

## Curriculum for Unmanned Aircraft Systems (Drone) Competition

**Objective.** This activity promotes STEM learning through two activities; 1) Written test covering subjects contained in the FAA's Remote Pilot Written Exam (Part 107) and 2) Indoor, RC, line of sight flying of a basic quadcopter. The intent is for all 6 team members to participate; Four team members take the written exam (WILL NOT BE PART OF THE 2019 PRWG COMPETITION) and two other team members fly the quadcopter.

### **Event 1- Written Exam (WILL NOT BE PART OF THE 2019 PRWG COMPETITION)**

**Conditions.** The written exam is a multiple choice test, where the cadet has 60 minutes to answer 50 questions covering topics from the FAA's Airman Certification Standards for Remote Pilot (FAA-S-ACS-10A). These topics include: Regulations, Airspace & Requirements, Weather, Loading and Performance and Operations. Four cadets from the team will take the written exam and their scores (each correct question is worth 2 points) will be averaged for a team score. There are 2 versions of the test with each team getting 2 of each of the versions.

### **Event 2 - Remote control, line of sight , search and rescue course challenge**

**Conditions.** This event is conducted using the Hubsan X-4 drone contained in the CAP AE STEM kit.

*Overview.* Teams will compete by flying their UAS through a simulated search and rescue course. Their attempts will be timed with penalties (time added to their actual course time) for specific rule violations

*Equipment.* (Will be provided by Competition Director). The teams will compete with *Hubsan X-4* drone acquired from NHQ through the AE STEM Kit. No modifications are permitted to the drone or controller. Teams are permitted to purchase their own replacement batteries and propellers provided they are exactly the same as the original batteries (in mah) and propellers (in length and pitch). Teams may purchase upgraded battery chargers (such as the type which charge 6 batteries at once) and battery voltage checkers at their own expense and discretion. Teams must fly with the blade protection accessory attached.

*Mission.* The course will be an indoor course adjusted to the size of the room (typically the size of a high school basketball gymnasium). The flight is expected to be conducted by line of sight (no First-Person-View FPV allowed) and will encompass flying search grid patterns with the drone required to maintain orientation to direction of travel (the front of the drone must generally face the direction the drone is traveling). A landing will be required to be executed to a specific spot, with distance from bullseye resulting in time penalty. Two team members are each given one chance to fly the course. Their completion times, plus any penalty times are averaged for a team score. The fastest team receives **XX** points, the second fastest receives **XX** points, the third fastest team receives and so forth.

*Scoring.* Each teams written average scores are added to their course average scores to determine placement in the event. Set-up for the competition. **Not to be shared with the teams!**

*Team prep.* Teams are required to show up at the site with their own drones and transmitters. (EQUIPMENT WILL BE PROVIDED BY THE COMPETITION DORECTOR). They must also have their own batteries for the transmitters and the drones. (The transmitters use AAA style batteries and the drone batteries can be carried aboard commercial aircraft (they cannot be in checked baggage, tho).