Drones, Robots and Public Safety

IWCE
Thursday, March 30, 2017
11:30 am - 12:45 pm
Room: S230
Session Number: TH12

The member organizations of the National Public Safety Telecommunications Council are grateful to the Department of Homeland Security’s Science and Technology Directorate, Office for Interoperability and Compatibility (OIC) and the National Protection and Programs Directorate, Office of Emergency Communications (OEC) Points of view or opinions expressed are those of the originators and do not necessarily represent the official position or policies of the U.S. Department of Homeland Security.
Welcome

• Tom Sorley, Moderator, NPSTC Technology and Broadband Committee Chair
• NPSTC presentation on current work by the Unmanned Aircraft System and Robotics Working Group.
NPSTC Mission Statement

NPSTC is a federation of organizations whose mission is to improve public safety communications and interoperability through collaborative leadership.
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Today’s Panel

• Tom Sorley, Moderator, Technology and Broadband Committee Chair

• Dr. Michael Britt, Chair, UAS/Robotics Working Group
  – Update on the Working Group’s activity
  – Review UAS Considerations Report

• Sergeant Matt Rogers, Michigan State Police, Aviation Unit
  – Overview of MSP UAS Program development and operation

• Matt Sloane, CEO, Skyfire Consulting
  – Discuss recent updates to FAA procedures regarding public safety UAS
  – Review recent issues and challenges involving UAS operations

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Unmanned Aircraft Systems (UAS) and Robotics Working Group

Dr. Michael Britt, Working Group Chair
UAS Robotics Working Group

- Meets on the 2nd Wednesday of the month at 12:00 noon Eastern.
- 105 participants are in this group.
- Working Group Charter
  - Review work being done by other groups and organizations.
  - Create use cases that document public safety use of UAS.
  - Review the current regulatory environment.
  - Provide input on pending rulemaking actions which will impact public safety operations.
  - Consider the need for additional spectrum to communicate with Public Safety UAS and coordinate with the NPSTC Spectrum Management Committee.
  - Develop outreach statements which will help educate the public safety community of the current state of UAS and Robotic usage.
  - Examine the need for best practices in the use of UAS and Robotic systems.
Presentations Pertinent to Public Safety

• Drew Jurkofsky, Petauro Systems (formerly Unmanned Experts)
  – Traffic accident reconstruction
  – Public Safety Coalition: governance, policy, training, CONOPS, planning, etc.

• Joe Clark, IronHand DVBE/Vision Technologies
  – Rose Bowl video over LTE/streaming video on a UAS platform

• Dr. Robin Murphy, Director of Center for Robot-Assisted Search and Rescue (CRASAR), Department of Computer Science and Engineering, Texas A&M University
  – Search and Rescue
Presentations Pertinent to Public Safety

• Steve Pansky/SAIC, Senior Aviation Analyst, Federal Aviation Administration
  – FAA update on the status of drone registration and licensing for public safety agencies.

• Sgt. Matt Rogers, Michigan State Police-Aviation Unit
  – State Police Unmanned Aircraft Operations

• Mike Worrell, Senior Fire Advisor, FirstNet
  – Persistent Close Air Support & Fire Line Advanced Situational Awareness for Handhelds
Guidelines for Creating an Unmanned Aircraft System (UAS) Program

• First report from the Working Group has been completed.
  – “Unmanned Air Systems and Robotics – Guidelines for Creating a UAS Program”.
  – Identifies specific components that must be evaluated by public safety agencies
  – NPSTC Governing Board is scheduled to consider approval of the report at this Friday’s meeting.
Guidelines for Creating an Unmanned Aircraft System (UAS) Program

• Highlights of the first report:
  – UAS Program Planning
    • Mission
    • Aircraft Selection Considerations
    • Resource Allocation and Staffing
    • Consideration of Multi-Agency Sharing
  – Policy Development
    • Documentation
    • Video/Still Imagery Policy Considerations
    • Risk Assessment
Guidelines for Creating an Unmanned Aircraft System (UAS) Program

• Highlights of the first report:
  – Cost Considerations
    • Flight Team
    • Training
    • Initial Equipment Purchase or Contract for Hire
Guidelines for Creating an Unmanned Aircraft System (UAS) Program

