Table D - UAS Design Specification

Requirement Title	Requirement Definition	Minimum Capability	Preferred Capability
UAS Manufacturer Suggested Retail Price (MSRP)	The price that UAS would sell for in a store. Includes the cost of formal flight training if required. Includes cost of licensed frequency if required.	MSRP of $7,500 or less.	MSRP of $5,000 or less.
Real Time Red, Green, Blue (RGB) Video	Real-time video is the ability to provide full motion video to the ground control station during anticipated mission operations. The video link needs to be able to maintain quality transmission through multiple indoor obstructions made of various building materials	The UAS shall provide real time full motion video to the ground control station at a minimum resolution of 1280 X 720 pixels at 30 frames per second.	Maximize resolution and frame rate. Encrypted solution.
Local (Onboard) Recording	Data recording of onboard UAS sensors/payloads that can be reviewed post flight.	The UAS shall provide recorded video that is stored on UAS or on storage device that can be viewed post flight. Must be a minimum resolution of 1280 X 720 pixels at 30 frames per second.	Maximize resolution and frame rate. Ability to record sensor/payload data from the UAS controller. Ability to record audio if equipped. Ability to record flight telemetry data.
Flight Time	The amount of time that the UAS can fly on one fully charged battery.	The UAS shall be able to fly a minimum of 15 minutes.	The UAS can fly greater than 30 minutes, which is considered the industry standard.

Requirement Title	Requirement Definition	Minimum Capability	Preferred Capability
Flyability (Ease of Control)	The ease in which the pilot/operator is able to control the UAS in the flight environment. This includes the ability to maintain a constant position when the remote pilot in command (RPIC) is not providing any control input (hands off) and the ability to easily navigate and maneuver in a GPS-denied environment. Various levels of autonomy may be incorporated.	During the live flight event, the UAS can be operated in the challenge live event by someone with formal flight training specific to the UAS.	Incorporated sensors that will assist the operator in the overall control of the UAS in dark and constrained spaces. Can be operated without formal flight training by someone with little to no experience in the challenge environment.
Ease of Operation	The ease in which the UAS can be operated. This includes the amount of personnel it takes to operate and how portable the UAS is.	The UAS shall be able to be operated by 1 person. The UAS shall also be portable enough that 2 people can carry and unload.	The UAS shall be able to be operated by 1 person. The UAS can also be portable enough that 1 person can carry and unload.
Power Source	The type of power that is used to operate the UAS.	The UAS shall be battery operated only.	N/A
Ground Station Control (GCS)	The device used to control the UAS. This includes the command and control (C2) link. The C2 link needs to be able to maintain control of UAS through multiple indoor obstructions made of various building materials	Ability to provide command and control through multiple indoor obstructions.	Frequency Hopping Spread Spectrum (FHSS). Encrypted C2 link.
Flight Termination System (FTS)	The FTS is a subsystem that can immediately cut power to all UAS motors at once when activated or initiates an inverted dive for a horizontal flight aircraft. Activation shall be possible for any one of the following: 1. If the UAS passes a geofence set by the contestant. 2. If the UAS is disconnected from the flight controller for a set amount of time. 3. To allow for a “kill” command to be sent to the UAS via the controller.	The UAS shall be equipped with an FTS (i.e., a Kill Switch) that when activated cuts power to all motors.	N/A

Requirement Title	Requirement Definition	Minimum Capability	Preferred Capability
Deployment Time	The amount of time it takes to deploy the aircraft from a packed carrying case to taking off for flight.	Deployable in 10 minutes.	Deployable in 3 minutes or less.
Additional Preferred Capabilities (No minimum)			
Thermal (Infrared)	Sensors that enable UAS operators to see invisible temperature data.	N/A	Capable of displaying thermal data and detecting hotspots.
Night Vision	Camera that enables the UAS operator to see into dark rooms/spaces.	N/A	Capable of displaying night vision on GCS in place of the standard RGB video stream.
Audio	Capability that the operator can use to communicate via the UAS with someone, or the operator can listen to what is happening on the UAS side.	N/A	1-way Operator to UAS, 1-way UAS to Operator, 2-way Both.
Auto-flip (Turtle)	Capability of the UAS to right itself after it has landed in an abnormal orientation.	N/A	Demonstrated capability
Battery Swappable	The UAS battery can be swapped out for a fully charged battery.	N/A	Demonstrated capability
Perching	The UAS can land on an uneven surface and maintain a level attitude by intermittently using motors.	N/A	Demonstrated capability

Safety Specific Requirements

- All flights shall comply with local, state, and Federal laws and regulations.
- All flights shall occur at authorized UAS flying areas.
- All UAS competing in the challenge must follow Federal Aviation Administration (FAA) rules and regulations.
- All UAS competing in the challenge must follow Federal Communications Commission (FCC) rules and regulations. Unlicensed and licensed frequencies are authorized. If using a licensed frequency, challenge participants must present an FCC license for the frequency.

Any design that is deemed to pose a significant risk may be disqualified or not selected to advance.