UAS and SmallSat Weekly News

Contents

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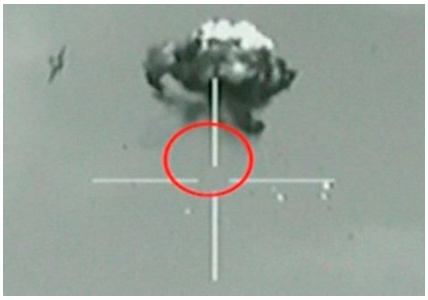
25Nov17

Pentagon prepares for the coming drone war

Christian Davenport | Washington Post
November 25, 2017



A still image taken from Israeli Defence Forces (IDF) video footage shows what they say is a small unidentified aircraft shot down in a mid-air interception after it crossed into southern Israel in 2012.

Instead of delivering packages, drones have been configured to drop explosives. Instead of inspecting telecommunications towers, others train their cameras to monitor troops and pick targets. Instead of spraying crops, they could spread toxic gas. Military strategists envision the day when they will be deployed in robot armies capable of swarming defenses in kamikaze raids. Last year, the militant group Hezbollah dropped two small bombs over rebel positions in Syria from a commercially available drone. Weeks later, two Kurdish fighters battling the Islamic State were killed when a small drone they had shot down exploded.

Some soldiers already carry specially outfitted "anti-drone" rifles that, instead of firing bullets, use pulses across radio frequencies that interfere with the vehicles' controls. France and other countries have trained eagles and other birds of prey to attack enemy drones.

At the annual Association of the U.S. Army conference in Washington recently, anti-drone technology was on display on the floor of the convention center. Nammo, a Norwegian company, showcased a drone that had been blown apart by an "air burst" round – programmed to explode as it reaches its target.

Raytheon is mounting a high-energy laser weapon on top of a militarized dune buggy that it says can be used to take out drones. The company also has developed what it calls Phaser, a high-powered microwave blast that scrambles a drone's avionics.

Lockheed Martin has a laser it calls Athena that is capable of frying the tail off a fixed-wing drone. And at an Army exhibit, officials showed a small quadcopter with what looked like a small bullet hole in it – that was caused by a laser, not a gun.

CACI, the Arlington, Virginia-based defense contractor, is developing a technology it calls SkyTracker that can find and track drones using radio frequencies. If a drone enters a restricted

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airspace, whether over a military base or a commercial airport, the system could force the drone to land. Or it could commandeer the vehicle and send it back to its operator, a technique that could help law enforcement authorities or soldiers locate the bad guys.
http://www.mercurynews.com/2017/11/24/pentagon-prepares-for-the-coming-drone-war/

27Nov17

Almost 1 million drones are registered with FAA; this ZIP code has the most

November 21, 2017 *The Associated Press*

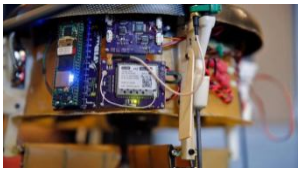
LAS VEGAS (AP) — Researchers say the ZIP code containing the highest number of registered hobbyist drone users in the country is in Las Vegas. The Las Vegas Review-Journal reports drone researchers at Bard College in New York analyzed data from the Federal Aviation Administration, finding the 89117 ZIP code had 672 hobbyist drone registrations.

The residential area west of the Las Vegas Strip had about 200 more hobbyist users than the next highest Zip code, which was in a Houston suburb. Researchers say there are 836,796 hobbyist drone users and 106,739 non-hobbyist users registered across the country as of last month.

Michael Sherwood, who is the city's director of information technologies, says the findings speak well for Las Vegas as a community that embraces new technology.
https://www.seattletimes.com/nation-world/analysis-las-vegas-zip-code-holds-the-most-drone-hobbyists/

York drone facility included in regional Go Virginia proposal Josh Reyes

York/Poquoson reporter



A ducted-fan unmanned aerial vehicle is displayed at Avid Aerospace Thursday September 28, 2017. Avid Aerospace in York County helped the York EDA come up with the idea getting a grant from the state to for a drone testing facility for businesses and recreation as well. (Jonathon Gruenke / Daily Press)

A regional board has approved a proposed unmanned systems facility in York County as one of five Hampton Roads projects to compete for state funding in the new Go Virginia program.

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On Nov. 14, the Region 5 Go Virginia board — which includes a couple dozen officials and business leaders from throughout Hampton Roads — met at Old Dominion University and signed off on five projects to share a pot of about $2.2 million state money for the region.

The money isn't in hand quite yet, though. The state Go Virginia board has final say on how each region's money is allocated.

The unmanned systems facility proposal requested $1.3 million total — the regional board decided to allocate $150,000 to cover the proposal's first step, which participating localities would have to match.

Jim Spore, president of Go Virginia Region 5, said the $300,000 total from the state and localities would cover preliminary work and studies for the project before potentially coming back to purchase the land. He called it a "risk reduction strategy."
http://www.dailypress.com/news/york-county/dp-nws-evg-york-county-unmanned-systems-20171113-story.html

MIT Develops Mach 0.8 Rocket Mini-Drone

Nov 22, 2017 Graham Warwick | Aviation Week & Space Technology

MIT's design/build challenges push the UAV envelope for Pentagon customers

The new challenge from the U.S. Air Force was to develop a UAV no more than 2.5 in. wide and 17 in. long that could be air-launched from a fighter to fly at Mach 0.8 for 2-5 min.

"There was no vehicle with this speed at this size that could deploy off an aircraft" he says. There was also no suitable propulsion system. "It is too small for a turbine and too fast for electric, while a pulse-jet presents thermal problems."