• Highlights of the first report:
  – Public Perception and Privacy
    • Engagement of the public
    • Data collection by UAS
      ➢ The purposes for which UAS will collect covered data
      ➢ The kinds of covered data the UAS will collect
      ➢ Data retention and data de-identification practices
      ➢ Privacy and Security concern complaint process
      ➢ Public Information release processing
  – Legal Concerns
    • Federal, state and local regulatory issues
Guidelines for Creating an Unmanned Aircraft System (UAS) Program

• Highlights of the first report:
  – UAS Operational Types and Capabilities
    • UAV Types and Sizes
    • Ground Control Station
    • UAS Sensor Capabilities
    • Communications Payload
  – UAS Airspace Integration
    • National Airspace System (NAS) FAA UAS Policy
    • FCC and Spectrum Information
Requirements for Aerial Communications Platforms and Additional Activities

• Next report will focus on UAS and Aerial Communications
  – How UAS can provide voice and data communications to support an incident.
  – Will examine both LMR and LTE implementations.

• Future Work
  – Continue to examine public safety use.
  – Schedule additional education presentations on UAS/R use by public safety and new technologies offered by industry.
  – Expand our focus to Robotics and other incident ecosystems.
Michigan State Police, UAS Program

Sergeant Matt Rogers, Michigan State Police, Aviation Unit

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Unmanned Aircraft Systems (UAS)
Sgt. Matt Rogers
Aeryon Skyranger
UAS Overview

- UAS Program originated with the Aviation Unit

- In 2013 the Aviation Unit researched the potential use of UAS for Law Enforcement Operations

- MSP determined the UAS would augment the already established rotorcraft and fixed wing operations
MSP First Steps

- Identified a platform to purchase and secured funding
- Created a policy that was realistic
- Met with the ACLU
- Met with media outlets

TRANSPARENCY
STATE LAW ENFORCEMENT HAS BEEN GIVEN THE GREEN LIGHT TO SPY WITH DRONES

THE WORDS ON YOUR VAN ARE IN REVERSE ORDER.
Aeryon Skyranger

- Up to 50 minute flight time per battery
- Operates up to 40mph sustained winds, 55mph gusts
- Temperature range of -22 F to 122 F
- Up to 2 mile range from base station
- Altitude up to 1500FT AGL
- Vertical take off and recovery
- Weighs 5.3 lbs.
Aeryon SkyRanger

- Federal Robotic Aircraft for Public Safety survey-2013
  - Highest ratings in class

- Includes many safety features
  - Auto return and land
    - Exceeding any flight parameter
    - Low Battery
    - High winds
    - Lost link
SkyRanger Capabilities

- High resolution daylight camera-30x optical zoom
- Thermal imaging camera
- Still photos, video, and live downlink of video
- Controlled using a tablet, point and click
- Programmable photo/video patterns
Images-Pix4D

- Images are geo-referenced
- Images can be “stitched” together to create a large mosaic photo by utilizing software-Pix4D
- 3D images can be created from those same photos
3 Dimensional PDF

- Accurate measurements taken from a PDF
- Viewable with Adobe Acrobat
The UAS and Law Enforcement

- The UAS can augment aviation operations by providing:
  - Response to critical incidents
  - Response to natural disasters
  - Hazardous material incidents
  - Accident and crime scene photography
  - Limited search and rescue capabilities
MSP UAS Policy Highlights

- Privacy rights are first and foremost
  - 4th Amendment
  - Get a Search Warrant!

- Missions must be approved by District or Division commander

- All flights must be documented, images retained for 3 years

- All missions flown in accordance with FAA rules
MSP UAS Highlights

• The Aviation Unit applied for a statewide operational COA in July of 2014 and received the approval on February 25, 2015.

• First agency in the country to receive statewide authorization for UAS operations.
MSP Districts

- UAS #1-Lansing (1st District)
- UAS #2-Tri City (3rd District)
- UAS #3-to be determined
MSP UAS Highlights continued…

- Since March of 2015 MSP has conducted many different types of missions to include:
  - Fire Scenes
  - House explosion scenes
  - Crime scenes
  - Traffic crash scenes
  - Natural disaster (tornado)
  - Search for fugitives
  - MDOT/DNR photo missions
  - Communication tower inspections
  - Barricaded Gunman
  - 208 actual scenes documented to date
MSP Downlink Vehicle

- Truck chassis acquired from the National Guard
- Outfitted with two inside monitors and one outside monitor
- Capable of capturing either the helicopter or UAS feed
- Can stream the video live through a secure internet connection
First Actual Mission

