mandated—arguably as a stopgap against potentially stricter regulations from Congress about how citizens can use drones—that anyone wishing to fly a consumer drone weighing more than 0.5 lbs needed to get a registration number from the FAA for $5. While there was a roughly month-long grace period where the FAA was refunding people that registered, if the agency had collected its fee for every person that registered, it would’ve brought in over $2.5 million.

According to the FAA, it took 100 years for about 320,000 regular aircraft to be registered with US officials—a feat that drones have surpassed in a matter of months. Granted, even the largest consumer drone is far smaller than the average plane, helicopter or hot-air balloon, but it’s an impressive statistic for an agency that has been criticized in the past for moving slowly on regulations that adapt to the growing uses for drones.

In June, the agency announced that its long-overdue regulations on commercial drones—how businesses can safely and legally operate them—would go into effect Aug. 29. Although the rules were comprehensive, they still outlawed the use of drones beyond the line of sight of the person flying them, meaning that a company—like Amazon, Alphabet, or Wal-Mart—that wants to operate a drone delivery service could not, unless they had their pilot walking along the ground alongside the drone, rendering the whole point of quick drone deliveries useless.

But at today’s conference, speakers discussed the potential for drone operations beyond the line of sight in the future. And the FAA is already testing out the feasibility of delivery services like this. Last month it approved a test by the drone delivery service Flirtey and 7-Eleven to deliver some snacks to a household in Arizona.

In the future, as the number of commercial and consumer drones continues to increase and our skies become filled with drones buzzing around for fun and work, a system will need to be in place to manage
the massive influx of flying machines in US airspace. The FAA is working with NASA to develop such a system, and today the White House committed to helping integrate drones into US airspace as quickly as possible. But at least in the time being, with a regulatory framework in place, more companies can begin to think about using drones in their business (about 5,000 companies have already started using them). It remains to be seen when they, or any regular consumer, will be able to fly them farther than they can see them.

http://qz.com/748286/the-faa-said-that-over-half-a-million-drones-have-been-registered-in-just-8-months/

New Part 107 Info in Updated Part 107 FAQ Page

I finally received some clarification from DC and updated the Part 107 FAQ page. http://jrupprechtlaw.com/

The updated text is below.

Those with Pending Section 333 Exemptions

I filed a 333 petition and it is still pending. Now what? The FAA will post a letter to your docket. The FAA is breaking the petitions down into three tiers: (1) operations that can be done within 107, (2) operations that can be done within 107, but need a waiver, and (3) operations that cannot be done within 107 even using a waiver. Aerial data collection and closed-set exemption petitions are going into tier 1 which means the FAA is closing your docket and no further action is needed from you. You are going to have to go fly under Part 107 and you won’t be given a 333 exemption.

But my exemption was just about to be approved. Am I goofed? There was a line drawn in the sand. Exemption petitions or amendments that were posted to regulations.gov by June 22nd are being put into 1 of 3 tiers. Exemptions posted June 23 and onward will NOT be analyzed and put into one of 3 tiers. But going back to the answer to question 1, you most likely will be Tier 1 and the docket will be closed.

Has the FAA gone through all the petitioners posted up until June 22nd? I think most of them have been analyzed.

Which tier does a closed-set TV/movie filming petition go? Tier 1. Remember that Part 107 does not allow operations over people and would need a waiver. We were hoping that petitions asking for closed-set operations would be put in Tier 2 to have a waiver to operate over participating actors operating under the MPTOM. The FAA analyzed the newer summary Section 333 exemptions (~March and onward) that were granted and determined that they do not allow operations over participating actors; thus, closed-set petitions cannot go into Tier 2. Restriction 28 says:
“Over or near people directly participating in the operation of the UAS. People directly participating in the operation of the UAS include the PIC, VO, and other consenting personnel that are directly participating in the safe operation of the UA.”

“Near but not over people directly participating in the intended purpose of the UAS operation. People directly participating in the intended purpose of the UAS must be briefed on the potential risks and acknowledge and consent to those risks. Operators must notify the local Flight Standards District Office (FSDO) with a plan of activities at least 72 hours prior to flight operations.”

Why did the FAA choose to do a cut-off? One primary reason is Part 11 of the Federal Aviation Regulations. Part 11 governs the FAA rulemaking process, which exemptions are a part of. 14 C.F.R 11.81 http://www.ecfr.gov/cgi-bin/text-idx?SID=aa176948052c55a989755e20007929a4&node=pt14.1.11&rgn=div5#se14.1.11_181 says, “You must include the following information in your petition for an exemption . . . The specific section or sections of 14 CFR from which you seek an exemption[.]” Before there was no Part 107. We had to get exemptions from certain parts of the FARs. Now we have Part 107 so we need to file petitions for exemption for particular regulations of Part 107. We didn’t have the final rules before so we couldn’t have anticipated the specific regulations that we wanted exemptions from.

