DRONE ZONE —

Switzerland first to test integrating drones into its air traffic control

Think of it as automated flight authorization and cataloging for drones.

ERIC TEGLER - 3/9/2018, 6:14 AM

Photo by Ronen Tivony/NurPhoto via Getty Images

Enlarge / During the recent California wild fires, there were several reports of drones interfering with firefighting attempts.

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Switzerland is on the cusp of becoming the first country to formally integrate drones into the air traffic management system that controls its airspace.

The limited integration is the first to be launched under a broader European initiative called U-space, which seeks to create a digital infrastructure that would allow millions of small drones to safely operate beyond line-of-sight in approved airspace. A similar, though more modest, model in the US called Unmanned Aircraft System Traffic Management (UTM) has been developed by NASA. Managing and tracking small drones is key to opening the commercial market for drone services.

Starting in June, Swiss air traffic control operator Skyguide will begin merging its own data and traffic management applications with a software platform developed by Santa Monica, California-based AirMap Inc. The software is called AirMap, which, as the name implies, is a digital airspace-mapping platform.

AirMap interacts with small unmanned aerial vehicles through an Internet application interface that's also used by drone manufacturers like DJI, 3D Robotics, Yuneec, and other commercial and military small UAV manufacturers. For the Swiss U-space application, AirMap will have two main components.

The first is a digital registry of drones and their operators, akin to the FAA aircraft registration system. The second is a data sharing and digital communication conduit that allows drone operators to quickly request air traffic control authorization to fly in a specific area and to receive notification of airspace areas that are geofenced and therefore offlimits to small drones.

Airspace geofences are GPS-defined and routinely subject to change. Drone pilots are immediately notified via real-time traffic alerts by an AirMap app when they cross a geofence area. Alerts show up as text messages or graphic cues on the tablets or smartphones that UAV pilots typically use to control small drones.

"We're bringing in the actual radar surveillance feeds that air traffic controllers use in providing that high fidelity data directly to drones and drone operators. The idea is to solve relatively simple problems which limit opening airspace to drones," says Ben Marcus, cofounder and chairman of AirMap.

He points out that until the recent rollout of the more limited system in the US, it often took 90 days to get authorization to fly a low-altitude drone (less than 400 feet/120m) in controlled airspace. Speeding up that process (it can now be done in seconds), alerting drone pilots to flight
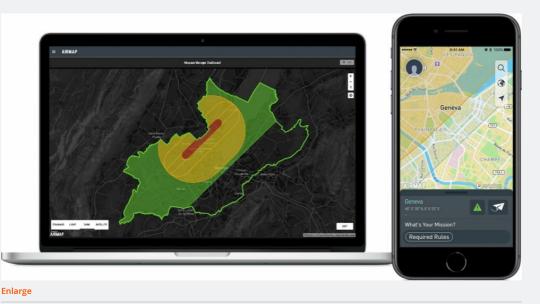
How Integrated?

The rollout of drone flight management in Switzerland is symbolically important, but it's also a long way from merging millions of small UAVs into an air traffic control system. For now, you can basically think of it as automated flight authorization and cataloging for drones.

U-space will unfold in four phases from 2018 through 2021. The first two phases will see "integration into the existing air traffic control system that will be rather limited," Marcus admits. As U-space moves into phases 3 and 4 in 2020-2021, there will be more integration, possibly including transponder-like position data broadcast from drones to Skyguide. Even this is several steps removed from full integration.

"Air traffic control systems need a very strict safety certification standard," Marcus acknowledges, "so [further integration] will take some time."

For the present, Switzerland, is very friendly to emerging commercial drone operators. There are few regulations and no specific legal framework tied to U-space. U-space does not even define what constitutes "low altitude" for small drone operations, the Swiss preferring to authorize drone flight on a case-by-case basis.

Skyguide

Enlarge

Use of the Skyguide/AirMap registration and alert system is voluntary, and there is no automated enforcement of the dynamic geofencing zones it designates by the Swiss civil aviation authority. (Drone flight control systems could possibly receive direct geofence coordinates in the future, barring them from flight into those zones.)

