Civil Air Patrol



CAP's Small Unmanned Aerial System (sUAS) Program Briefing

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Overview

- Cadet Involvement / Programs
- Aerospace Education
- Emergency Services
- Air Frame Types
- Counter sUAS Program (Red Cell)
- Implementation Across the Country
- Questions

Cadet Involvement / Programs

- **CADETS CAN PARTICIPATE IN THIS PROGRAM!**
  - 16 y/o can perform as Mission Pilots (with Part 107 – and CAP sUASMP Quals).
  - Cadets can perform as sUAS Technicians (Visual Observers) at any point (w/GES).
  - **Cadets may NOT participate in "Red Cell" missions in any capacity (like CD).**
- **Incorporate Cadet UAS in MARC and NESA**
  - Already well versed in the model/computer gaming world.
  - Already very computer literate – easily adapt to changing technology.
  - Cadets have repeatedly been the Distinguished Grad at UAS Course in NESA.
- **Creating a pathway for Cadets from start to collegiate success!**

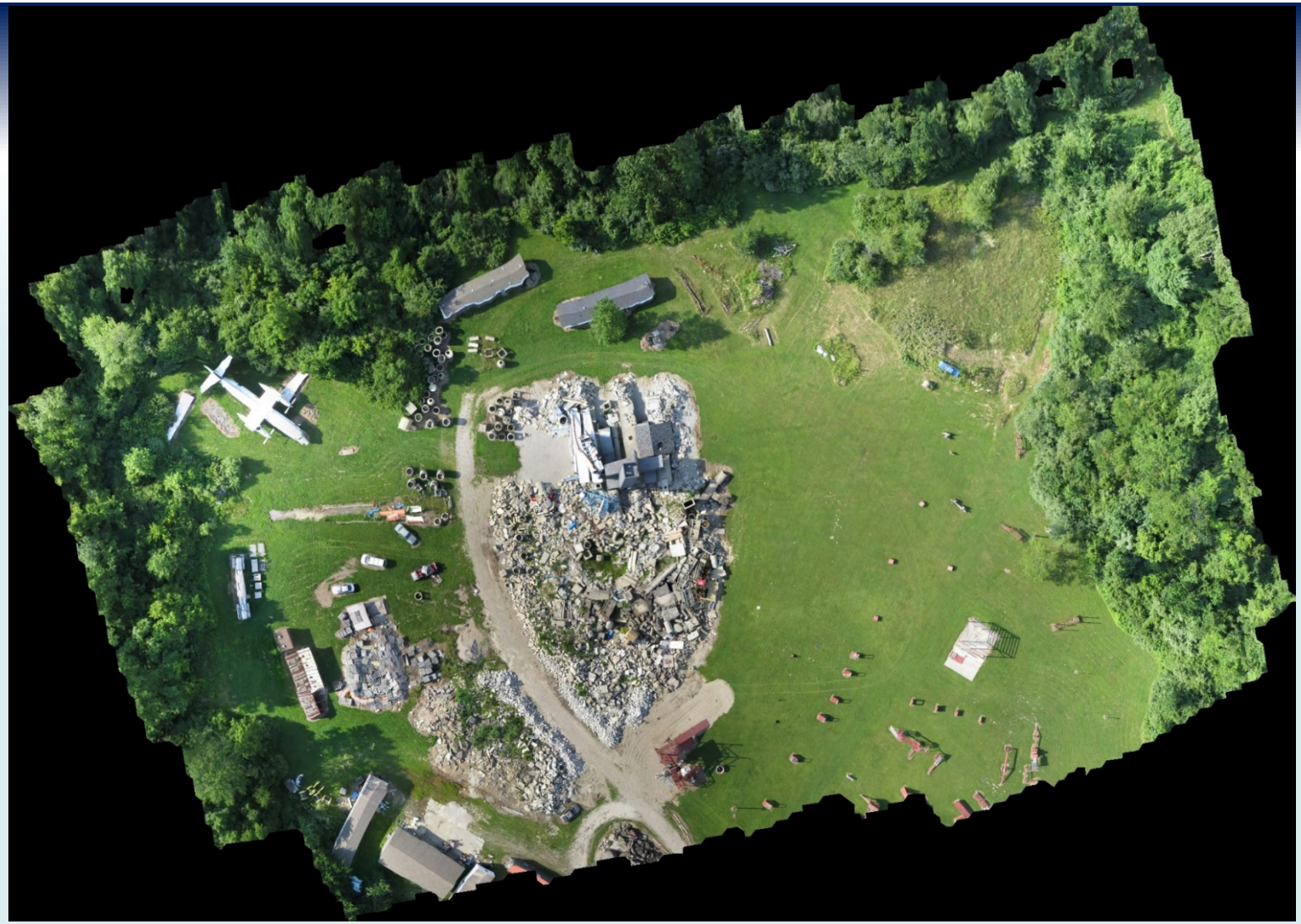
Aerospace Education

- STEM KITS! Available 1 September through 31 May each year
  - 4 STEM Kits are within the sUAS program areas
  - Micro Quadcopter, Quadcopter (must be FAA registered), RC Airplane (must be FAA registered), and Raspberry Pi Computer.
- Non-Part 107 sUAS Pilots will be classed as Demonstration Pilots (Currently Demo Pilots will fly under Section 349 – will require a FAA safety knowledge test and current CAPF 5U in type)
  - Many UAS AE activities exist.
  - Partnerships with AMA fields and instructors (cadets can get a free membership).

Emergency Services

- **Disaster Relief**
  - Live video streaming for Incident Awareness and Assessment (IAA)
  - Low altitude, very high resolution, oblique still imagery
  - Georeferenced Orthomosaic Imagery
