



# FIRST RESPONDER UAS INDOOR CHALLENGE

4.0 Live Event Safety Plan

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# First Responder UAS Indoor Challenge

## Live Event Safety Plan

### Overview

The Live Event Safety Plan creates a common language and standardizes requirements and protocols for use during the First Responder UAS Indoor Challenge Live Event. This overarching plan describes how to address safety during specific procedures, tasks, and events throughout the live event.

All staff and contestants shall comply with both the words and the spirit of this safety plan. All judgments and decisions shall be made with safe operations in mind.

### Safety Plan Objectives

The ultimate objective of this plan is to instill a safety culture and to create a safe environment for those involved with the live event. The safety plan aims to:

- Safely execute flight operations in a timely and cautious manner.
- Identify, evaluate, and eliminate hazards or reduce any associated risks to a level acceptable to the Safety Officer.
- Prioritize the reduction of dangers throughout flight evaluations.
- Creating an overarching safe event for spectators attending or participating in the live event.

### Live Event Schedule

The following schedule (Table 1) defines the key events and planned tasks associated with the live event. The products developed to support the live event will be iteratively refined over time. The final delivery will take place on or about 45 days before the start of the Live Event.

Date	Task / Event
02 May 2023	Safety Tests
02 May 2023	Static Test and Evaluations
02 May 2023	Additionally Preferred Capabilities Evaluation
03 May 2023	Technical Flight Evaluations
03 May 2023	Simulated Indoor Mission Evaluations
04 May 2023	Simulated Indoor Mission Evaluations
04 May 2023	Award Ceremony

Table 1- Live Event Schedule

### Roles and Responsibilities

Each member of the staff team has specific roles and responsibilities, as highlighted below:

**Mission Commander** – Directs and oversees the live event, including ground and flight events. Responsible for establishing, maintaining, and enforcing the live event policies.

**Safety Officer** – Responsible for implementing and verifying the safety protocols and managing risks before and during the live event.

**Test Administrator** – Conducts and oversees event criteria testing. Records all required criteria scoring on the scorecard.

**Scorer** – Collects event criteria scoring taken by the Test Administrators and compiles scores into the overall score tracker.

**Runner** – Collects scorecards from the Test Administrators and delivers them to the Scorers in the command center.

**Admin/SME/Judges** - Oversees the live event, takes notes as needed to inform judge's decisions better, and participates in competition remediation as needed.

**Event Staff** – Responsible for the overall logistics of the competition. Duties may include:

- Registration
- Badging
- Providing event instructions
- Managing access control
- Operations area logistics
- Food/Water
- Set up and tear down

## Risk Management

Before any participant can fly, the Safety Officer will assess flight risk using a Flight Risk Analysis Tool (FRAT). A FRAT aims to identify potential hazards, their effect on mission outcomes, and mitigations that might help to lessen those potential hazards.

## Communication Equipment

Event staff will be equipped with radios to maintain communications with the Mission Commander, Safety Officer, and Test Administrators. The Mission Commander and/or the Safety Officer will have access to a P.A. system to loudly communicate instructions and directions in the event of an emergency to all people attending the live event.

## Access Control

Access control protocols streamline access into certain event areas according to need, role, or responsibility.

- Access Control Points (ACP) will govern proper access to the spectator area, restricted areas, and the operations area. Event staff will manage ACPs by monitoring access badges.
- Access control badges will be provided at a designated welcome and check-in area (outside controlled areas).
- Government-issued identification, such as a state-issued driver's license or student identification card, must be presented to receive a badge.

- Badges will be of sufficient size and color to enable easy identification and determination of appropriate access.
- Color will be used to denote access levels as described in Table 2.

Access Title	Badge Color	Issued to	Access Areas
Event Staff	Purple	Airport Staff & Event Staff with TSA training	All Access
Event Staff	Black	Event staff, NIST, & CCC	All Access Except Ramp Access
Judges	Black	Judges	All Access Except Ramp Access
Subject Matter Expert	Black	Subject Matter Experts	All Access Except Ramp Access
Contestants/NIST Lane Participants	Green	Contestant Teams	Staging, Spectator Area, Testing Area, and Ops area when escorted
VIP Access	Yellow	TBD	Spectator Area, Ops Area with Event Staff Chaperone
News/Media	Red	News and Media Teams	Spectator Area
Spectators	Red	Attendees Viewing the Live Event	Spectator Area

Table 2 - Notional table defining badges and levels of access

## Event Command Center

An event command center will be established and staffed each day of the event. The command center will:

- Be located in a manner that enables the best view to see most aspects of the live event.
- Be always staffed by Mission Commander or designee.
- Have access to call emergency services
- Be equipped with medical supplies

## Briefings

Before entering the live event, all staff, participants, press, and VIPs must receive the appropriate briefing(s) as listed below. The Mission Commander and Safety Officer will provide a briefing at the beginning of each day. Event staff and participants must attend this briefing. Additional briefings to spectators, media, and VIPs will be provided as needed by event staff.