How many drone operators/drones will participate in Swiss U-space? Ben Marcus says "many," though he has no concrete estimate. It's reasonable to assume that recreational/hobbyist drone operators, who constitute the vast majority of current drone users, will pay little attention to U-space initially.

Integrating drones with air traffic (and radar data) also gives rise to security concerns, and Marcus affirms that AirMap has been designed with cybersecurity in mind from the outset. However, the 4G and 5G telecom layer used to control drones is vulnerable, as multiple recent media reports illustrate.

What may be as important is the question of whether elevating small drones to full-fledged participants in a highly monitored, regulated air traffic control system will actually consolidate drone flight, transforming it to a realm of fewer commercial operators, leaving the rest of us behind.

"Not at all," AirMap's cofounder counters "The services we're offering are unlocking airspace that was not previously available."
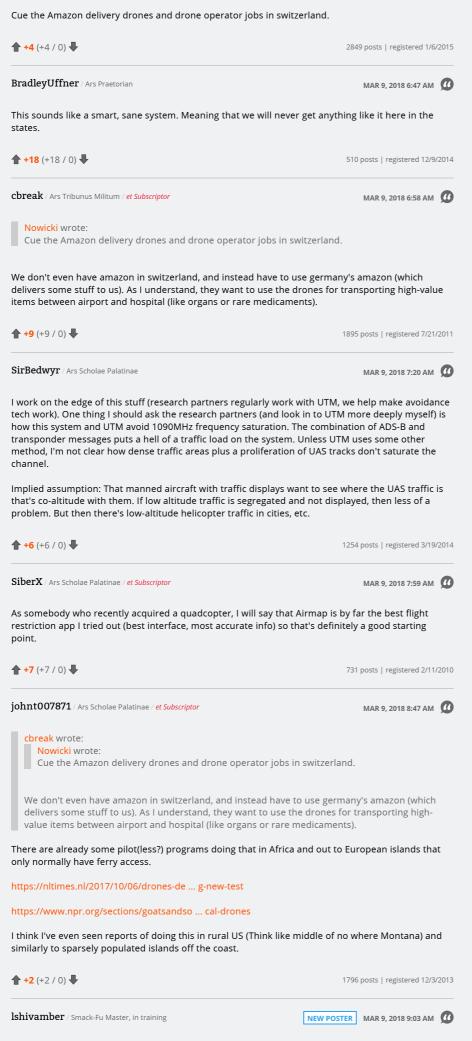
He may be right. But aviation history shows us that as flight became commercialized, its cost and regulation went up, and the number of operators declined. When drones fully join air traffic control systems in a decade or more, history could repeat itself.

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Nowicki / Ars Scholae Palatinae   MAR 9, 2018 6:32 AM

Cue the Amazon delivery drones and drone operator jobs in switzerland.

⬆ **+4** (+4 / 0) ⬇   2849 posts | registered 1/6/2015

BradleyUffner / Ars Praetorian   MAR 9, 2018 6:47 AM

This sounds like a smart, sane system. Meaning that we will never get anything like it here in the states.

⬆ **+18** (+18 / 0) ⬇   510 posts | registered 12/9/2014

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cbreak / Ars Tribunus Militum / *et Subscriptor*   MAR 9, 2018 6:58 AM

> Nowicki wrote:
> Cue the Amazon delivery drones and drone operator jobs in switzerland.

We don't even have amazon in switzerland, and instead have to use germany's amazon (which delivers some stuff to us). As I understand, they want to use the drones for transporting high-value items between airport and hospital (like organs or rare medicaments).

⬆ **+9** (+9 / 0) ⬇   1895 posts | registered 7/21/2011

SirBedwyr / Ars Scholae Palatinae   MAR 9, 2018 7:20 AM

I work on the edge of this stuff (research partners regularly work with UTM, we help make avoidance tech work). One thing I should ask the research partners (and look in to UTM more deeply myself) is how this system and UTM avoid 1090MHz frequency saturation. The combination of ADS-B and transponder messages puts a hell of a traffic load on the system. Unless UTM uses some other method, I'm not clear how dense traffic areas plus a proliferation of UAS tracks don't saturate the channel.

Implied assumption: That manned aircraft with traffic displays want to see where the UAS traffic is that's co-altitude with them. If low altitude traffic is segregated and not displayed, then less of a problem. But then there's low-altitude helicopter traffic in cities, etc.