I waited all this time and the FAA is just goofing me up? The FAA’s response would be that you should have filed sooner. They have thousands of pending 333 petitions.

http://jrupprechtlaw.com/faas-far-part-107-frequently-asked-questions

PUBLIC SAFETY:

1st US system to keep drones away from wildfires kicks off

BOISE, Idaho — The first national system intended to prevent hobby drones from interfering with planes and helicopters fighting wildfires has launched, federal authorities say.

The U.S. Interior Department announced the kickoff of the pilot project Monday that uses a smartphone app and real-time wildfire information to create virtual boundaries, or geofences, that drones can’t cross.

Officials say drones colliding with firefighting aircraft could be catastrophic. Planes and helicopters have been grounded numerous times this year because of drones, most recently on Sunday in Southern California where 10,000 homes are threatened by fire. Earlier this month authorities arrested a man they say flew a drone over a Northern California wildfire and grounded firefighting aircraft.

“We believe this program, which uses the global positioning system to create a virtual barrier, will move us one step closer to eliminating this problem for wildfire managers,” Mark Bathrick, director of the Interior Department’s Office of Aviation Services, said in a statement.
The Interior Department developed the system with DJI, the world’s largest civilian drone-maker, and two other companies that specialize in offering navigational information to drone fliers, AirMap and Skyward.

Specifically, the Interior Department allows AirMap and Skyward to get the latest wildfire information directly from the federal agency’s Integrated Reporting Wildland-Fire Information program.

That information is then immediately pushed to drone pilots through apps on their smartphones, with the smartphones themselves typically used to navigate in combination with the drone’s GPS.

DJI has its own app called DJI GO. AirMap pushes the Interior Department’s wildfire flight restriction information to DJI. DJI uses it as a safety feature that prevents its drones from flying in temporary flight restrictions at wildfires. It even prevents DJI drones from taking off in wildfire restricted areas. The system can be overridden by those authorized to fly over a wildfire.

“This enhancement ... will help prevent DJI drones from inadvertently taking off within, or flying into, a wildfire location without authorization,” Brendan Schulman, DJI Vice President of Policy and Legal Affairs, said in a statement.

Ben Marcus, CEO of AirMap, said DJI is the only drone maker so far to take that step but attributed it more to DJI’s large size. He expected smaller companies that make drones to begin integrating the technology as well to set up the geofences around wildfires based on Interior Department information.

“Giving drone operators real-time information about wildfires we think will dramatically increase the safety for firefighters,” Marcus said.

For drone pilots without a DJI drone, smartphone apps can still provide the Interior Department’s location of wildfire flight restrictions, but it will be up to the operators to avoid flying over a wildfire rather than the drone technology automatically preventing an incursion.

Marcus estimated that more than 70 percent of drones now operating in the country will benefit from the real-time wildfire information.


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UAV’s and Holograms Used to Fight Wildfires

For the first time, unmanned aerial systems (UAS) and holograms are helping fight the wildfires. Flight operators manipulate holographic tactical maps of ScanEagles, helicopters and firefighters to direct resources to where they’re most needed. With Inexa Control software, the engineers hope to use mixed reality technology to one day control an entire fleet of UAVs for commercial use.
Vancouver firm working to make drones 'see', think and avoid accidents

Vancouver-based Iris Automation is working on one of the most vexing problems in artificial intelligence — to make commercial drone flight more reliable, effective and most importantly, safer.

Teaching drones to “see” the world as humans do and make wise decisions is nothing short of a Holy Grail in the robotics industry, but one that co-founder and CEO Alex Harmsen believes the company is edging toward.

Smarter drones would also be able to work more independently, without the constant attention of an expensive, paid human operator or operate reliably beyond the operator’s line of sight, even in complex environments.

“Humans live in a very visual world, so we really prefer systems that perceive the world as we do,” said Harmsen, who is residing temporarily in Mountain View, Calif., to participate in the Y-Combinator business accelerator program. “What we are building is computer vision, situational awareness and artificial intelligence that could guide any robotic system.”

The individual technologies required for such systems from sensors to computing platforms are maturing, but autonomous systems need to be as close to 100 per cent reliable as possible before industrial users will adopt the systems, he said.

The market for reliable drones in mining exploration, oil and gas and pipeline inspection is potentially vast. They are all multi-billion-dollar industries, Harmsen noted. Goldman Sachs predicts the market for commercial drones will reach $100 billion in the next five years.

But there is justifiable nervousness inside the drone industry that eventually — perhaps inevitably — someone is going to die at the hands of an irresponsible or unskilled operator. Jail time and fines of up to $25,000 are meant to deter rule-breakers, according to Transport Canada, which investigated six drone incidents in 2013, 61 in 2014 and 97 in 2015.

On May 25, two pilots — one from WestJet Airlines Ltd., one from Air Canada — reported seeing a drone that was flying too close for comfort on their descent into Ottawa. In response, two CF-18 fighter jets under the direction of NORAD were scrambled to investigate and track down the errant drone.

