**Exploring Government and Private Sector Applications of UAS-Drones in Washington State Workshop**

June 28, 2018

Clover Park Community College

**Overview of UAS/Drone Capabilities**

Tom Hagen (President Association for Unmanned Vehicle Systems International Cascade Chapter). Drone was coined in 1930s by the Navy. Today UAS/Drone is an acknowledgement of a link with vehicle with no driver on board. Hagan envisions a fleet of UAS by 2050 in Washington. Uses will include: Agriculture to double yield, fire response/ monitoring/suppression, communication, and package delivery. WA has a good positon to be in the forefront of the industry due to our aerospace industry, 130,000 skilled workers, and advanced material manufacturing companies.

**Panel I – Federal Regulatory Environment**

What do local governments need to know about current and future regulation of UAS?

 Moderated by Robert Hodgman (Sr. Aviation Planner WA State Dept. of Transportation Aviation Division), and Panel Scott Harris (Special Agent FAA), and Charlton Evans (Consultant EndState Solutions). Scott informed FAA covers in CFR Part 47, 48, 101, and 107 three areas: 1) where and how you fly, 2) things you fly, and 3) operator requirements. National Air Space (NAS) starts 1 inch above ground. Key elements are if you operate a drone in an air space for any purpose, you carry the requirement to comply federal, state, and local rules. All drones weighing 0.55 ounce to 55pounds need FAA registration ID. If you operated this drone for commercial purposes you need a FAA unmanned aerial vehicle pilot’s license (CFR Part 107) or COA (Certificate of Authorization). Compliance issues are: operator maintain visual line of sight, daylight flights, not over people or highways, avoid airports and flight paths, not exceed 100 m.p.h., or exceed altitude over 400 feet. COA allow variances in the above requirements. Government and official entities can operate under the FAA 107 and/or COA.

Working with legal system and government. Scott stressed when local government or other agencies write up ordinances coordinate with FAA. Banning operator is harder, but making the square of takeoff /landing larger is easier to enforce. Charlton stressed businesses coordinate with FAA to generate a trust that they meet guidelines, design insurance, and systems used are solid.

**Panel II - Research and Education**

 Moderated by Ryan Davis (Pres.CEO Skilled Workforce, and Panel Andrew Kusper (CoE UAS), Christopher Lum (UW Assistant Research Professor Dept. of Aeronautics and Astronautics), and Lav Khot (WSU Assistant Research Professor Irrigated Agriculture Research and Extension Center). Lum stressed the public perception of UAS needs to focus away from toy to a system that is safe in US airspace stressing ethics. Kusper stressed pilot education brings up questions if it should be company handled specific training or general pilot’s license. A need for drone repair is another opportunity. Khot showcased WA agriculture conducts UAS trials from crop monitoring and spraying to drying off growing cherries to prevent damage.

**WSDOT Aviation**

 David Fleckenstein (WSDOT Aviation Director) suggests officials creating UAS/Drone legislation with FAA and WSDOT coordination. WSDOT will help with technical assistance on WSDOT’s executive orders, user’s guides and coordinator training. 360-529-6550 fleckda@wsdot.wa.gov and John MacArthur 360-596-8954 macarj@wsdat.wa.gov.

Aviation UAS projects include BVLOS (Beyond Visual Line of Sight), sense and avoid collision systems, package delivery, and disaster damage assessment, and night flying. GE AiRXOS system goal is to enable precision navigation for cloud computing for visualizing airspace, intelligent avionics to collect and use data in flight, and creation of regulation/policy operation safety.

**Panel III - Public Sector Users**

How are public entities deploying UAS? Is the current regulatory environment suitable to achieve objectives of UAS programs? How are cities and counties managing privacy concerns and collaborating with the public? What have been the challenges in establishing your programs?

Moderated by Steve Myers (Sr. Program Mgr. Center for Regional Disaster Resilience), Panel Ginger Armbruster (Chief Privacy Officer City of Seattle), Sean Davido (Community Relations Specialist City of Yakima), and Mike Hirte (Admin. Sgt. to Undersheriff Thurston County Sheriff Office), and Capt. Jay Cabezuela (Criminal Investigative Division WSP). All panelists expressed concerns by the public on privacy of collecting and storage of data. Simple photo will need limited data space and security but a criminal case could need huge amounts of each. Policies need to be created to address these issues.

Hirte and Davido strongly felt listening to the public for they will dictate your UAS program direction and success. UAS is a county wide resource that saves money and lessens risk mitigation by collecting data efficiently for safety in response and recovery. Creating county wide policy on using USA as tools and protect data will help limit liability law suits.