The student team decided to go with a solid rocket, "but in a design space where no one had gone before," Hansman says. Only 5-10 Newtons (1-2 lb.) of thrust was required, but the rocket motor had to run for as long as possible to maximize endurance.

If a solid rocket burns too slowly, there is not enough pressure to maintain combustion, so the ammonium perchlorate propellant is mixed with an oxamide inhibitor to control the burn rate. "We use this burn-rate suppressant that cools the flame and changes the flame

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structure so that it burns slower," doctoral candidate Tony Tao—who led design of the Locust/Perdix—told *MIT News*.

Where a model rocket will burn for 1-3 sec., the slow-burn propellant will power the 2-3-lb. Firefly for up to 3 min. "The real advantage is now we can schedule thrust by varying the inhibitor mix to vary burn rate," says Hansman.

The Firefly is shaped like a seed. The bottom half is the rocket motor. The top half houses the payload, avionics and flight control system. A pop-out wing is mounted under the body, and deployable tail surfaces provide flight control. http://aviationweek.com/technology/mit-develops-mach-08-rocket-mini-drone?NL=AW-05&Issue=AW-05_20171127_AW-05_153&sfvc4enews=42&cl=article_3&utm_rid=CPEN1000003332045&utm_campaign=12757&utm_medium=email&elq2=302846d649534e72be62526a79090c97

Old, meet new: Drones, high-tech camera revamp archaeology MICHAEL CASEY, ASSOCIATED PRESS ENFIELD, N.H. — Nov 24, 2017

In this Nov. 14, 2017 photo, Dartmouth's Chad Hill readies a drone to be flown over a site of a Shaker Village in Enfield, NH. The cameras use heat differences between stone and the soil surrounding it to identify structures below the surface like foundations of buildings, which then can be further explored.

Scanning an empty field that once housed a Shaker village in New Hampshire, Jesse Casana had come in search of the foundations of stone buildings, long-forgotten roadways and other remnants of this community dating to the 1790s.

But instead of a trowel and shovel, Casana and his Dartmouth College colleague Chad Hill are using a drone equipped with a thermal imaging camera and mapping instruments. The camera can identify remnants of buildings and other structures up to several feet below the surface, since the temperatures of that brick or stone material is often warmer than the soil around it. And by using the drone, the researchers can survey an area in minutes that might take months with traditional methods.

Casana and Hill have taken the process a step further by adding a thermal imaging camera. In 2014, they used the drone and camera at an ancestral Pueblo settlement in Blue J, New Mexico. The researchers were able to find a dozen ancient house compounds and a circular structure that could be a kiva that was used for public events and ceremonies. They have found

structures around an Islamic fort in Qatar and used the drone and camera in October to identify a circular structure at a prehistoric site connected to Native Americans near Joliet, Illinois.
http://abcnews.go.com/Technology/wireStory/meet-drones-high-tech-camera-revamp-archaeology-51361788

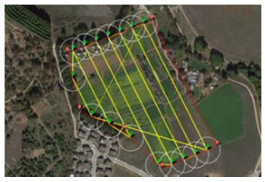
Drones and smartphones help fight malaria in Tanzania Jon Fingas, @jonfingas
Technology is leading to smarter anti-mosquito spraying.

A mix of technology is making the mosquito battle more practical. Wales' Aberystwyth University and Tanzania's Zanzibar Malaria Elimination Programme have partnered on an initiative that uses drones to survey malaria hot zones and identify the water-laden areas where malaria-carrying mosquitoes are likely to breed.

An off-the-shelf drone (in this case, DJI's Phantom 3) can cover a large rice paddy in 20 minutes, and the data can be processed in the space of an afternoon. You can discover and spray trouble zones within hours, preventing outbreaks from getting started. The next step is to bring the drone imagery to smartphones to both guide the spraying teams and track their progress. Instead of having only a general idea of where to go, sprayers can make a beeline for affected areas and report back when they're done.

There are concerns that drones may interfere with local wildlife and spark privacy concerns. The creators hope that familiarizing residents will make them more comfortable with the technology, though, and mindfulness could prevent clashes with the ecosystem. So long as that happens, it might be possible to virtually wipe out malaria in entire neighborhoods without having to spend a fortune or waste valuable hours.
https://www.engadget.com/2017/11/26/drones-and-smartphones-help-fight-malaria-in-tanzania/

Drones are taking to the skies above Africa to map land ownership November 26, 2017 **Robert Wayumba** Lecturer , Technical University of Kenya



In most African countries only about 30% of the land boundaries have been mapped. Once mapping is completed, usually using techniques like Global Positioning Systems (GPS), authorities can issue a title deed or certificate of occupancy. In most parts of Africa, people demarcate their land using hedges, and drones can be used to photograph hedges from the air. The maps developed from those photos are then linked to land ownership records to create formal land registers.

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A project funded by the European Commission, its4land, is testing the use of drones for land mapping and registration. The research is being carried out in three African countries; Kenya, Rwanda and Ethiopia. As far as we're aware, this is among the first internationally to test the use of drones for land registration.

Different types of UAVs can be used for mapping. We're testing a fixed wing drone, DT18; it is produced by Delairtech, a French company. This type of drone is suitable for covering long distances.

