

Appendix H – Unmanned Aircraft Systems (UAS) at SGH

State of UAS in and around Airports

Small unmanned aircraft systems (sUAS) are increasingly being used in and around airports. Airports are finding numerous use cases to integrate the technology into planning and operations, using them for asset inspections, wildlife management, construction monitoring, security and emergency response amongst other applications. The technology not only provides many benefits to operators but also creates numerous risks for the airport environment. Safe integration is a top priority for the Federal Aviation Administration, Industry and SGH.

As of January 2020, the U.S. Department of Transportation reported that the number of UAS registered with the Federal Aviation Administration (FAA) has eclipsed 1.5 million¹. The FAA also reports that there are now just over 162,000 Part 107 licensed pilots. Also, in 2018 the FAA projected the small model hobbyist UAS fleet would reach 2.4 million units and the commercial, small non-model UAS fleet would grow to 451,800 by 2022².

The Federal Aviation Administration has developed numerous rules and initiatives for protecting our airports and safely authorizing sUAS into controlled airspace. LAANC, the Low Altitude Authorization and Notification Capability, “provides drone pilots with access to controlled airspace at or below 400 feet, awareness of where pilots can and cannot fly, and air traffic professionals with visibility into where and when drones are operating”.³ LAANC is just one example of how the FAA has begun partnering with industry to improve the safety of airports and sUAS.



There currently are two primary challenges for SGH as they relate to UAS in the National Airports System (NAS): 1) the safe integration of UAS into everyday operations, whether through a consultant or trained airport staff; and 2) managing those outside of the airport who attempt to use UAS in their airspace.

Airports are similar to small cities in their varying needs, applications, operations, risks, etc. And just like a city, it is crucial to identify champions of new technologies to ease integration. From SGH's perspective, those champions should include ATC, consultants, managers, engineers, public relations, security, etc. SGH stakeholders have varying levels of concern with rising UAS numbers, and the impact is going to be different for each. But as technology and awareness continue to grow and champions are kept abreast of these changes, they will better prepare SGH to be active partners in UAS integration. UAS planning and data services will continue to improve SGH's scheduling of UAS operations, detection and tracking systems will remove blind spots of airport operations to all UAS in flight, and education supported by accountability will promote safer and more conscious UAS pilot decision-making.

Recent experiences involving UAS technology and risks have validated the aviation industry's call for increased public awareness. At London's Gatwick airport in December⁴ of 2018, drone sightings reported by dozens of customers led to

¹ https://www.faa.gov/uas/resources/by_the_numbers/

² <https://www.faa.gov/news/updates/?newsId=89870>

³ https://www.faa.gov/uas/programs_partnerships/data_exchange/

⁴ <https://www.bbc.com/news/uk-england-sussex-46741687>

the disruption of hundreds of flights at Britain's second busiest airport. In January, departures at Heathrow were grounded due to a drone sighting⁵ and later that month, flights in and out of New Jersey's Newark International Airport were disrupted after pilots reported drones flying near Teterboro Airport.⁶ This illustrates the dire need not only for continued safety, but continued education on the topic.

Conducting public outreach that addresses misconceptions and related fears about adding UAS into the flow of air traffic, both internally and externally, is being prioritized on a national level. Similar to communications from state and federal organizations on the dangers of operating a vehicle safely near a railroad crossing, communications from airports and the aviation industry are crucial to improving UAS operations safely in the vicinity of airports. The beneficiary of these efforts is both SGH and the flying public.

Evolving Support Technology

Counter-UAS (cUAS) capabilities is a focus area of continual advancement, both technically and politically. SGH will find these evolving solutions relevant to future investment and deployment as this technology emerges.

Sense and avoid, detect and avoid, and detect and deter technologies are another large area of UAS investment and innovation. The industry is taking advantage of technology developments from military-related applications in drone detection systems, translating those technologies into commercially available solutions. There are types of solutions being developed for ground-based sensor solutions as well as UAS-mounted technology for a UAS pilot to detect and avoid objects and aircraft. UAS manufactures are installing lidar sensors and ADS-B transponders with the goal of providing a holistic UAS platform to increase capabilities, while enhancing safety and collision avoidance. Independent innovators have developed UAS with an optical sensor on board, giving the UAS the ability to detect subtle changes in the airspace environment in real time. This allows the UAS operator to detect airplanes, helicopters, birds and other UAS in the air, while in flight.