- Assist to a Fire investigator
  - Wednesday March 4, 2015
  - Near Jenison, MI
  - Photographs and video of the scene were collected
Infrared Photograph
Tower inspection
House Explosion

- Sent to document a house explosion scene
- Assist to MSP Detectives and ATF
- One fatality
Explosion
Drummond Island Shooting

- Assist to our ES Team (SWAT) on a barricaded gunman
- Prior to arrival, suspect found deceased
- Documented crime scene for the crime lab.
Suspect Search
50 car crash
Fatal house fire
Contact Information

- Please contact me with any questions:
- Sgt. Matt Rogers
  - Rogersm11@michigan.gov
  - (517) 230-6983
A PROUD tradition of SERVICE through EXCELLENCE, INTEGRITY, AND COURTESY
Public Safety UAS Program: Regulations and Operations

Matt Sloane, CEO, Skyfire Consulting

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FAA Authorization for Public Safety UAV Programs

Matt Sloane
CEO, Skyfire Consulting
Flying Drones Legally

- Hobbyist
- Commercial Operator
  - 333 Exemption, Part 107
- Public Agency
  - Certificate of Authorization (COA)
Flying Drones Legally

- **Hobbyist**
- **Commercial Operator**
  - 333 Exemption, Part 107
- **Public Agency**
  - Certificate of Authorization (COA)
Title 14 CFR Part 107
sUAS Rule

- Less than 55 pounds
- Visual Line of Sight
- Daylight Operations
- Not Over People
- Under 400' Above Ground
- Class G Airspace

ALMOST ALL WAIVE-ABLE
Title 14 CFR Part 107
Waiver Process

Performance Based Standards

1. Applicant must provide a method for the remote pilot to maintain visual line of sight during darkness.

2. Applicant must provide a method for the remote pilot to see and avoid other aircraft, people on the ground, and ground-based structures and obstacles during darkness.

3. Applicant must provide a method by which the remote pilot will be able to continuously know and determine the position, altitude, attitude, and movement of their small unmanned aircraft (sUA).

4. Applicant must assure all required persons participating in the sUA operation have knowledge to recognize and overcome visual illusions caused by darkness, and understand physiological conditions which may degrade night vision.

5. Applicant must provide a method to increase conspicuity of the sUA to be seen at a distance of 3 statute miles unless a system is in place that can avoid all non-participating aircraft.

FAA.gov/UAS/request_waiver

Blanket Waiver:
Conditions - Darkness Over people
Visual line of sight

Specific Waiver:
Locations - Class B, C, D, E
Special Use Airspace

4-6 Weeks or more
Part 107 Certification

- Remote Pilot in Command (RPIC) Written Test
  - Roughly $150
  - 60 question, 70% to pass
  - Valid for 2 years
  - TSA Background Check

- Responsibility always falls to RPIC
- Airspace waiver required each time
- Primarily for commercial operators
- Public safety must declare a “civil operation”
Public Agency
Certificate of Authorization

Blanket COA

Less than 55 lbs

Visual Line of Sight

Daylight Operations

Under 400’ Above Ground

Class G Airspace
Public Agency
Certificate of Authorization

Jurisdictional COA

- Less than 55 pounds
- Airspace in your jurisdiction
- Nighttime
- In the vicinity of airports
- Any other conditions you request
COA Approval

- Training self-certified
- Medical fitness to fly self-certified
- Responsibility falls to proponent agency
- Airspace waiver included
- Primarily for public safety/public agency
- Allows for flight over people in an emergency

Emergency COA

COA Timeline

1. Public Declaration Letter
2. COA Login Request
3. Filing Blanket COA
4. Blanket COA Approval
5. Filing Jurisdictional COA
6. Jurisdictional COA Approval
7. Renewal (2 Years)
8. Reapply (4 Years)
Public Declaration Letter

Blanket COA Approval

Jurisdictional COA Approval

Renewal (2 Years)

Reapply (4 Years)
Run Video 1 Here
SKYFIRE CONSULTING

UAV PUBLIC SAFETY SYMPOSIUM

Fort Collins, CO
June 21-23, 2017
Questions (…..and answers)

**Tom Sorley**, Moderator, NPSTC Broadband and Technology Committee Chair
Thank You!

Attend our Friday Governing Board meeting
8:30 a.m. Room S-231

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