Two pilots per country were trained at Delairtech's offices in Toulouse, France. Flight paths are set up using waypoints or digital markers. The drone follows these from start to finish. The DT18 can map a distance of up to 20km at a time. The drone is fitted with a camera, when takes pictures as directed by the pilot – who is following the flight on a laptop screen from the ground. The pictures are sent back to the laptop and stored on the drone's own on board memory card. http://theconversation.com/drones-are-taking-to-the-skies-above-africa-to-map-land-ownership-87369

28Nov17

Police to be given powers to ground drones in UK crackdown Alex Hern 27 November 2017

The new drone bill to be published in 2018 will allow police officers to order drone operators to ground their devices where necessary, alongside a series of new changes that will create a mandatory registry for larger unmanned aerial vehicles, such as those sold by Parrot or DJI.

It could also include a ban on drones flying near airports or above 122 metres (400 feet), the government says, and a requirement for drone owners to use apps, rather than simple remote controls, to fly their aircraft, in order to ensure that the rules are always readily accessible and incorporated into the flight plan.

Aviation Minister Baroness Sugg said: "Drones have great potential and we want to do everything possible to harness the benefits of this technology as it develops, but if we are to realise the full potential of this incredibly exciting technology, we have to take steps to stop illegal use of these devices and address safety and privacy concerns.

"These new laws strike a balance, to allow the vast majority of drone users to continue flying safely and responsibly, while also paving the way for drone technology to revolutionise

businesses and public services." https://www.theguardian.com/technology/2017/nov/27/drone-bill-police-safety-crackdown-uk-civilian-use

Drone pilot arrested after dropping leaflets over NFL games Associated Press November 27

SANTA CLARA, Calif. — A Northern California man accused of flying a drone over two NFL games this weekend and dropping political leaflets has been arrested in a case that raised concerns about security at professional sports events, police said Monday.

Police cited Tracy Michael Mapes, 55, with misdemeanor charges and released him after a drone was spotted over Levi's Stadium as the San Francisco 49ers and the Seattle Seahawks played. The drone released fliers criticizing television news media during the second quarter of the game, but most of the papers blew out of the stadium during the windy, rainy game, Moreno said. It didn't disrupt play.

Surveillance cameras helped detectives track the drone to its operator, who was seen driving away from the Santa Clara stadium and identified by a license plate, Moreno said.

Santa Clara detectives called their counterparts in Oakland in anticipation that Mapes would go there next as the Raiders hosted the Denver Broncos. Oakland officers spotted a drone over Oakland-Alameda County Coliseum, and it dropped the fliers again, Moreno said. That game also was not affected. Mapes was arrested shortly afterward while leaving in his vehicle. https://www.washingtonpost.com/national/drone-pilot-arrested-after-dropping-leaflets-over-nfl-games/2017/11/27/ea299bb6-d3be-11e7-9ad9-ca0619edfa05_story.html?utm_term=.74b0fff88fc5

Drone maker DJI in cyber-security row over bug bounty 20 November 2017

Drone maker DJI has accused a cyber-security researcher of hacking its servers.

Kevin Finisterre claims that he accessed confidential customer data after finding a private key publicly posted on code-sharing site Github.

He approached the firm, which offers a "bug bounty" reward of up to $30,000 (£23,000) for security weaknesses discovered in its systems. The data Mr Finisterre was able to see included "unencrypted flight logs, passports, drivers licences and identification cards", he said.

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Despite initially offering him the money, in a statement DJI has now accused Mr Finisterre of refusing to agree to the terms of its bug bounty programme "which are designed to protect confidential data and allow time for analysis and resolution of a vulnerability before it is publicly disclosed".

It added: "DJI takes data security extremely seriously, and will continue to improve its products thanks to researchers who responsibly discover and disclose issues that may affect the security of DJI user data and DJI's products." It added that it would continue to pay bug bounties in exchange for reports. http://www.bbc.com/news/technology-42052473

SwiftCore FMS to be Integrated on Penguin BE UAV for NOAA Mission 23 Nov 2017 | Caroline Rees

Black Swift Technologies has announced that its SwiftCore Flight Management System will be integrated with a UAV Factory Penguin BE UAV platform, in support of a joint research project with the University of Tennessee Space Institute and the NOAA Atmospheric Turbulence and Diffusion Division of the Air Resources Laboratory.

“The Penguin will enable airborne measurements of hyperspectral and thermal imaging to assess surface fluxes of sensible and latent heat,” stated Dr. Steve Brooks, Associate Professor Department of Mechanical, Aerospace and Biomedical Engineering at the University of Tennessee Space Institute. “Yet we needed an autonomous autopilot for the aircraft capable of navigating the same flight path six times a day, ten days in a row, and you want the aircraft over the same points at the same time. Black Swift Technologies’ autopilot can very precisely control all aspects of our aircraft’s flight. We’re almost getting to the point where you hook everything up, put it on a runway and it pretty much does everything on its own.”
http://www.unmannedsystemstechnology.com/2017/11/black-swift-technologies-flight-management-system-supports-noaa-drone-mission/

Whitepaper: Remote Hydrogen Refueling for UAVs 23 Nov 2017 | Caroline Rees

Protonex has released a technical whitepaper that investigates remote hydrogen fueling solutions for fuel cell powered UAVs. The paper highlights the challenges of access to hydrogen fuel in remote locations where UAVs are deployed and explores how it can be produced on-site from water through electrolysis as a means of fueling UAVs operating in remote locations.

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Hydrogen fuel cells provide greater endurance, range, and operational flexibility for UAVs. However, UAVs powered by proton exchange membrane (PEM) fuel cells require high purity hydrogen as the fuel and currently the hydrogen supply infrastructure is somewhat limited, particularly in remote locations. As such, small on-site production of hydrogen is a practical and flexible means of bridging gaps in hydrogen infrastructure.