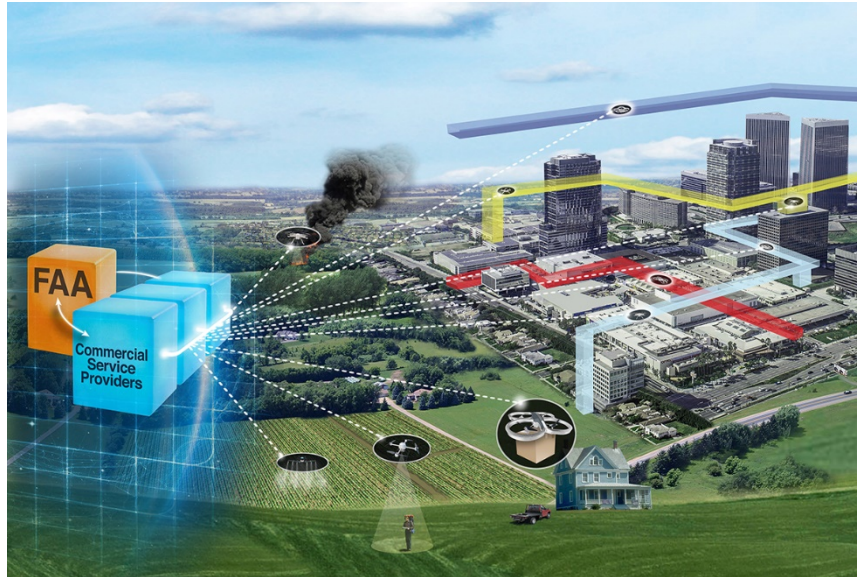
SGH must continue to research these advancements and how they will impact their ability to protect airspace and provide situational awareness, allowing them to better track and control UAS without disrupting airplane, helicopter and other UAS flights.

Future UAS Industry Advancements

⁵ <https://www.theguardian.com/uk-news/2019/jan/08/heathrow-airport-departures-suspended-after-drone-sighting>

⁶ <https://www.cnn.com/2019/01/22/us/newark-drone-sightings/index.html>

To fully integrate sUAS, there must be advancement of the UAS Traffic Management systems (UTM). Current research and focus on UTM is being placed by federal agencies and commercial businesses around the globe. The notional concept of UTM was first tackled by NASA and, in a relatively short period of time, the technology and standards for deployment of UTM have advanced to address a variety of applications and coverage areas. NASA defines UTM as a system that “would enable automated safe and efficient low-altitude airspace operations by providing services such as airspace design, corridors, dynamic geofencing, severe weather and wind avoidance, congestion management, terrain avoidance, route planning and re-routing, separation management, sequencing and spacing, and contingency management.”⁷



The UTM Pilot Program (UPP) was established in 2016⁸. In January of 2019, three test sites were announced to begin phase one of the UPP. The FAA describes, “UTM services demonstrated in UPP Phase One included: (1) the exchange of flight intent among operators, (2) the generation of notifications to UAS Operators regarding air and ground activities, known as UAS Volume Reservations (UVRs), and (3) the ability to share UVRs with stakeholders, including other UAS Service Suppliers (USS) and the Flight Information Management System (FIMS).”⁹

Phase two of the UPP include further testing of Remote Identification (RID) for sUAS. RID ID, as defined by the FAA, “is the ability of a UAS in flight to provide identification information that can be received by other parties”¹⁰. Proposed rulemaking was released by the FAA as Remote Identification continues to be a priority for sUAS integration.

These traffic monitoring advancements and applications overlap with airports because they look at not only how to detect and integrate inside and outside the fence, but how a mixed fleet of aircraft can coexist in one layer of airspace.

