

## UAS Advisory Committee Minutes

**Date:** 4/30/2022, 2-6PM

### **Members:**

Han Tse (Repair-a-Drone)  
Gabriel Lovasz (Cardno/Stantech)  
Gus Calderon (Airspace Consulting/Firewatch)  
Isaac Hernandez (Scout Drone USA)  
Mike Guest (Palomar College/Repair-a-Drone)  
Mikela Garza (Birds Eye Aerial Drones)  
Wing Cheung (Palomar College)  
Mark Bealo (Palomar College)

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### **1. Introductions (2:00-2:30)**

Member introduced themselves, their affiliations, current projects, and experience with drones.

### **2. Curriculum/Program Review and feedback (2:30-3:00)**

Wing asked members to review the curriculum of the Palomar drone certificate and degree programs and requested feedback.

The committee unanimously agreed that the meteorology course (GEOG 110) currently required by the programs should be replaced by an introductory photography course, which covers camera settings (f-stop, aperture, ISO, etc...) and how to frame a shot.

In addition, the following topics should be introduced in existing or new courses:

- Photogrammetry (Gabriel, Isaac)
- The roles of surveyors and surveying equipment in drone operations (Isaac)
- Liability issues and awareness of public perception of drones in different settings (e.g. residential neighborhoods, military and federal installations) (Gabriel, Gus)
- When to use manned aircraft vs. drone (Gus, Gabriel)
- Fleet management and maintenance software (e.g. battery maintenance, flight log) (Isaac, Gabriel, Han, Mikela)
- Overview of the applications of artificial intelligence in analyzing drone data (Han)
- Overview of how autonomous systems are advancing the drone industry (Gus)
- Discussion of drone-related IT topics such as data link security and transmission of locational data (Gabriel)
- Continue to partner with industry partners to create project-based learning opportunities and internships for students in different industries (Han)
- Continue to expose students to different aircrafts and sensors (Isaac)

### **3. Labor market discussion (3:00-4:00)**

**-Where are the jobs? (location, industry)**

Drone related jobs can be found in the region in various sectors including utility/infrastructure inspection (Mikela, Isaac, Han), defense and federal agencies (Gabriel), public safety and fire monitoring (Gus), environmental/tree monitoring (Isaac, Gus), and other contracting opportunities (Isaac).

**-What are the in-demand skills?**

- File management and security (Gus, Gabriel)
- Understanding of different file formats (e.g. jpg vs raw) (Isaac, Mark)
- Understanding of what to do during in-flight emergency (Mike)
- Ability to learn and navigate the settings in different flight operation apps (e.g. DJI Go) (Mike)

**4. Emerging trends (4:00-6:00)**

**-Hardware/software**

**Hardware:**

“Blue sUAS” that have been cleared by DoD are increasingly deemed the only acceptable drones when operating in federal installations, under federal contracts, or by federal agencies. Similar trends are starting to be observed at the municipal and state levels. (Gabriel)

DJI drones continue to be used by private companies and non-federal contractors (Mikela, Han). The school may want to get a larger number of relatively cheaper enterprise drones (e.g. Matrice 300), in order to ensure that all students have equitable access to these drones, and are trained to operate them safely and confidently. (Mikela, Han)

LiDAR has important commercial applications in coastal erosion and environmental monitoring (Isaac), homeland security (Isaac), structural and powerline inspection (Mikela). But it is currently cost prohibitive for many companies, so that may be undermining the number of job openings for LiDAR operators in existing drone companies at the moment (Gus). More research needs to be conducted by Mark to assess the number of local companies which are using this emerging technology in order to understand the current labor market potential for students.

Mark explained the need for a gas-electric hybrid drone (Harris H6) to give more students the opportunity to operate a heavy lift drone in the GCIP 268 and LiDAR Operations class. The committee discussed the pros and cons:

*-Pros:*

- Higher endurance (longer flight time) allows more students to operate the drone during class (Mark, Isaac)
- Students will be exposed to a heavy-lift aircraft and learn to respect the power and risk involved in its operation (Gabriel)
- Students will learn about PX4/Pixhawk since it will be used for mission planning (Gus, Mark)
- A second heavy-lift aircraft may be needed to continue running the LiDAR Operations class in case anything happens to the only heavy lift aircraft that the district currently has (M600) (Mark)

**-Cons:**

- The money spent to acquire one additional heavy lift aircraft can be spent on acquiring several less expensive aircrafts with less capable LiDAR scanners, which may increase access for students and still expose students to the technology (Han, Isaac)
- Students can be exposed to a heavy-lift aircraft and learn to respect the power and risk by asking vendors to conduct an on-campus demo, which would cost less and minimize any concerns about maintenance and liability (Gabriel)
- There are liability, safety, and maintenance concerns given the significant differences between the H6 and the existing M600. (**weight:** H6-16.5kg with fuel, M600-10kg with batteries; **power source:** H6-gas/electric, M600-electric; **prop to prop dimension:** H6-2326 to 2351 mm, M600-1180 mm)
- It is uncertain how many jobs are in the region for students who are proficient in operating a heavy lift LiDAR drone, given how cost-prohibitive the technology is and the lack of data on this topic (Wing, Gus, Han, Gabe, Isaac)

**Software:**

- Open source software such as Pixhawk/PX4, Ardupilot Mission Planner (Mike, Gabriel, Gus)
- Fleet management and operations software such as Sitiescan (Isaac)
- There is a strong need for GIS skills in many drone projects (Gus)

**-Challenges to the drone industry**

Current drone operators may not fully understand the science (e.g. photogrammetry) and the accuracy requirements of their drone projects. (Gabriel)

There is an incomplete understanding of LiDAR and photogrammetry. While some projects require the use of LiDAR, other projects (e.g. tower inspections in remote, clear areas) can be done just as well with lower cost photogrammetry equipment and techniques. (Gus, Mikela)

The transition from DJI drones to “Blue sUAS” drones remains incomplete, with some companies remaining with DJI drones while others have no choice but to use “Blue sUAS”. (Gabriel, Mikela)

The representation of women in the drone industry remains extremely low. Greater efforts are needed to attract women to the industry. (Mikela)

## 5. Action items

- Submit program change proposal to include PHOT 120 in drone programs. (Wing, Mark)

### **PHOT 120 Digital Photography (3.0)**

1.5 hours lecture - 4.5 hours lab

#### **Transferability:** UC/CSU

Introduction to theory, mechanics, optics, lighting principles, and practices of photography using Digital Cameras. Explores the history, aesthetics, and the conceptualization of photographic imagery. Photographic seeing is stressed. Includes practices and procedures for image capture, asset management, software developing, printing, finishing and presentation and critique. Students are required to have an adjustable digital camera with manual exposure and RAW format capabilities.

- Integrate topics into existing courses or new courses as needed. (Wing, Mark, other faculty)
- Research LiDAR labor market potential for program graduates (Mark)
- Continue outreach at professional conferences and work with professional organizations (e.g. Women and Drones) to attract women to the drone industry (Wing, Mark)