The paper goes on to explain how a deployable refueling system would be part of a UAV ground control system and addresses considerations such as power and water supply, and pressurization. Download the full whitepaper (opens in PDF).
http://www.unmannedsystemstechnology.com/2017/11/whitepaper-remote-hydrogen-refuelling-uavs/?utm_source=Unmanned+Systems+Technology+Newsletter&utm_campaign=98ed35bd98-eBrief_2017_Nov_28&utm_medium=email&utm_term=0_6fc3c01e8d-98ed35bd98-111778317

Mercedes Plans More Drone Deliveries After 100 Perfect Flights Elisabeth Behrmann, November 28, 2017

Mercedes-Benz, conducting the biggest test using drones to ship everyday items like ground coffee and cellphones, said the mini aircraft completed 100 drop-offs to strategically placed vans in Zurich with a perfect safety record and more deliveries are planned for next year.

About 50 individual customers placed orders with Swiss online shopping platform Siroop, choosing “airmail deals” from selected items from retailer Black & Blaze Coffee Roasting Co. for same-day delivery. The drones then flew to four fixed points in the city, covering a distance as far as 17 kilometers (11 miles) to land on the roofs of specially adapted Mercedes-Benz Vito vans. The parcel is carried by road for the final stretch, before the drones return.

“Our expectations were all met -- our main goals were about the technical feasibility and execution,” Corinna Elosge, who coordinates the last mile logistics vans and drones project for Mercedes’ parent Daimler AG, said in an interview. “We’re really, really satisfied because we had a perfect safety score.”

The miniature helicopters, developed with U.S. company Matternet, delivered parcels for a total of 11 days as part of a three-week test. Daimler last year said it was looking at drones as part of a 500-million-euro ($597 million) effort to speed delivery times for online orders.

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For Mercedes, the pilotless craft are components of a van prototype featuring a suite of on-board systems like digital sorting equipment that could cut in half costs for the final portion of a parcel's journey. While the drones didn't directly deliver to a customer's doorstep, they skipped much of the inner-city traffic, and saved one journey from the retailer to the logistics center.

"Regulation is a decisive factor for us," she said. "We are working cooperatively with authorities and are ready to engage with them about our experiences because we feel governments do depend on insight from industry as they want to learn more."
https://www.bloomberg.com/news/articles/2017-11-28/mercedes-plans-more-drone-deliveries-after-100-perfect-flights

Kiwi business launches high-tech drone out to change the face of global security

Jenny Suo, 1 NEWS Reporter, New Zealand

VigilAir today launched its high tech surveillance drones designed to change the face of security globally. Targeted at large facilities like schools, prisons, hospitals and shopping centres, the drone lives in a charging pod, or a "nest" onsite and is linked to the security system. When an alarm goes off, the drone will know the best flight path and can begin streaming live video as it heads to the disturbance. Once it has visited the site, it flies back to its nest to recharge.

The drone works at night and in moderate wind and rain. It saves sending a human into a dangerous situation, and the recorded video can be used for prosecutions. It can also save customers up to 50 per cent in security costs.

The drones will be further developed to follow fleeing suspects and even capture their getaway cars. There's potential for nests of drones to one day be in neighbourhoods, subject to privacy laws, attending your home alarm. https://www.tvnz.co.nz/one-news/new-zealand/kiwi-business-launches-high-tech-drone-change-face-global-security-v1

29Nov17

THE AMERICAN DRONES SAVING LIVES IN RWANDA

Zipline technicians prepare the Zipline drone for launch at the company's headquarters in Muhanga, Rwanda. on July 20, 2017 ESTHER MBABAZI FOR TIME

U.S. startup Zipline has teamed up with the Rwandan government to deliver blood supplies by drone ARYN BAKER / KIGALI, RWANDA

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For all the talk of unmanned vehicles changing our lives in the West, they are already doing so in the east African nation of Rwanda. Zipline, a U.S. startup, has partnered with the Rwandan government to launch the world's first commercial drone delivery service, ferrying vital medical supplies to its far-flung hospitals by air. Since December 2016, the company has dispatched more than 4000 units of blood products to 12 hospitals—red blood cells, platelets, and plasma that would have otherwise needed to travel by a treacherously tangled road network, losing precious hours in the race to save lives.

"Before, it took at least three hours to get blood in an emergency," says Dr. Roger Nyonzima, head surgeon at Nyanza Hospital's maternity ward, which is about 100 km. from Kigali. "Three hours can make the difference between saving or losing a life. Now we get blood in 15 minutes. Fifteen minutes, we can work with."

The success of Zipline in Rwanda has inspired the company to look further overseas, and even to the U.S., for expansion. In August, Zipline announced that it would expand into Tanzania, a country 35 times the size of Rwanda. A Latin America launch is in the works as well, says co-founder Keller Rinaudo. "The reality is, moms die in every country in the world for [lack of blood]. Rwanda was just the first country to do something about it." http://time.com/rwanda-drones-zipline/

How we're using drones to deliver blood and save lives Keller Rinaudo at TEDGlobal 2017

Keller Rinaudo wants everyone on earth to have access to basic health care, no matter how hard it is to reach them. With his start-up Zipline, he has created the world's first drone delivery system to operate at national scale, transporting blood and plasma to remote clinics in East Africa with a fleet of electric autonomous aircraft. Find out how Rinaudo and his team are working to transform health care logistics throughout the world -- and inspiring the next generation of engineers along the way.

This talk was presented at an official TED conference. See it at https://www.ted.com/talks/keller_rinaudo_how_we_re_using_drones_to_deliver_blood_and_save_lives?utm_source=newsletter_daily&utm_campaign=daily&utm_medium=email&utm_content=button__2017-11-28

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State police drones cutting time on crash investigations *The Associated Press*

NOVEMBER 28, 2017 AUGUSTA, MAINE

The value of Maine State Police drones came into sharp focus in the aftermath of a silo explosion that injured three people last month.