Two-and-a-half weeks later in Winnipeg, police were called to the city’s airport after a drone flew within 25 meters of a landing plane. In both cases, the drone and its operator were never found.

Iris raised $500,000 from investors in Vancouver and San Francisco in March to transition the company from development to commercialization.
Harmsen and co-founder James Howard founded the company in 2015 in a Kitsilano basement suite, just months after graduating from the University of British Columbia, where the pair kindled their interest in the field participating in drone-flying competitions.

Harmsen worked briefly as a programmer in NASA’s Jet Propulsion Laboratory creating 3-D vision systems to guide the Mars Rover, while Howard accepted an engineering internship in spacecraft engineering for the UK-based Spire Global satellite firm.

“We founded Iris because we could see this demand building and we felt that all the technology required to make this work was right there for us,” said Harmsen. “Everything is ready, except the situational awareness element that would make it safe and reliable. We knew we had the skills to build that.”

Pilot projects are getting underway with the company’s development partners — a delivery firm, a mining engineering firm and a pipeline inspection company — to see how the systems perform in the field.

“Drones are already semi-autonomous following GPS way-points, so we are trying to get over that last hurdle to complete autonomy,” he said. “That means real-time situational awareness and decision-making.

“Iris is creating systems that detect and avoid stationary objects from mountains and trees to power lines and oil derricks, but also mobile threats such as planes and other drones. Autonomous drones could be a huge help in areas such as pipeline inspection or search and rescue operations, but we don’t quite trust them to go off and work by themselves.”

A GPS failure or an incorrect map coordinate can result in a crash if the drone is not aware of its surroundings, a potentially dangerous and expensive outcome in an industrial setting.

Iris systems aim to create three-dimensional maps of the environment in real time, track anything moving in the environment and assess its threat potential.

“At that point we can return control of the drone to an operator to avoid the problem or just cut power to the engines if it’s really serious,” he said. “Better to drop the aircraft right out of the sky than to have a mid-air collision.”

Identifying moving objects and plotting their trajectory is one of the key challenges Iris hopes to solve. The system’s camera-based sensor range is roughly 500 meters, a distance that would take a crop-duster less than 10 seconds to cover.


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Drones to Mitigate, Predict Landslides

West Virginia (Aug. 3, 2016) — Woolpert has tasked its unmanned aerial systems (UAS), or drones, with monitoring landslide areas and potential landslide areas in northern West Virginia.

“This is an active weather time, with West Virginia experiencing historic rains,” said Aaron Lawrence, Woolpert GIS expert and UAS technology developer. “Access to this terrain can be challenging and view sheds from ground level can be blocked due to overgrown vegetation. UAS gives us a tool to get as close to these remote and often unstable areas as possible in a quick and safe manner.”

The Woolpert team collected high-resolution aerial imagery via UAS and generated 3D data after a slope failure on a recently developed parcel of land in West Virginia, completing this process in less than 24 hours.

“The 3D data collected during this event and others like it can be used by engineers to not only identify but reinforce and stabilize these dangerous slopes,” Lawrence said.

Woolpert has conducted UAS projects with various states’ departments of transportation, departments of natural resources and oil and gas developers, identifying slopes of a designated percentage for road and highway construction as well as land development. For instance, if a slope next to a road is greater than 30 percent, Lawrence said, there is a higher probability of a landslide to occur and/or for debris to enter a roadway corridor.

“There is value in collecting imagery before, during and after a landslide because, from the resulting data, we can better understand the mechanics of these natural disasters,” Lawrence said. “Then this information can be used to prevent future landslides, and we can better protect the public, our industries and our resources.”

[http://www.amerisurv.com/content/view/15358/2/](http://www.amerisurv.com/content/view/15358/2/)

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Drone deliveries of blood and medicine are about to begin in the US

PWC says drones could save businesses $127 million worldwide

Zipline, a California-based startup, will begin using drones to deliver blood and some medications to remote locations in the US, according to the Verge.

Zipline, which launched in 2014 with the assistance of Microsoft co-founder Paul Allen, has already been using drones to deliver medicine and blood samples in rural Rwanda through a partnership with the country’s government.

The hope is that the drones will be able to deliver much-needed medical supplies to areas that are otherwise hard to access. Keller Rinaudo, Zipline’s founder and CEO, said that he expects the delivery program will start serving remote communities in Maryland, Nevada, and Washington, including some
American Indian reservations. He added that it is in these areas where the greatest health outcome inequalities in the country are observed.

The use of drones for medical purposes has long been anticipated and is now taking off. Back in June, Johns Hopkins School of Medicine teamed with the drone startup Flirtey to test a drone carrying medical supplies in Cape May, New Jersey as members of the United Nations’ humanitarian arm observed. Meanwhile, Microsoft has made use of drones to search for mosquitoes infected with the Zika virus outside of Houston. However, commercial use of delivery drones in the US has been constrained by regulatory barriers.