Armbruster said Seattle has been going away from surveillance approach. Seattle has all departments doing a privacy risk assessment, then collecting cases where UAS/Drones can be used to improve job performance and lessen costs. Seattle is then getting approval of use using gradient of no privacy or public concerns to involvement of city council approval. She feels this approach works to get the UAS in use with less public challenges. Other options to adding UAS is contract and 3rd party partnerships to lessen costs. Data storage could be added as needed, but ownership of data needs to be contractually owned by agency. Also mitigate how storage or destroy data not needed or collected wrong will be handled. She felt ACLU involvement could need legal assistance and support to address issues in responsible manner. Agencies need to consider time and cost of redaction of facial, license, etc. when public request access comes in.

Cabezuela indicated WSP is successfully using UAS to collect data in traffic and crime investigations. Agency limited scope and drafted policy in 2016 to add drones. The agency has over 50 trained officers trained and using UAS. WSP created polices by 1) evaluation of programs to get best option, 2) limited scope of use by starting small and expanding program and create policy of store data to mitigate software and computer expense, and 3) training and develop curriculum to enhance program.

**Luncheon Keynote: Drones and Emerging Tech**

Bill Schrier (Senior Advisor FirstNet) AT&T was awarded in 2017 the band width for first responder priority on separate network channel. Current UAS application in communication area are inspecting towers and remote facilities, create a UAS cell site by tethering UAS to ground with a constant power supply to keep it in the air, and systems to get the UAS data back to the responders with priority and encryption features. Schrier also questions how the UAS will be deployed and information will be stored as systems are developed and used. Third party data usage is an issue. Currently “Big Business” is developing systems with trust needed for the FAA and end users.

He asked the audience for some quick ideas on UAS use. The following ideas came up: drone swarm to light up site, hazardous material engagement for safety, nuclear handling, and apps to see through smoke to locate movement and status of site, earthquake post disaster building mapping, and underwater rescue.

**Panel IV - Private Sector Usage**

Moderated by David Fleckenstein and Panel Greg Thies (News Operations Manage King 5), Paul Applewhite (Pres. Applewhite Aero), Mo Swanson (Mgr. Public Policy and Partner Engagement Echodyne), and Samuel Adams (Owner Eagle-Eye Aerial Solutions LLC).

Applewhite Aero is promoting The Baton system. The Baton is a rod that uses GPS to guide it to a site after launching from a helicopter or plane. The payload could be communication equipment or needed supplies for the ground target where help is needed. His idea come from Hurricane Katrina. The first day fuel was the number one need, while day three had pharmacy and dialysis crisis. Broken money supply chain also occurred.

Thies (King 5) stated UAS videos sent in by sources goes through a submission process to make sure legality is addressed before it is viewed in broadcasts. King 5 does not live broadcast from site. The feed goes back to control, then it is aired to the public. They will coordinate with onsite responders by sharing UAS and other video as it is public information.

Swanson with Echodyne stated this company is developing an air space awareness radar to promote safety of UAS. Echodyne is working on low cost sensors manufacture and testing to radar to detect other UAS in area. Applications could be BVLOS usage.

Adams with Eagle-Eye Aerial Solutions, LLC has UAS flying to collect data for critical infrastructure, construction, and engineering support. Inspections are good for areas that are hard to reach, dangerous to personnel, and too time consuming for cost effective. Data can show possible structural problem areas, then teams can go to the area.

**Counter Autonomous Unmanned Systems (C-AUS)**

Mark Jones (Senior Program Mgr. Echodyne) states UAS is using IoT, AUS vehicles, and Smart Grid commercially to reduce costs to the consumer. What needs to be considered and evaluated is the real level of technology companies offer new products and systems. Jones has developed a UAS timeline: Detect, Locate, IT, Track, Exploit, Deflect and Assess. C-AUS prevention and tracking of various types of drones need a variety of methods: i.e. radar to track Radio frequency used in many drones, acoustical signature of propeller drones, and visual track by optical tracing. Environment interference can change the signature of the track: 1) Weather, 2) Urban location of cluster of blocking buildings, multiply altitudes, and 3) multiple signals from other frequencies interference (cell phones in area). Security to sites may also need “3D” air consideration, i.e. prison needed air coverage from UAS. Some of the security methods are Block/Jam the frequency, physically stop the AUS with kinetic, net or raptors, or Cyber/Spoof with broadcasting alternate commands.

Legislature has limited types of interdictions allowed by law. Security need to be aware of the Communication Act of 1934, FCC, and various Criminal Codes. Potential new legislation to check out is HR5366 and S2836. Restriction of air space to prevent AUS is an issue for local law enforcement and prosecution jurisdiction.

**CRDR Resilience Challenge Project: Utilizing UAS for Technical Inspections**

Phil Anderson (Director of Research and Chief Innovation Officer at Global Resilience Institute at Northeastern University) goal is data collection in post disaster sites. The research is using LIDAR to inspect infrastructure for damage. The team is going to Puerto Rico to test technology on damaged infra structure using UAS mapping. Questions the team with ask on viewing the images are: Is the infrastructure still usable? If damage is found will site need immediate mitigation, or delay and use is the best response. The research will be available by the end of the year from the college.