State police operators used one of the newly acquired unmanned aerial vehicles to check for victims after an explosion and sulfur leak made it unsafe for emergency personnel to go inside the 86-foot structure, State Police Sgt. Darren Foster told reporters Tuesday. "This is something we never would've anticipated when we started the program. But because of the technology, it was a no brainer for us," he said.

State police purchased three drones for $6,000 apiece this fall, two years after lawmakers crafted rules and regulations governing their use. Drones are used regularly to analyze and document crash scenes, reducing the amount of time roads are closed and the amount of work for investigators. In a matter of minutes, drones can take 100 to 200 photos from which precise measurements can be gleaned by crash investigators who previously spent an hour or more taking several hundred measurements with surveying equipment, said State Police Maj. Chris Grotton.

Traffic doesn't have to be stopped for the drones to take photos, meaning traffic delays are minimized, Grotton said. Besides benefiting motorists, state police are finding that 15 to 20 hours of work is being saved for each crash scene analysis, he said.
http://www.miamiherald.com/news/business/technology/article186809413.html

FAA Warns of Drone Collision Risks With Airplanes Alan Levin November 28, 2017

The millions of small civilian drones plying the nation's skies can cause significant damage to airliners and business jets in a midair collision, new research commissioned by the U.S. Federal Aviation Administration concluded.

Even though airliners and other aircraft are designed to take impacts from birds, "it doesn't mean they are going to be able to withstand a 4-pound or an 8-pound UAS impact," said Gerardo Olivares, a researcher at Wichita State University who helped lead the study.

The results of the government-sanctioned study, the most comprehensive of its kind to date, add urgency to FAA's efforts to improve safety as the industry pushes to expand drone

operations in everything from delivering consumer goods to performing aerial inspections. It also comes on the heels of the first two midair collisions between small drones and traditional aircraft in North America.

Last month the FAA said reports of drone-safety incidents, including flying improperly or getting too close to other aircraft, now average about 250 a month, up more than 50 percent from a year earlier. The reports include near-collisions described by pilots on airliners, law-enforcement helicopters or aerial tankers fighting wildfires.

The agency estimates that 2.3 million of the devices will be sold for recreational use in the U.S. this year. As of Nov. 3, more than 838,000 people had registered with FAA as owners of small, civilian drones. https://www.bloomberg.com/news/articles/2017-11-28/faa-warns-of-drone-collision-risks-with-airplanes-as-use-grows

Boulder considers drone use, promises not to spy ALEX

BURNESS | burnessa@dailycamera.com | Boulder Daily Camera November 28, 2017

Boulder may in the near future make use of drones to advance various municipal interests, ranging from search-and-rescue efforts to 3-D modeling to inform infrastructure design.

Tim Haynie, owner of Spectrabotics, launches a drone to fly over and photograph ash trees damaged by the emerald ash borer in Boulder in July.

But officials are first collecting public input before moving ahead with the program.

A survey is posted on the city's website now, soliciting feedback on 22 different potential ways for Boulder to use unmanned aircraft systems.

There is some precedent for local governments using drones. In Austin, Texas, fire crews use them to sniff out hot spots. In Dallas, they're used to inspect water utilities. In Mesa County in Colorado, they're tools for public safety.

But rollouts of these programs haven't always been smooth, said Julia Richman, the city's first "chief innovation and analytics officer," who cited examples in Seattle and Los Angeles, where municipal drone programs have struggled due to varying levels of mistrust from the public. Specifically, many citizens worry about governments potentially using drones to spy on citizens.

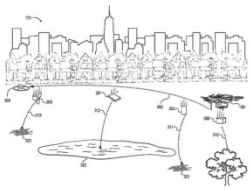
Read the full story at DailyCamera.com. http://www.denverpost.com/2017/11/28/boulder-considers-drone-use/

Amazon delivery drone could self-disintegrate for safety if it falls from sky *Trevor Mogg — November 28, 2017*

Whether it's inclement weather, a software malfunction, or some ne'er-do-well with a catapult and a rock, we have to accept that those multi-copter contraptions will sometimes get into difficulties and fall all the way back to the ground.

The online shopping giant is exploring an innovative system that would cause an airborne drone that's in difficulties to disintegrate in mid-air, minimizing the force of the potential impact on any human, animal, or object on the ground.

The idea is outlined in a patent granted this week by the U.S. Patent and Trademark Office. "The fragmentation sequence includes a release timing and a release location to fragment away (e.g., release, drop, jettison, eject, etc. away) one or more UAV components in case the flight operation of the UAV is disrupted," the company says in the patent.



Conditions that could cause problems for a delivery drone are listed as "unexpected heat, cold, wind, rain, hail, high or low (e.g., barometric) pressure regions, or other meteorological conditions." These could affect the drone's rotor system, flight control computer, battery, flight sensors, or other components, resulting in a major malfunction that makes it behave more like a brick than an aircraft.

Amazon says the fragmentation sequence would happen automatically, and that depending on which parts of the drone are jettisoned, "the weight, speed, air drag coefficient, and other factors related to the UAV can be altered." This suggests that the drone wouldn't always *completely* disintegrate. Rather, it would in some situations only eject the parts causing the problem if it allowed the damaged drone to make a safer landing.
https://www.digitaltrends.com/cool-tech/amazon-delivery-drone-self-disintegrate-safety/

Drones Used to Fight Malaria in Zanzibar MARCO MARGARITOFF NOVEMBER 28, 2017

One of the most effective ways to stop the cycle of infection is to locate the small bodies of water that mosquitoes use to reproduce,

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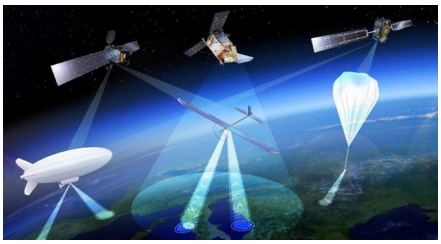
which drones can spot clearly from a bird's eye view—inexpensively, and most importantly, quickly.

