North Fire UAS Assignment

Overview and Lessons Learned – June 15, 2016

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Presented to Tactical Fire Remote Sensing Advisory Committee

Overview

- USFS and BLM collaborated to mobilize a four-person UAS crew to the North Fire on the Cibola National Forest on June 1, 2016.

- The objective of the assignment was to test UAS and UAS sensors in the incident (wildfire) environment and develop operational procedures for future missions based on lessons learned and practical applications of the aircraft/sensors based on feedback provided by operations/planning personnel.

Crew Composition

- Gil Dustin, UAS Crew Leader, UAS Operator (BLM)
- Steve Stroud, UAS Operator (BLM)
- Steve Ramaekers, UAS Operator (DOI/OAS)
- Jeff Safran, Data Specialist (BLM)

UAS Aircraft & Sensors

- Falcon (fixed wing)
- 3DR Solo (quadcopter)

Sensors

- Falcon - 2 axis stabilized gimbal video payload (Sony Block and Tau 2 640 IR)
- Falcon - Sony A-5100 with Voigtlander lens (mapping/photogrammetry)
- Solo - Gimbaled GoPro Hero4 (mapping/video)

Operations Summary

- UAS were flown in two Divisions on the incident and provided live infrared video, performed mapping missions, and provided real-time intelligence and situational awareness to firefighters.
- Data (still and video imagery) was collected and sent to a processing specialist every evening over a Wi-Fi network.

Operations Summary – What Worked Well

- Resource orders were processed efficiently once the crew was statused in ROSS as THSP.
- The PASP was written and approved within 24 hours.
- Coordination between agency Public Information Officers.
- Treating the UAS/Crew as a normal aviation asset and including them in operational briefings.
- Working with helicopter pilots and OSC3 to establish aircraft separation procedures and mission priorities.
- Direct communication with the helicopter to coordinate missions in the same geographic area (Fire Traffic Area protocol).
- Integrating into the traditional ICS structure via the Planning and Operations Section Chiefs.
- **Working directly with crews to demonstrate and provide situational awareness. Firefighters would watch live video on a tablet (IOS device) as the aircraft flew over points of interest as directed.**

Operations Summary – What Worked Well

- Developing high resolution mapping products for pre and post burn analysis.
- Having a Data Specialist work a night shift to develop planning products (maps).
- Using established technologies to view map products. Most of the firefighters carried IOS devices to view geo-referenced maps with the Avenza app.
- Flight crew coordination with the Data Specialist, primarily by texting and evening phone conversation.
- Aerial photography flights with Geotagged photos were easy to process.
- The ESRI Full Motion Video (FMV) extension worked as designed, and allowed the video to be displayed spatially.
- The shift offset between the Data Specialist and flight crew was good. The UAS Data Specialist is a cross between a GISS and an IRIN, working afternoons into the night.

Operations Summary – Challenges

- Incidents don't typically require a PASP.
- Familiarizing IMT personnel with the capabilities and limitations of the aircraft.
- Familiarizing IMT personnel with final data product types.
- Uploading data over a WiFi network.
- Finding safe launch and recovery areas for the fixed wing system.
- Lack of aerial supervision caused delays for some UAS flights.
- Ground control station monitors extremely difficult to see in direct sunlight.

Operations Summary – Challenges

- Hand flying the micro UAS for situational awareness. A high degree of skill is required.
- DOD GPS testing caused two flight delays.
- FAA Emergency Certificate of Authorization (ECOA) process was not implemented as advertised.
- Current work/rest policy for UAS flight crews was difficult to manage and may not be appropriate since most of the crew's time was spent performing normal and expected incident duties (driving, briefings, hiking, etc.).
- Data Management was the single biggest time hit for the Data Specialist.
- Data transfer rates between the BLM NOC EGIS servers over VPN was very slow.

Applying Lessons Learned – Action Items

- Develop an Interagency UAS Operations Guide.
- Build a UAS briefing packet for incident use.
- Research SATCOM for data upload, download, and live video feeds to incident decision makers.
- Conduct debriefs focusing on data and products, particularly on the final deliverables.
- Training for the GISS personnel on what data we can provide.
- Work with UAS vendors and ESRI on simplifying the data processing workflows.

Conclusions

- Micro UAS are a powerful tool on the fireline. The crew we worked with (Kings Peak) found immediate utility. UAS program strategies must be developed to safely integrate this technology into established fire/aviation incident management/operations procedures.
- UAS capable of 16-24 hr. flights, loitering above all incident aircraft, and delivering high resolution images/video in multiple spectrums will be more effective than flying smaller systems to gather imagery to develop planning products.
- Micro UAS used for crew level situational awareness and large UAS used for strategic planning may be a consideration for UAS program development within incident management.
- It's critical to maintain an interagency approach regarding UAS operational procedures, qualifications, and data support/management.
- National UAS procedures and guidelines will ensure a safe approach to incident UAS operations.

Questions?