  - 3D debris / event modeling
  - Critical infrastructure assessment
- **Search and Rescue**
  - Visual searches
  - Thermal Imagery
- **Homeland Security**
  - 3D Critical infrastructure modeling
  - Pre-incident documentation
  - Counter sUAS

Georeferenced Orthomosaics



Missing Person Searches





ES / DR Future

- Survey quality mapping (capability at NHQ, working on Regional capability)
- Hyperspectral imagery (capability at NHQ, working on Regional capability)
- LiDAR
- Higher end imagery processing / change detection
- Radio direction finding

Airframes in Use

- **Small sUAS in use:**
  - DJI Phantom 3 / 4 Professional
  - DJI Mavic 2 Enterprise Duo
  - Instanteye (Mark 3 / Gen 4)

- **Medium sized sUAS in use:**
  - RC Timer F800
  - Skylark Endurance Quad
  - DJI Inspire 2

- **Larger sUAS in use:**
  - DJI Matrice 210 RTK
  - Event 38 E384 (our fixed wing solution)

Phantom 4 Professional



- Up to 25 min of flight
- 4K / 12 MP camera
- 1 unit equipped with multi-spectral cameras (R,G,B, O, Cy, NIR) – 20MP MAPIR Survey 3 cameras

DJI Mavic 2 Enterprise Dual



- 30 min flight time
- Dual 4K/12MP EO camera with 160x120 IR sensor
- Has mountable speaker, spotlight.

InstantEye Mark 3 / Gen 4



- ISR Version
- Uses a gimbal stabilized 4K EO camera coupled with 640x512 IR camera
- Can mount a MAPIR Survey 3 20MP camera
- AFSOC Approved as non-COTS sUAS for DOD use

- HLS Version
- Has a mount to carry/drop up to a 3lb object
- Can mount a MAPIR Survey 3 20MP camera
- AFSOC Approved as non-COTS sUAS for DOD use

Inspire 2



- Up to 30 min of flight
- 1 downward sensor
- Zenmuse X5S Camera (5.6K, 20MP camera)
- Images are georeferenced

Skylark Endurance Quadcopter



- 35-40 min flight time
- MAPIR Survey 3, 20MP (R,G,B) camera which can be interchanged to multispectral.