Andy Hardy of Aberystwyth University in Wales has decided to work with ZAMEP to comb the African country's malaria-infested areas with UAVs, and then deploy boots on the ground to spray larvicide.

Reportedly, one drone can survey 30 hectares in 20 minutes. That's a lot of ground covered in less time than your morning commute, with high-definition imagery collected and data ready to be analyzed. The drones in question are DJI's Phantom 3, with plans to allow the drones to send its imagery to smartphones on the ground. That way, teams on the ground wouldn't have to wait for UAVs to complete their surveying before heading into the field to deploy larvicide, they'd work in tandem, making the process even more efficient. http://www.thedrive.com/aerial/16456/drones-used-to-fight-malaria-in-zanzibar

30Nov17

ESA seeks "missing link" between drones and satellites David Szondy



High Altitude Pseudo-Satellites are platforms that float or fly at high altitude like conventional aircraft but operate more like satellites

The space agency is interested in High Altitude Pseudo-Satellites (HAPS) because it combines many of attributes of drones and satellites. Like a satellite, a HAPS vehicle can cover a large area because it operates at altitudes of about 20 km (12 mi), which places it above clouds, jet streams and winds in general, and commercial airliners.

However, a HAPS flyer sits over 320 km (200 mi) lower than satellites, so it can produce images of similar high resolution to a drone and, like a drone, HAPS vehicles can remain on station for a very long time – weeks or even months at a time without refueling. This means they can not only be used for remote sensing, but also for high-bandwidth communications and as a backup for GPS and other satellite navigation systems in remote areas or terrain that blocks mobile or satnav signals.

In addition, communications with HAPS vehicles don't suffer from

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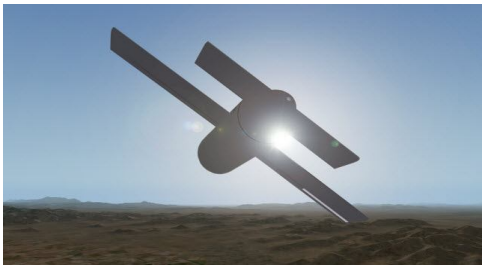
the time lag that satellites must take into account. They are also, unlike satellites and drones, ideal for setting up temporary or even semi-permanent communications and navigation nodes in the event of wars and natural disasters. https://newatlas.com/esa-haps-missing-link-drones-satellites/52419/

Electric aircraft start-up tests disposable UAV glider for USMC 29 NOVEMBER, 2017, FLIGHTGLOBAL.COM, LEIGH GIANGRECO, WASHINGTON DC



Teams off US Marines on remote bases could be re-supplied in the future with "disposable" unmanned gliders toting up to 454kg (1,000lb) of cargo each. Yates has previously characterized its Silent Arrow UAV as an electric-powered UAV capable of hauling payloads up to 454kg.

"By removing the electric powertrain from our Silent Arrow product line, we will meet all performance requirements at unprecedented unit costs for such a capable air delivery asset," says chief executive and founder Chip Yates.

The MCWL called for a disposable glider that could deploy from Lockheed Martin C-130, Bell Boeing MV-22 and Sikorsky CH-53 aircraft and deliver a payload of up to 317kg to within 45.7m (150ft) of the targeted delivery point.

Silent Arrow is part of a larger initiative the USMC and US Army are targeting, as the two services search for ways to lighten their expeditionary forces' load.
https://www.flightglobal.com/news/articles/electric-aircraft-start-up-tests-disposable-uav-glid-443750/

Drone advocates press Congress to ease flight restrictions MELANIE ZANONA - 11/29/17

The drone industry pleaded with Congress on Wednesday to ease restrictions on flight operations, warning that the U.S. is falling behind other countries that are using the emerging technology in innovative ways.

But even though the Federal Aviation Administration (FAA) finalized the first-ever rule allowing small commercial drone use last year, there are still strict limits on the types of operations that are allowed, including restrictions on flights over people, nighttime operations and flying beyond the visual line of sight.

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That has prevented drones from being used for commercial package deliveries, which are already taking place in other countries and could provide a huge business opportunity for tech giants like Amazon and Google.

However, drone operators are allowed to apply for a waiver from the restrictions, while the FAA just launched a new pilot program allowing local governments to partner with the private sector to test expanded drone operations.

"If we can move to an environment where instead of seeking waivers, we have a clear set of rules we can work under, that is a much better environment than having to ask for waiver by waiver by waiver," said William Ball, executive vice president and chief transmission officer of the Southern Company. Lawmakers largely agreed that it's critical for the government to embrace the new technology, but they also said it's imperative to ensure that drones are integrated into the airspace in the safest possible manner.
http://thehill.com/policy/transportation/362353-drone-industry-presses-congress-to-ease-flight-restrictions

FAA awards Albuquerque film company first drone waiver *The Associated Press* NOVEMBER 29, 2017

An Albuquerque cinema drone company says the Federal Aviation Administration has issued it a waiver that will allow it to fly drones over cast and crews on film locations.