**NOTE: Each day, a colored sticker applied to attendee badges will identify that they have attended the day's briefings.**

Staff and Challenge Teams will receive:

- Event overview
- Schedule
- Operations briefing
- Safety briefing

News/Media/VIPs will receive:

- Operations briefing

- Safety briefing

Spectators will receive a safety briefing.

## Spectator Area Policy

The designated event staff will strictly enforce the following safety policy:

- The spectator area will be clearly marked and enclosed by a semi-permanent barrier.
- The spectator area will have an access control point; every individual entering will be checked and must display an appropriate badge and daily briefing sticker.
- The spectator area will be placed at a distance sufficiently away from the flight operations to minimize risk to the spectators.
- No flight operations are permitted over the spectator area.

## Operations Area Policy

Discipline to safety is critical while live flight operations are being conducted. The policies below are designed to protect the aircrews and UAS participating in the event.

- All personnel with operations area access must receive an operations briefing before entering the access-controlled area.
- The operations area will have an access control point; every individual entering will be checked and must display an appropriate badge and daily briefing sticker.
- All staff and challenge participants must keep the operations area clear of clutter.
- While flying, no one may talk with the pilot other than the participant's crew, the Test Administrator, the Safety Officer, or the Mission Commander.

## Flight Operations

### Indoor Airspace Management

- Operations areas utilized for the event shall be limited to designated flight boxes inside the building.
- Flight boxes for specific events shall be defined and clearly marked off from the surrounding area.
- Only one UAS will operate within a flight box at a time.
- A landing/takeoff zone will be designated and clearly marked within each flight box. This is the area from which all UAS must take off and land (unless an emergency landing is required).
- No vehicle or personnel are allowed to enter the flight boxes when a UAS is in flight.

**NOTE: If unforeseen encroachment into a flight box occurs, the Test Administrator must immediately halt flight operations until the matter can be resolved. The Test Administrator shall determine the most appropriate method to terminate the flight and then immediately inform the Mission Commander and Safety Officer of the issue and status.**

### Aircraft Inspections

Each pilot is responsible for the safe maintenance and inspection of the UAS that they will fly. However, to reduce risk, before flight, each aircraft must pass the safety inspection and Flight Risk Analysis.

## Flights

During live flights, the items below must be followed:

- Flight crews will follow all directions from the Mission Commander, Safety Officer, or Test Administrator without delay or question.
- A Test Administrator will be present during all participant flights.
- The Test Administrator will survey the local area and flight box to ensure it is safe for flight operations.
- At no time shall any UAS operate outside of a flight box.
- Any malfunctioning UAS shall land immediately in a safe area.

**NOTE: If the Mission Commander, Safety Officer, or Test Administrator identifies an unsafe condition, the flight must be immediately stopped until the matter can be resolved. The Test Administrator shall determine the most appropriate method to terminate the flight and then immediately inform the Mission Commander and Safety Officer of the issue and status.**

## Recharging Stations

Power outlets will be available in the staging area during the live event for charging batteries. If additional capacity is needed, a second location will be provided to challenge participants.

## Incident Response Plan

### Incident Response

The most critical component of an incident is to prepare in advance and clearly communicate how such events are handled. The Safety Officer will cover these procedures within the Safety Briefing.

If any incident occurs, the Safety Officer will direct and coordinate the overall incident response and notify appropriate emergency response agencies as required.

### UAS Crash and Recovery

In the event of a UAS crash, the process below shall be followed:

- The Test Administrator will tell the pilot to initiate the 'kill switch.'
- The Test Administrator will notify the Mission Commander and Safety Officer of a crash or unplanned landing.
- If someone is injured or there is an immediate threat (i.e., fire), the Test Administrator will provide that information to the Mission Commander and Safety Officer and provide aid.
- The Test Administrator will tend to the patient if first aid is needed until incident response personnel arrive.
- The Safety Officer will evaluate the crash site and determine if further action is required before recovery.
- If cleared, the Safety Officer will direct event staff to recover the UAS.

**NOTE: If the Mission Commander, Safety Officer, or any Test Administrator observes a UAS not responding appropriately to commands and deems it a threat to safety, will immediately direct the UAS team to initiate the 'kill switch.'**

**NOTE: If anyone observes indications of fire following a crash, notify the Mission Commander or Safety officer immediately. The Safety Officer will direct all teams to land their aircraft immediately and lead an evacuation to the predetermined safe location outside.**

### **Medical Services**

The Safety Officer will contact the appropriate local emergency services if these services are needed. The Safety Officer may direct other Event Staff to use on-site medical kits to tend to a patient until medical services arrive.