Drones turned the corner in 2015 to become a popular consumer device, while a framework for regulation that legitimizes drones in the US began to take shape. Technological and regulatory barriers still exist to further drone adoption.

Drone manufacturers and software providers are quickly developing technologies like geo-fencing and collision avoidance that will make flying drones safer. The accelerating pace of drone adoption is also pushing governments to create new regulations that balance safety and innovation.

Safer technology and better regulation will open up new applications for drones in the commercial sector, including drone delivery programs like Amazon’s Prime Air and Google’s Project Wing initiatives. Jonathan Camhi, research analyst for BI Intelligence, Business Insider’s premium research service, has compiled a detailed drones report that forecasts sales revenues for consumer, enterprise, and military drones. It also projects the growth of drone shipments for consumers and enterprises.

The report details several of world’s major drone suppliers and examines trends in drone adoption among several leading industries. Finally, it examines the regulatory landscape in several markets and explains how technologies like obstacle avoidance and drone-to-drone communications will impact drone adoption.

Here are some of the key takeaways from the report:

• We project revenues from drones sales to top $12 billion in 2021, up from just over $8 billion last year.
• Shipments of consumer drones will more than quadruple over the next five years, fueled by increasing price competition and new technologies that make flying drones easier for beginners.
• Growth in the enterprise sector will outpace the consumer sector in both shipments and revenues as regulations open up new use cases in the US and EU, the two biggest potential markets for enterprise drones.
• Technologies like geo-fencing and collision avoidance will make flying drones safer and make regulators feel more comfortable with larger numbers of drones taking to the skies.
• Right now FAA regulations have limited commercial drones to a select few industries and applications like aerial surveying in the agriculture, mining, and oil and gas sectors.
• The military sector will continue to lead all other sectors in drone spending during our forecast period thanks to the high cost of military drones and the growing number of countries seeking to acquire them.

In full, the report:

• Compares drone adoption across the consumer, enterprise, and government sectors.

• Breaks down drone regulations across several key markets and explains how they’ve impacted adoption.

• Discusses popular use cases for drones in the enterprise sector, as well as nascent use case that are on the rise.

• Analyzes how different drone manufacturers are trying to differentiate their offerings with better hardware and software components.

• Explains how drone manufacturers are quickly enabling autonomous flight in their products that will be a major boon for drone adoption.


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SENSORS/APPLICATIONS:

Raytheon to Develop Networking Technology for Manned-Unmanned Aircraft Communications

Raytheon Company has announced that it is developing new technologies to allow the next generation of manned and unmanned flying vehicles to communicate seamlessly, even in hostile environments.

Under two contracts totalling $9 million, Raytheon BBN Technologies will deliver new networking solutions as part of the Defense Advanced Research Projects Agency’s Dynamic Network Adaptation for Mission Optimization program, or DyNAMO.

The goal of DARPA’s DyNAMO program is to allow pilots of different types of aircraft, with different sensor suites, to easily share information for a comprehensive view of the battlespace.

“Our team will develop two new capabilities,” said Jason Redi, vice president for Raytheon BBN Technologies’ Networking and Communications unit. “First, we will adapt radio parameters in reaction to changing information needs and conditions, so current and future airborne networks can communicate with each other. Second, we will create an efficient way to share information across and between networks that are currently incompatible so that applications operating on them can share relevant data.”
Unmanned Aerial Vehicles for High-Throughput Phenotyping and Agronomic Research

Abstract

Advances in automation and data science have led agriculturists to seek real-time, high-quality, high-volume crop data to accelerate crop improvement through breeding and to optimize agronomic practices. Breeders have recently gained massive data-collection capability in genome sequencing of plants. Faster phenotypic trait data collection and analysis relative to genetic data leads to faster and better selections in crop improvement. Furthermore, faster and higher-resolution crop data collection leads to greater capability for scientists and growers to improve precision-agriculture practices on increasingly larger farms; e.g., site-specific application of water and nutrients. Unmanned aerial vehicles (UAVs) have recently gained traction as agricultural data collection systems. Using UAVs for agricultural remote sensing is an innovative technology that differs from traditional remote sensing in more ways than strictly higher-resolution images; it provides many new and unique possibilities, as well as new and unique challenges. Herein we report on processes and lessons learned from year 1—the summer 2015 and winter 2016 growing seasons—of a large multidisciplinary project evaluating UAV images across a range of breeding and agronomic research trials on a large research farm. Included are team and project planning, UAV and sensor selection and integration, and data collection and analysis workflow. The study involved many crops and both breeding plots and agronomic fields. The project’s goal was to develop methods for UAVs to collect high-quality, high-volume crop data with fast turnaround time to field scientists. The project included five teams: Administration, Flight Operations, Sensors, Data Management, and Field Research. Four case studies involving multiple crops in breeding and agronomic applications add practical descriptive detail. Lessons learned include critical information on sensors, air vehicles, and configuration parameters for both. As the first and most comprehensive project of its kind to date, these lessons are particularly salient to researchers embarking on agricultural research with UAVs.

http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0159781

Into the cold zone: UAV platform flies high in Antarctica

In February, mechatronics lead Kevin Bass of Intuitive Machines and contracted pilot Mike Laible successfully flew multiple runs with an unmanned aerial vehicle platform, Tiburon Jr., on the coast of Antarctica.
From Wilkins Aerodrome in the southeast, the team launched Tiburon Jr. and collected valuable testing and environmental data. Battling harsh weather and constantly changing conditions, the team flew the UAV several times, allowing tests of all aspects of its platform.