Flytcam Motion Pictures Managing Partner Luke Davis says they are the first cinema drone company to get such a waiver from the FAA. The Albuquerque Journal reported Tuesday the waiver will allow the company to get aerial shots they could not have gotten otherwise.
http://www.miamiherald.com/entertainment/celebrities/article187126753.html

Drone Strike Hazards Confirmed in New Manned-Unmanned Study S.L. Fuller | November 29, 2017

Quadcopter wing impact.

When an unmanned aircraft system (UAS) struck a Beechcraft King Air 100's wing last month in Canada, it showed that hypothetical "what-ifs" about the dangers of drones flying around manned aircraft aren't actually hypothetical. It also makes the FAA's Center of Excellence for UAS Research Alliance for System Safety of UAS through Research

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Excellence (ASSURE) final report on air-to-air, unmanned-to-manned collisions all the more significant.

"While the effects of bird impacts on airplanes are well documented, little is known about the effects of more rigid and higher mass [small UAS] on aircraft structures and propulsion systems," said Mississippi State University's Marty Rogers, the director of ASSURE. "The results of this work are critical to the safety of commercial air travel here in the United States and around the world." ASSURE researchers also determined leading edges of wings, vertical and horizontal stabilizers, and windscreen as the areas of manned aircraft most likely to be impacted by a small drone.

Through collision simulations, ASSURE found that collisions with small drones inflict more damage on an aircraft than collisions with birds. This means that some structural components designed by original equipment manufacturers (OEMS) to withstand bird strikes are not enough to withstand drone strikes http://www.aviationtoday.com/2017/11/29/drone-strike-harmful-bird-strike-different-standards-needed/

Drone Giant DJI To Feds: Your Allegations Are "Insane"

A newly-surfaced Immigration and Customs Enforcement memo alleges that DJI is feeding sensitive data to the Chinese government. BY DANIEL TERDIMAN

China's DJI, the world's-largest maker of consumer and business drones, is pushing back strongly on what it calls an "insane" memo issued by the federal government claiming the company is essentially spying on the U.S. for the Chinese government.

The unclassified memo, issued in August by the U.S. Immigration and Custom Enforcement (ICE) in Los Angeles, argues that DJI may well be leveraging its drones to provide "U.S. critical infrastructure and law enforcement data to the Chinese government [and that the company is likely] selectively targeting government and privately-owned entities within these sectors to expand its ability to collect and exploit sensitive U.S. data."

The document, which U.S.-based DJI spokesperson Adam Lisberg says first appeared on the internet last week, is attributed to information gathered from "open source reporting and a reliable source within the [drone] industry with first and secondhand access." It further states that software powering DJI's consumer and business drones can "automatically tag GPS imagery and locations, register facial recognition data even when the system is off, and access users' phone data."

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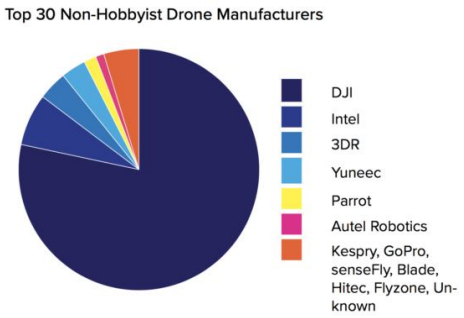
Additionally, it continued, "the applications capture user identification, e-mail addresses, full names, phone numbers, images, videos, and computer credentials. Much of the information collected includes proprietary and sensitive critical infrastructure data, such as detailed imagery of power control panels, security measures for critical infrastructure sites, or materials used in bridge construction."

In an email to *Fast Company*, Lisberg called the memo "utterly insane," and pointed to the company's official response. In it, the Shenzhen, China-based company wrote that "the allegations in the bulletin are so profoundly wrong as a factual matter that ICE should consider withdrawing it, or at least correcting its unsupportable assertions."
https://www.fastcompany.com/40502042/drone-giant-dji-to-trump-administration-your-allegations-are-insane

DJI Is a Leader – Detailed Analysis of FAA Data Provides Key Drone Market Insights Frank Schrothon: November 27, 2017



Dan Gettinger Arthur Holland Michel at the Center for the Study of the Drone at Bard College have published an excellent analysis of FAA drone registration data the provides confirmation to some commonly held opinions as well as surprising insights. The analysis covers both hobbyist and non-hobbyist segments. It is a data driven report that identifies which drone are being used and where.

They note that their study, *Drone Registrations: A Preliminary Analysis*, is "based on the raw, unedited dataset published by the FAA, which may contain errors such as misspelled place names or duplicative reg- istrations." Regardless, it is a must read for anyone with an active interest in the industry."

The authors have identified the following key takeaways:

- As of October 31, 2017, there are 836,796 hobbyist users and 106,739 non-hobbyist drones registered with the Federal Aviation Administration.
- Non-hobbyist drone registrations have increased in 2017, while hobbyist user regis- trations have slowed.
- States with low population densities are more likely to have high rates of non-hobbyist drone registrations.

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- The 30 most common non-hobbyist drones account for 88 percent of all non-hobbyist registered systems.
- The most popular non-hobbyist drone is the DJI Phantom 4. Drones made by the China-based DJI account for at least 70 percent of all non-hobbyist drones.
- The data contains registrations from users in 123 countries.

https://dronelife.com/2017/11/27/yes-dji-leader-detailed-analysis-faa-data-provides-key-drone-market-insights/

Drone photos offer faster, cheaper data on key Antarctic species November 29, 2017

Adult leopard seal on a beach at Cape Shirreff, Antarctica.

Scientists in Antarctica have demonstrated a cheaper, faster and simpler way to gauge the condition of leopard seals.