Matrice 210 RTK (Real Time Kinematics)



- Up to 35 minutes of flight
- GPS accuracy to 2 cm
- 2 downward sensors or
- 1 upward sensor
- Z30 Camera is 5K+ FMV, 20 MP still, x30 Optical Zoom, x6 Digital Zoom for up to x180 zoom.
- ZXT2 is a 4K/12 MP camera teamed with a 640x480 IR camera.

Event 38 E384



- Fixed Wing UAV
- 90 min flight time
- Sony R10C 20MP mapping camera
- Size and flight characteristic similar to RQ-11 Raven

USAF Counter sUAS Support

Using USAF provided COTS/GOTS sUAS, specially approved & trained CAP personnel are supporting active duty AF SECFOR C-sUAS training by acting as a "Red Cell" and flying those sUAS into AF installation airspace.

USAF Counter sUAS Support

- Program is being administered within the sUAS program much like Green Flag is within OPS. This is an HQ CAP mission and is assigned/administered by them and is funded directly from the USAF. The program is known as “Red Cell”
- Personnel will be specifically vetted by the CAP/DOU and staff for participation
- Will be working directly with USAF SECFOR and OPS staff at the chosen USAF installations.
- Will require both pilots and technical teams.
- Requires coordination between Red Cell Teams and Active Duty AF locally.
- sUAS will be intercepted with non-kinetic equipment ONLY.

sUAS Programmatic Implementation Update

- Every wing (with the exception of IAWG) has a sUAS kit (18 months ahead of our projected schedule).
    - Has a Phantom 3 or 4 Professional
    - A F800 or Endurance Quad with computer
    - Zayrock training sUAS
- A fixed wing E384 will be deployed to each FEMA region by the end of FY2019 (12 mo ahead of schedule)

To be declared to have its initial operational capacity, a Wing must have a minimum of 5 qualified sUAS Mission Pilots. and 5 qualified sUAS Technicians – we'd like each wing to have IOC by the end of FY20!

sUAS Programmatic Implementation Update

- We currently have region and national level response capability for sUAS
- An OPLAN for CAP sUAS National/Regional level response was briefed to Region & Wing/CCs (and any other interested party) via Webinar on 13 June.
- A sUAS push pack to support that response has been developed and is staged at HQ CAP to support that OPLAN (sUAS, IT equip, Generator, Comm Equip).

Future Program Goals

- ICP sUAS capability (150 across the country)
- Field a true FLIR capability for GT to the field by FY 2023 (we're way ahead of schedule – its in our unfunded request list now. GT testing occurred at NESA this year). A FLIR/GT Integration course is under development for NESA next FY.
- Upgrade our F800 & EQ platforms (part of the ICPs in our unfunded list)
- Field one Matrice 210 RTK, and an iGage iG3s GPS system to support both RTK and PPK processing for each FEMA region (now being tested at HQ CAP)

Kittyhawk Enterprise Solution

- We have acquired an unlimited use / unlimited license account with Kittyhawk.io. Accounts are set up through the HQ CAP sUAS Offices

- This gives us the fleet management/maintenance tracking, battery tracking, sUAS mission management, Low Altitude Authorization and Notification Capability (LAANC)

- Pilot logs!

- Secure video streaming from the UAS to the customer!

- Soft roll out occurring now with C-sUAS Teams. Hard roll out after the National Conference.

Region, Wing & Unit Acquired sUAS

- Units often have other financial resources beyond HQ CAP
- Unit acquired sUAS are permitted (but we want them to be mission capable – fit our operations)
- Please coordinate your purchase / donations with CAP/DOU and his staff before and after your acquisition.
- HQ CAP will register all CAP owned sUAS (unit purchased, donated, acquired, etc.) with the FAA. Please do not register it on your own! The FAA doesn't want to be inundated with hundreds of accounts (One CAP – One Account)

Questions!?!?!?

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