“These flights provided us with valuable insights into cold-weather flight characteristics,” Bass said. “We successfully demonstrated that our on-board flight system is hardened the proper amount for the harsh environment.”

The on-board software also proved to be robust as it dealt with sensors whose response to the extreme conditions was not previously known.

With an 80-knot cruise speed and a 15-minute assembly, deploying a Tiburon Jr. UAV saved time and is significantly safer than manned flights in hazardous environments such as Antarctica, Bass explained.

The carbon-fiber Tiburon Jr. has a swappable nose cone, enabling a modular ISR sensor pod including visible, infrared and multispectral options. A remote ground station can accompany the ground transportation trailer for a portable stand-alone solution. Aircraft operations can be fully autonomous or man-in-the-loop.

The flight was conducted in cooperation with the University of Texas Institute for Geophysics and ICECAP (Investigating the Cryospheric Evolution of the Central Antarctic Plate).

For its climate change studies, ICECAP currently uses an upgraded World War II era DC-3 with a suite of geophysical instruments to map the thickness of the ice sheet and measure the texture, composition, density and topography of rocks below the ice.

Beginning in summer 2017–18, Tiburon Junior’s big brother, Tiburon, will join the survey team.

http://gpsworld.com/into-the-cold-zone-uav-platform-flies-high-in-antarctica/

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Unmanned Aircraft to Gain Access to Precise, Real-Time Weather Data for Safer Flight

Andover, Mass., and Santa Monica, Calif – August 3, 2016 - One of the largest private weather enterprises in the world, The Weather Company, an IBM Business (NYSE: IBM), announced today that they will be working with AirMap, a leading provider of low-altitude airspace management services for unmanned aircraft, to allow AirMap to deliver real-time hyper-local weather data directly to drone operators. As drone technology moves toward increasingly sophisticated, autonomous operations, precise and accurate weather data will be critical for safe and efficient operations. Drone operators will be able to access the weather data from The Weather Company via AirMap’s app for iOS and Apple Watch as well as AirMap’s APIs for developers.

On August 29, 2016, drones will be cleared for takeoff in the United States. The Federal Aviation Administration recently published a new section of the Federal Aviation Regulations, Part 107, that defines new rules for commercial drone flights. As part of the new regulations, remote pilots of
unmanned aircrafts are required to be familiar with available weather information prior to flight departure.

“Part 107 is a major milestone in drone regulation for visual line-of-sight operations,” said Ben Marcus, CEO of AirMap and an airline transport rated pilot and flight instructor. “The availability of real-time hyper-local weather data from The Weather Company will help today’s drone pilots avoid hazardous and severe weather, and will be absolutely critical for safe, efficient flight planning and operations of more autonomous, beyond visual-line-of-sight drones.”

The Weather Company’s forecasting platform produces precise weather forecasts every fifteen minutes for 2.2 billion locations worldwide. Drone operators will gain access to real-time data such as current and forecasted conditions, including temperature, precipitation, pressure, cloud cover, and more. This high-performance, cloud-based platform provides an average of 20 million forecasts daily.

“The Weather Company is a leader in the global aviation industry, and we are thrilled to work with AirMap to help lead the way in the emerging drone aviation market, which is a natural extension of the value we already provide every day to major airlines and aviation business worldwide,” said Mark Gildersleeve, president of business solutions at The Weather Company. “As a result of this AirMap deal, we can help drone operators not only be in compliance with Part 107 regulations, but also be able to leverage precise and accurate hyperlocal weather data to help guide decision-making and help work towards the safety, efficiency, and performance of their unmanned aircraft.”


COUNTER UAS:

Airbus & Dedrone Join Forces against illegal Drones

Airbus DS Electronics and Border Security (EBS) and Dedrone, San Francisco, have concluded a cooperation agreement to combine their skills to protect lower airspace from small drones. The partners intend jointly to offer drones defense systems that can reliably detect and defend against the unauthorized entry of drones in critical airspaces.

“All over the world, incidents with universally available small drones have revealed a security gap with regards to major events or critical installations such as airports,” said Thomas Müller, Managing Director of Airbus DS Electronics and Border Security (EBS). “By pooling the capabilities of Airbus, with our long-range radar and jamming functions, and those of Dedrone, with their market-leading multi-sensor platform, we have a wide deployment range covering both urban and rural areas.”