Synonymous to the sUAS technology industry developments, the introduction of large UAS is rapidly advancing and their applications are equally advantageous to operators. Large UAS has the capability to support cargo and shipping, disaster response, geospatial mapping, security and surveillance, passenger transportation, and an anticipated multitude of additional applications. Each of these use cases are currently being developed, with significant investment being made by large industry.

⁷ <https://utm.arc.nasa.gov/index.shtml>

⁸ https://www.faa.gov/uas/research_development/traffic_management/utm_pilot_program/

⁹ https://www.faa.gov/uas/research_development/traffic_management/utm_pilot_program/

¹⁰ https://www.faa.gov/uas/research_development/remote_id/

As these technologies continue to become more prevalent in the airspace, SGH must prepare to make operational and capital changes to incorporate the new needs of a shared airspace. National research through groups such as the Airport Cooperative Research Program (ACRP) will assist SGH in identifying and planning for these changes and improvements.

Urban Air Mobility (UAM) Impacts

The compilation of small and large UAS integration technology and policy, UTM and advance air traffic management technology, counter-UAS and detection technology, and existing manned air traffic systems comprise the foundational pieces of UAM. Common thought as UAM, the long-range vision of unmanned/piloted aircrafts carrying good and passengers. Many organizations, including NASA, are developing technology, policy, operational procedures, and air traffic management solutions with the common goal of safely integrating everything from small package delivery drones, to large passenger-carrying air taxis.

The UAM industry is forecasted to see an annual compound growth rate of ~10%, especially in areas with heavy surface congestion by relieving ground-based transpiration networks with airborne operations. SGH currently possesses the existing airport facilities and is geographically located centrally to many organizations and business which could see economic benefits from UAM operations at the airport. SGH is prepared to incorporate UAM solutions into the airport operations, surrounding community, and regional transportation system by harnessing the UAS and UTM groundwork already established in the Springfield area. The airport must take advantage of the environment in the region continuing to support federal, state and local development activities to facilitate industry progress and business investment at the airport.

Ohio-Based UAS and Emerging Technology Research and Development

Formed in 2013, the Ohio Unmanned Aircraft Systems Center (Ohio UAS Center) is located in Springfield, Ohio, approximately 15 miles from SGH. Beyond serving as the operations and management center for integrating UAS into the Ohio Department of Transportation's (ODOT) UAS activities, the Ohio UAS Center services as a shared resource to support Ohio-based agencies, organizations and institutions testing or developing unmanned technology. Ohio UAS Center is the unofficial hub of multiple other UAS research, development, and operations groups, including the Air Force Research Labs (AFRL), Sinclair Community College UAS National Training Center, University of Dayton and Wright State University Research Institutes, and numerous other public and private organizations conducting development programs in UAS-related technology.

SGH has recognized the relatively proximity to these various entities focusing on UAS technology and will continue to offer facilities and airspace for UAS and other related technology operations. Opportunities will continue to present themselves to SGH for revenue generating opportunities, as well as, notoriety and reputation of being a "UAS friendly" facility to encourage additional technology operations.

With a 5-million-dollar investment in 2018, upgrades were made to SGH to prepare the site for UAS testing. The major upgrade included the construction of a ground-based, sense-and-avoid radar system at the airport. Since then, the FAA has approved test flights beyond visual line-of-sight, above 400 feet and in controlled airspace in a limited parcel of airspace at and around SGH, thus opening the doors for numerous airports around the region and nationally to begin operation testing of these capabilities that were previously only realized in Department of Defense realm.

UTM systems and sense and avoid technologies are being developed and highlighted by the work being done on the Ohio Department of Transportation's U.S. 33 Smart Mobility Corridor research. The project team is led by Ohio State University to establish a UTM to monitor and control air traffic, manned and unmanned, along a 45-mile stretch of state highway. The purpose of this project is to deploy new UTM technologies to permit the mixture of aircraft types along the busy roadway corridor. Projects such as these are what spawn the next layer of technological advances. Maintaining facilities and identifying airspace UAS operations will occur safely at SGH provides a location for future UTM deployment, offering providers a wide UAS and manned operator mix.