⬆ **+6** (+6 / 0) ⬇   1254 posts | registered 3/19/2014

SiberX / Ars Scholae Palatinae / *et Subscriptor*   MAR 9, 2018 7:59 AM

As somebody who recently acquired a quadcopter, I will say that Airmap is by far the best flight restriction app I tried out (best interface, most accurate info) so that's definitely a good starting point.

⬆ **+7** (+7 / 0) ⬇   731 posts | registered 2/11/2010

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johnt007871 / Ars Scholae Palatinae / *et Subscriptor*   MAR 9, 2018 8:47 AM

> cbreak wrote:
>> Nowicki wrote:
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> We don't even have amazon in switzerland, and instead have to use germany's amazon (which delivers some stuff to us). As I understand, they want to use the drones for transporting high-value items between airport and hospital (like organs or rare medicaments).

There are already some pilot(less?) programs doing that in Africa and out to European islands that only normally have ferry access.

https://nltimes.nl/2017/10/06/drones-de ... g-new-test

https://www.npr.org/sections/goatsandso ... cal-drones

I think I've even seen reports of doing this in rural US (Think like middle of no where Montana) and similarly to sparsely populated islands off the coast.

⬆ **+2** (+2 / 0) ⬇   1796 posts | registered 12/3/2013

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lshivamber / Smack-Fu Master, in training   NEW POSTER   MAR 9, 2018 9:03 AM

This is a necessary step for real commercial drone services to "take off" at scale. Sounds like a reasoned approach and we hope they can accelerate this successfully.

Looking forward to seeing more programs like this in the major drone markets.

Leon
https://mydroneservices.com

⬆ 0 (0 / 0) ⬇   1 post | registered 3/9/2018

PowerG / Smack-Fu Master, in training   [NEW POSTER]   MAR 9, 2018 11:44 AM   ❝

Living in Switzerland, and knowing a bit of the mentality of the people there you can be pretty sure that most of the operator will adhere to these voluntary registrations.

It's fascinating to observe the Swiss, so far the only people I've met that are capable to massively vote to increase their taxes or limit their holidays.

Anyhow, integrating UAV into air traffic is a pretty good idea in my sense. Involving ATC is in my sense the best option to keep other planes aware of the drones. I'm pretty sure this initiative will be successful.

⬆ **+4** (+4 / 0) ⬇   2 posts | registered 4/25/2017

Pirokobo / Ars Tribunus Militum   MAR 9, 2018 12:01 PM   ❝

> **cbreak** wrote:
>
> have to use germany's amazon.

"That is why EU fail." -Yoda, The Empire Strikes Back

As an American I don't get this thinking. I get stuff from multiple Amazon facilities. Some from Lenexa Kansas, some from Whitestown Indiana, sometimes from Harrisburg Pennsylvania. It's all just Amazon, only difference is which warehouse has the stuff.

⬆ -6 (0 / -6) ⬇   1571 posts | registered 5/10/2010

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cbreak / Ars Tribunus Militum / *et Subscriptor*   6 HOURS AGO   ❝

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No...

The difference is taxes and import duties. Because Switzerland is NOT in the EU.

⬆ **+2** (+2 / 0) ⬇   1895 posts | registered 7/21/2011

Makka_Pakka / Smack-Fu Master, in training   [NEW POSTER]   3 HOURS AGO   ❝

"… 4G and 5G telecom layer used to control drones is vulnerable, as multiple recent media reports illustrate."

Has anyone some reliable sources for further reading?
Thanks

⬆ 0 (0 / 0) ⬇   1 post | registered 3/9/2018

Auguste_Fivaz / Seniorius Lurkius / *et Subscriptor*   2 HOURS AGO   ❝

Leave it to the Swiss! The work being done in Zurich with autonomous UAVs
https://spectrum.ieee.org/automaton/robotics/drones/ai-powered-drone-mimics-cars-and-bikes-to-navigate-through-city-streets is amazing and it is in the public domain.

> **Quote:**
> Deep-learning algorithm uses car and bicycle dataset to fly a drone autonomously

⬆ 0 (0 / 0) ⬇   45 posts | registered 5/2/2012

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