Dedrone’s CEO Jörg Lamprecht adds: “Small drones have until now conquered lower airspace as criminals discovered this technology for smuggling, espionage and terrorist attacks. We offer an
effective solution for this new threat that secures lower airspace once again. Airbus’ and our systems complement each other perfectly, and combine early detection of drones in near and far fields with the ability to initiate effective countermeasures automatically.”

“Early detection with the ability to initiate effective countermeasures”

The drone defense system from Airbus and Dedrone uses different sensors – cameras, radars, microphones, and directional scanners – that combined can secure the airspace up to 6 miles away. The information is merged with advanced data fusion and signal analysis technologies. The result is compared to a comprehensive database of drone patterns and signatures, along with real time analysis of the control signal. When connected to a jammer, communication between the drone and the pilot can be interrupted and navigation disturbed to repel or disable the drone. Additionally, the location of the pilot can be determined for further investigation.

“Connected to a jammer, the connection between the drone and the pilot can be interrupted”

Thanks to the Smart Responsive Jamming Technology developed by Airbus DS EBS, the jamming signals only block the frequencies used to operate the drone while other frequencies in the vicinity remain operational. The Counter-UAV System has been tested extensively at Airbus Defence and Space’s own facility and during customer presentations in Germany and France. Depending on the configuration required, an operational system will be available as from the end of 2016.

Dedrone developed DroneTracker, a unique drone warning system consisting of optimized hardware and intelligent software. DroneTracker is already available and is being used successfully in prison and stadium installations, to name a few. Mounted on facades, DroneTracker recognizes flying drones with various visual and acoustic sensors and frequency scanners. Detected signals such as noise, movement patterns, silhouette, and frequencies are processed and evaluated by Dedrone software. DroneTracker identifies drones reliably in a radius up to one kilometer and alerts security forces. Dedrone’s detection solution combined with the jamming technology from Airbus can automatically activate defense mechanisms.


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IOC Tomorrow? F-35A Kills First Drone: ‘Boola Boola’

WASHINGTON: The F-35 is now a real, honest-to-god weapon. It located, fixed and killed a real moving target on July 28.

“It’s been said you don’t really have a fighter until you can actually hit a target, and we crossed that threshold with the first air-to-air weapon delivery of an AIM-9X. This successful test demonstrates the
combat capability the F-35 will bring to the US military and our allies,” Air Force test pilot Maj. Raven LeClair says in a statement issued this afternoon.

The statement says that “test data and observers confirmed the F-35 identified and targeted the drone with its mission systems sensors, passed the target ‘track’ information to the missile, enabled the pilot to verify targeting information using the high off-boresight capability of the helmet-mounted display (HMD) and launched the AIM-9X from the aircraft to engage the target drone.”

The Joint Program Office, which released the statement, is clearly anticipating the Air Force’s declaration of Initial Operational Capability for the F-35A, which may occur as soon as tomorrow — though no official plans have been released yet.


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AI technology leveraged for C-UAV system

The UAVX system employs electro-optical/infrared cameras and radar to detect and track targets.

Black Sage Technologies is employing artificial intelligence (AI) as part of a counter-unmanned aerial vehicle (C-UAV) system.

The company's UAVX is designed to detect, identify and track UAVs through the use of a number of different technologies, including a Doppler radar, and daylight and infrared cameras. The AI aspect comes through an Artificial Neural Network, which is deployed for automatic target classification.

Dave Romero - founder of Black Sage Technologies - told IHS Jane's that the company has secured a number of military customers, but declined to provide further details. However, he said the company hosts demos of the system for potential buyers every month, "and the grand majority of these customers are either military or they are private companies who are already working with military or government agencies that care about this problem.

"When we look at this, we consider where can we be most effective, and that comes down to who's experiencing the most pain. Right now it's military, and in certain parts of the world, [UAVs] are already being used as weapons. It's not just espionage, it's not just the risk of recreational pilots flying in the wrong places, and it's not just fear. It's that they are being used as flying IEDs [improvised explosive devices]."

The individual components of UAVX are already being used in theatre by various militaries, Romero said, with the radars and camera systems in service with the US forces in Iraq and Afghanistan.

The use of AI is intended to defeat a "boy who cried wolf problem with false alarms", Romero said. This stems from the use of what Romero termed "deterministic systems" that work on a binary level. For example, a simple motion detector is binary, and does not account for the nature of the motion - whether it is a bird, a UAV, or tumbleweed.
INTERNATIONAL:

Drone Market Environment Map 2016

Last year Drone Industry Insights published the initial Drone Market Environment Map and it was so successful that they updated and enlarged it to visualize the current evolutionary stage. This map provides a comprehensive picture of the global drone ecosystem, making the drone market more transparent and accessible for prospective customer, investors and newbies.