### **Severe Weather**

The Safety Officer will monitor the local weather for adverse conditions (i.e., severe storms, tornados, etc.). Upon notification of impending severe weather, the Safety Officer may elect to postpone the event or notify all present for the live event to move to safe areas until the weather passes.



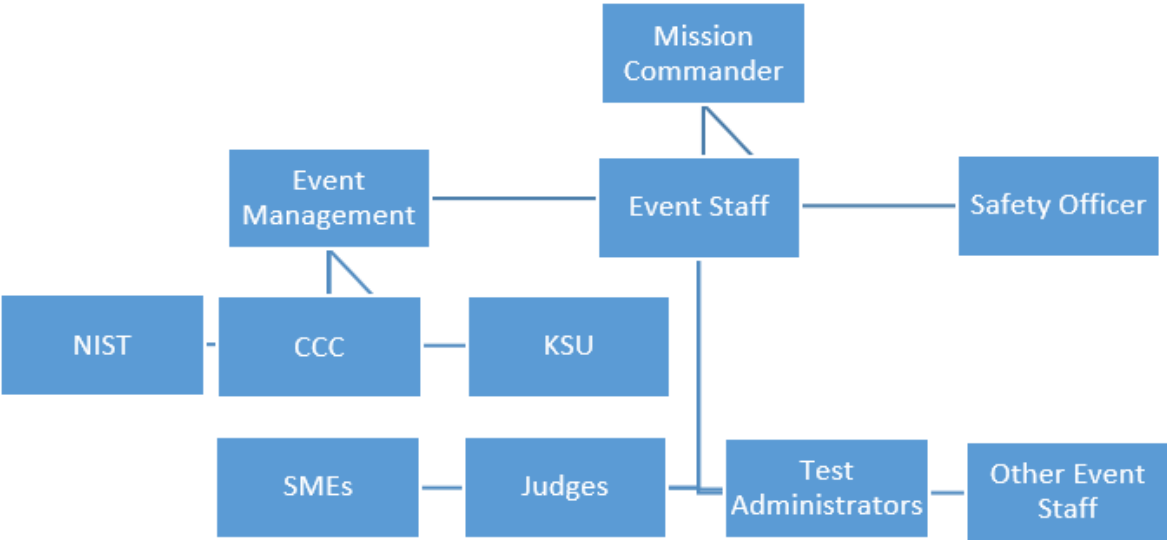
## Appendix A: Flight Risk Assessment Tool (FRAT)

Instructions: The safety officer will use the FRAT below to fill out a holistic risk assessment for the day. This includes all participants and staff. If a mitigation is in question, the higher risk value must be used.

NIST Indoor Challenge FRAT						
	Date Modified: 03/21/2023		Pre-Mitigation #	Mitigation Strategy	Post Mitigation Sign-Off	
Environmental	Current Weather	Clear	1			
		Low-Med Risk Storms	2			
		High Risk Storms	3			
	Forecast Weather	Clear	1			
		Low-Med Risk Storms	2			
		High Risk Storms	3			
	Temperature Inside	50°F-80°F	1			
		(20°F-49°F)(81°F-100°F)	2			
		(< 20°F)(>100°F)	3			
	Emergency Egress	Checked and free of obstructions	1			
Not checked or obstructed		50				
Equipment	Passed Tech Inspection	Complete by all Teams	1			
		Partially Complete	2			
		Not Complete	3			
		Complete	1			
Daily Safety Briefing	Not Complete	50				
	First Aid	Available and stocked	1			
Fresh Water	Not available or not stocked	50				
	Available and stocked	1				
Access Control	Available and stocked	1				
	Not available or not stocked	2				
Fire Extinguishers	In place and inspected	Not inspected	50			
		Available and in green arc	1			
	Not available or not in green arc	Available and in green arc	1			
		Not available or not in green arc	50			
Staff	Safety Officer Hours of Sleep	> 8	1			
		7-5	2			
		< 4	3			
	Safety Officer Distractions (Stress)	None-Mild	1			
		Mild-Moderate	2			
		Extreme	3			
	Mission Commander Hours of Sleep	> 8	1			
		7-5	2			
		< 4	3			
	Mission Commander Distractions (Stress)	None-Mild	1			
		Mild-Moderate	2			
		Extreme	3			
Staffing	All positions staffed	1				
	- 1 position staffed	2				
	- 2 positions staffed	3				
	- 3 or more positions staffed	5				
<b>Pre-Mitigation Total</b>				<b>Post Mitigation Total</b>		

Pre-Mitigation Totals			
< 20	Good to fly		
21 - 24	Requires Self Mitigation		
> 25 < 30	Requires Mitigation and Mission Commander Signature	Signature:	
> 30	Requires Mitigation + Executive Director Signature	Signature:	

**Appendix B: Operational Structure**



The operational structure of the live event reflects a program hierarchy and communication paths. All those responsible for the safety and execution of the Live Event will report to the Mission Commander.

Appendix C: Event Map

TSA Restricted Access Area