Scientists from NOAA Fisheries' Southwest Fisheries Science Center and Aerial Imaging Solutions described the approach today in the online journal PLOS ONE. "We continue to develop technologies to gather the data we need to manage fish and wildlife in a safer, less expensive way," said Douglas Krause, a research scientist in the Southwest Fisheries Science Center's Antarctic Ecosystem Research Division (AERD), and lead author of the paper demonstrating the new research method. "We're certainly excited because we can get that much more work done, in less time, and at lower costs than ever before."

Scientists tested the accuracy of aerial measurements by catching and measuring the same seals the drone photographed. They found the length measurements accurate to within about 2 percent, and the weight measurements within about 4 percent. The biggest difference was the time and effort involved: While a crew of five people took more than four hours to capture each of 15 leopard seals for the study, a crew of two people using the drone needed only about 20 minutes to gather the same data.
Read more at: https://phys.org/news/2017-11-aerial-drone-photos-yield-accurate.html#jCp

1Nov17

Military-Grade Killer Drones Are Starting to Hit the Market Kyle Mizokami Nov 30, 2017

The battlefield drone can be operated by one man, drop its own precision-guided munitions.

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The recent explosion of the consumer drone market has had far-reaching effects, the deadliest being their adaptation to weapons of war. Pushed to speeds up to 70 miles an hour by eight propellers, the killer drone has a single hard point—or a multi-carriage launcher—for launching lethal munitions at the enemy. It has a laser designator, for marking its own targets, and the control signals are encrypted to prevent someone else from hacking in and taking control of it.

The unmanned aerial vehicle (UAV) debuted at the 2017 Dubai Air Show, where it was displayed carrying the Textron Fury precision-guided munition. Fury is a thirteen pound aerial glide bomb that has both a GPS/inertial navigation guidance system and a laser guidance system. The little bomb is useful against moving targets and accurate to within three feet of its target. Fury is also capable of carrying first aid supplies, ammunition, or other supplies, dropping them by parachute.
http://www.popularmechanics.com/military/aviation/a13990354/military-grade-killer-drones-are-starting-to-hit-the-market/

Rocket Lab's Tiny-Satellite Launcher Will Get 2nd Test in December

Calla Cofield, Space.com Senior Writer | November 29, 2017

A Rocket Lab Electron rocket sits on the launchpad at the company's launch facility in New Zealand, ahead of a test flight. The launch window opens Dec. 8, 2017.

The spaceflight startup Rocket Lab has scheduled the second test flight of its innovative Electron rocket, a small vehicle built to accommodate small satellites and other petite payloads. The 10-day launch window opens Dec. 8 and will take place at Rocket Lab's private launch facility on the Mahia Peninsula in New Zealand, the company announced today (Nov. 29).

Despite its test status, the rocket will carry and, if all goes according to plan, deploy three customer satellites. The payload will include one Earth-imaging Dove satellite (about the size of a loaf of bread) for the private company Planet (formerly Planet Labs), and two Lemur-2 satellites for the private company Spire, which uses the Earth-observing satellites for weather mapping and ship-traffic tracking, according to the statement from Rocket Lab.
https://www.space.com/38938-rocket-lab-second-electron-test-flight-date.html?utm_source=sdc-newsletter&utm_medium=email&utm_campaign=20171130-sdc

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FAA Urges Small Drone Pilots To Wear Vests Sean Broderick November 30, 2017

Seeking to boost "public awareness" of legal small unmanned aircraft system (sUAS) operations, the U.S. FAA is urging sUAS pilots to wear reflective safety vests when flying their aircraft. "By taking this simple action, sUAS [pilots] can demonstrate that they are accepting responsibility for the activity and that they are intending to operate in a safe and compliant manner," the FAA said in a newly released safety information for operators bulletin.

The move comes as the FAA attempts to cut down on the number of nuisance reports and general concerns tied to sUAS flying. "With the rapid increase in sUAS activity, combined with the technology and regulations being relatively new, the general public and law enforcement can be uninformed of what, when, how and where sUAS are legally permitted to be flown," the FAA said. "Additionally, the public perceives some sUAS operations as threatening to their safety or privacy, in part because remote pilots are not easily identifiable."

It recommends that vests contain wording such as "Drone Pilot, Stand Clear" to easily designate operators and encourages people not to disturb them. "The vest may reduce the likelihood that someone will approach or query an sUAS crew member engaged in safety-sensitive duties and will also help preserve a 'sterile cockpit' for these operations," the agency said.
https://www.ainonline.com/aviation-news/business-aviation/2017-11-30/faa-urges-small-drone-pilots-wear-vests

EU Agrees Registration Rules for Drones REUTERS NOV. 30, 2017

BRUSSELS — Drone owners in Europe will have to register their devices if "dangerous" and aircraft makers ensure that black box recordings can be downloaded in real-time if a plane is in distress under a sweeping reform of Europe's aviation safety agency.

Under the agreement, drones which can cause significant harm to people either by crashing into them or presenting risks to privacy, security or the environment, will have to be registered.

"Dangerous" drones will be defined as having a kinetic energy of over 80 joules based on their mass and maximum speed. The European Parliament had pushed for a registration threshold of 250 grammes but EU governments resisted.

The rules will apply to all drones, including ones sold in shops for private use.

"The drone industry is soaring and has potential uses in agriculture, delivery, mapping, building maintenance. To ensure these activities develop in full security, a European regulatory

framework will prevail," said Karima Delli, chair of the European Parliament's Transport Committee. https://www.nytimes.com/reuters/2017/11/30/world/americas/30reuters-eu-drones.html

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