Diversity dominates

The maps philosophy is to present the strong diversity of the market instead of only focusing on a specific UAV sector/category. Hence, the user benefits from a horizontal view and insight into the UAV market as a whole. For example, there are tens of thousands of registered operators around the world, but for clarity’s sake we only picked those with special concepts or those already operating on a certain industrial scale.

On the drone market map you’ll find 711 entries from 49 Countries led by UAV companies from North America (54%) and followed by Europe (30%), Asia (9%), Oceania (3%), MEA (3%) and South America (1%).

It is clustered in the following UAV market categories: Platforms (29%), Components and Systems (16%), Services (20%), Universities and Research Programs (10%), Software (7%), News/Media/Blogs (6%), Coalition/Organizations/Initiatives (5%), Conferences and Events (3%), Operator Marketplaces (2%), Drone Insurances (2%), User Groups/Networks (1%)

Many companies on the market map are at a mature growth stage – others are in an early startup or concept stage, containing revolutionary approaches or technologies. The majority, however, are SMEs with an average age of 6,5 years and an average of 8,3 employees.

What has changed within the last year on the UAV market?

Compared to the first map you will recognize a stronger differentiation. There are more sub categories revealing that many UAV companies identified and started occupying market niches. Many business models changed or got much more specific over the last year creating powerful concepts and future-proof verticals.

3DR for example completely gave up the recreational sector and is focusing on commercial solutions only. Insitu expanded their portfolio and started manufacturing platforms not just for military, but also for civil and commercial applications.
DJI, the market leader in the recreational sector, now expands into the commercial market with platforms for professional media production and agricultural crop dusting solutions.

This sort of differentiation can also be observed in software, services, components and systems.

What to expect of the UAV market?

We expect the market to further grow and with it, the variety of end-to-end business models. There are plenty of niches waiting to be discovered and occupied. Hardware will become more capable allowing new applications. Advanced drone operation regulations will allow new use cases with a high grade of automation. The drone ecosystem is strongly technology driven and market growth will additionally be catalyzed by developments outside the drone market environment (e.g. mobile phone industry, etc.).

For your convenience and to learn more about the companies shown on the map, we offer a Database with name, cluster, sub cluster, country, address, city, state, ZIP, ULR, e-mail and phone number for of each of the 711 items.


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**COMMENTARY:**

**Unmanned Systems and Manned Conflict in East Asia**

Potential (mis)use of military robotic technology in East Asia’s maritime conflicts is enormous.

(The Diplomat 02 Aug 16) ... Tobias Burgers and Scott N. Romaniuk

The South China Sea (SCS) and East China Sea (ECS) maritime conflicts, which have occasionally been likened to “Mexican standoffs,” have seen steady escalation over recent years.

Contested oil rigs, newly build islands on coral reefs, sunken boats declared islands, military encounters between air and naval forces, contested freedom of navigation, and aggressive fishermen acting like national militias have become an integral part of the SCS. Further north, unilaterally declared air identification zones, incursions into air and sea spaces around the Senkaku/Diaoyu/Diaoyutai Islands, locked radar systems, and hostile diplomatic language have become part of the ECS conflict.

Both conflicts have seen a rapid rise in political and security tensions – foremost after the recent arbitral tribunal verdict and through the deployment of military, rather than non-military (fishermen) or para-military (coast guards) assets. Nevertheless these tensions are politically manageable, and will likely not escalate into full military conflict, at least for the time being. Despite recent military deployments and
aggressive naval action, the focus among all actors, regional (Vietnam, China, Taiwan, Japan, the Philippines, and Indonesia) and international (the United States and Australia, among others) is to maintain a (fragile) peace.

The rise and increasing use of robotic technology could drastically alter that peace, giving rise to an escalation of tension and hostility in which sustained, albeit likely limited, conflict could become a possibility. This relates to two factors: first, the likelihood that so-called unmanned systems will be deployed in such conflict; second and subsequent, the still-obscure role of unmanned systems in these conflicts.

The role and importance of unmanned systems will only further increase in the near future. Given the operational and economic advantages of unmanned systems, it is likely that their current and still-limited deployment will increase quickly over the next few years, as they have unique capabilities and qualities that would make them ideal for use in both the SCS and ECS. They can remain at sea or in the air for extended periods, patrolling thousands of miles of land and sea – ideal for the extended geographical distances of the SCS and ECS. The development, procurement, and operational costs of unmanned systems are significantly less, making them available for regional actors with limited military budgets. From a quantitative perspective, we can expect that the use of unmanned systems in both conflicts will become more widespread. On a qualitative level, they have the endurance suited for large-scale and extended intelligence, surveillance, and reconnaissance (ISR) roles. Indeed, medium and high altitude unmanned systems, such as the Global Hawk and China’s Xianglong Unmanned Aerial Vehicle (UAV) are able to conduct surveillance of thousands of square miles within a single day. They could provide states with better means and opportunities to enhance their ISR capabilities, thereby enabling better situational awareness by providing enhanced audio and visual ammunition in addition to evidence for media wars over both conflicts.

These advantages, unique abilities, and relatively limited costs make it likely that we will see more unmanned systems on, below, and above the waters of both seas. Indeed, an analysis of regional unmanned system capabilities show that nearly all actors have, to different extents, such capabilities.

China has over the course of the last decade developed a wide array of unmanned systems and has slowly become one of the world’s leaders in unmanned systems development. It is developing and producing sophisticated Unmanned Combat Aerial Vehicles (UCAVs) such as the Dark Sword. In addition, it has already operationally deployed other UAVs such as the CH-4, an UAV that bears a stark resemblance to the MQ-9 Predator. It is also developing and is partly capable of deploying Unmanned Underwater Vehicles (UUVs).

Japan possesses the U.S. developed Global Hawk, a long endurance, high altitude UAV, and a number of smaller UAVs. It too is aiming to develop UUVs for maritime security purposes.

Vietnam recently revealed an advanced high-altitude long endurance unmanned system with a range of 2,500 miles that can remain in flight for up to 35 hours. Vietnam’s HS-6L is the product of nearly 10 years of development and will likely be used to maintain constant surveillance on Chinese military
deployment and activity in contested SCS waters. Orbiter 2 and Orbiter 3 drones from Israel have likewise also become part of Vietnam’s arsenal.

The Philippines has also turned to unmanned systems in the SCS rivalry. According to Defense World, the Philippine Defense Department’s Modernization Program includes several projects that will result in the supply of surveillance systems, including drones. Interest in acquiring American Predator drones is also largely evident.

Taiwan, too, has developed a wide array of unmanned systems in recent years, among others the Chung Shyang II UAV and a newly developed MALE UAV, which resembles the U.S. MQ-9 Predator.

The United States – the world’s leader in unmanned robotic development – has already deployed its unmanned systems (the Global Hawk) in East Asian airspace. Last April, U.S. Defense Secretary Ashton Carter, while aboard the aircraft carrier USS Stennis sailing in the South China Sea – an unmistakable signal for China – stated that the United States had operational UUV capabilities and would deploy them as Washington saw fit. His visit signaled the determination of the United States to stand firmly alongside its ally, the Philippines, in the wake of a stout China posture in the area against its much smaller but equally-determined neighbors.

The deployment of unmanned systems would, however, not need to directly lead to contested waters, airspace, and increasing tension. Thousands of vessels and planes fly and sail through both seas monthly, without leading to violent military conflict. Rather, it is the possible purpose for which these systems could be used that could give rise to increasing tensions and possible violent conflict.

Unmanned system are relatively easy to spot, making their military value, beyond ISR roles, relatively limited. However, this obvious visibility makes them ideally suited for political purposes: They are perfect tools for highly visible intrusions into opposing actors’ airspaces or sea zones. Such actions would fit within the strategy or tactics of the infamous salami slicing tactics, or as what James Holmes refers to as small stick diplomacy: Small, minor actions, which are not imminent (major) security threats, but which over time would contest actors’ control, dominance and sovereignty.

The utility of unmanned systems, vis-à-vis manned systems, is that the absence of human operators creates advantages for the intruding actor. As no direct human interaction is possible – like communication between pilots within visual range, or crew of naval vessels – the opposing forces are limited to only two possibilities: communication or the use of violence. However, if an actor seeks to communicate, warn, and to deter the intruding systems, it would need to relay this effort by means of an extensive and time consuming process: It would need to go up and through various military and diplomatic channels, after which the entire communicational effort would need go back down to the operators of the intruding unmanned system. This is a lengthy, cumbersome process and one during which an unmanned system could remain in the contested air or sea space. If, however, an actor would decide to not pursue this lengthy process it can only decide to damage or destroy the intruding systems. This would be a significant escalation, as it would be the destruction of military material – a novelty in a region of increasing tension – and could be met with a strong political and possible military response.
Within the framework of the public relations and media wars, it would make the defender look like the aggressor.

James Holmes summarized the situation of what to do with intruding unmanned systems well when he described such operations: “In effect they dare you to escalate.” As such, the use of unmanned systems could favor those seeking the offensive, intrusive use of such systems for political purposes. Particularly actors with significant military powers and the upper hand could play this game of dare-to-escalate. They could engage in a game of maritime bluff, where they seek to outmaneuver opposing actors with lesser military capabilities, challenging them to contest their actions and power.

Approaching the SCS and ECS like a game of poker is risky strategy, foremost if what is at stake are not merely chips, but geopolitical powers and human lives. It is therefore essential that all nations involved in both conflicts develop frameworks and understandings on how to deal with the rise of unmanned systems and their possible offensive and assertive use. The South and East China Seas have recently seen their waters become increasingly stormy though they remain sailable. It would be a mistake if the rise and use of unmanned systems turned them into inaccessible waters.

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