Orientation

SUAS 2022

Welcome to SUAS!

You made it!

- SUAS 2019
- ~~SUAS 2021~~
- ~~SUAS 2020~~

- **SUAS 2022**

71 Teams Registered

69 Technical Designs

37 Flight Readiness Reviews

Mission Demonstration

Check In

Check-In
Team captain present
At least 50% of competition team present
Signed waivers for all attendees
Updated contact info for team captain and advisor (if traveling) *Get a local phone number for the captain and advisor to contact them if needed.*
Badges *Teams receive badges that must be shown to gain entry to events. They will not get another copy.*
Interop Details *Teams receive interop details (IPs, login) which they'll use at the interop testing and during the mission. Teams must bring this copy to the flight-line for the demonstration, they will not get another copy.*
Meal & banquet tickets *Teams receive tickets for up to 8 competition team members and the advisor, based on registration. Additional tickets must be purchased separately by competition guests.*
SWAG *If the competition is distributing SWAG (e.g. stickers), this happens at check-in.*

Orientation

- Dinner

- Details & what to expect this week

- Reminders on rules & requirements

- Select flight order

Food & Drinks

- Food requires tickets
  (provided at check-in)

- Extra tickets available for purchase

- Breakfast and lunch each day

- Dinner at Check-in & Awards Banquet

- Water bottles in coolers onsite

SUAS Staff

- **Leads**

- **Judges**

- **Logistics**

SUAS Staff - Best to Ask Questions

Phillip Tischler
Seafarer President
SUAS Technical Director

Veronique Nedeau
Seafarer Vice President
SUAS Lead Scorer
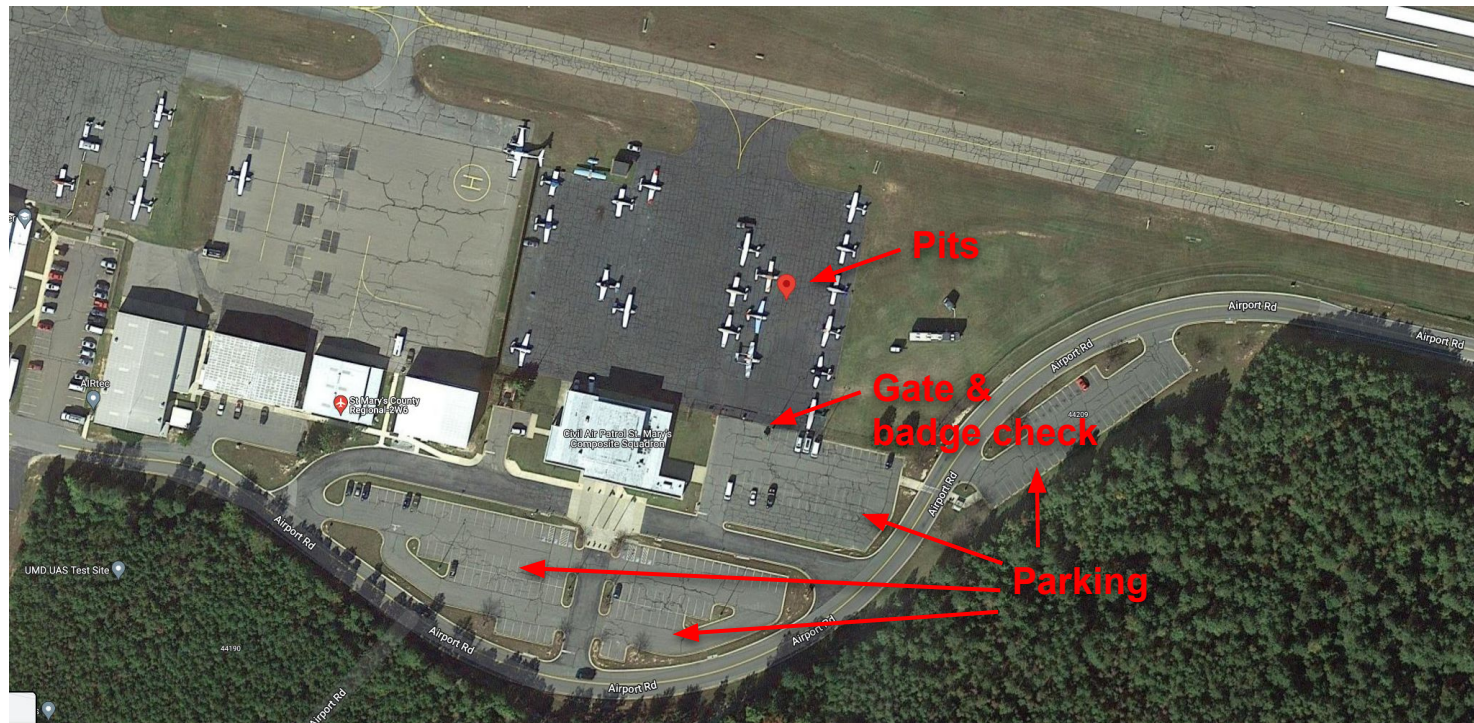
Tom Sanders
SUAS Lead Judge

Thursday

- Arrive

- Take individual team photos

- Pass safety inspection

- Test interop (optional)

- Mission demonstrations

Arrival & Setup

- **6am - 7am**: arrive, park, unload, unpack, setup

- Teams given arrival time, based on flight order, to stagger arrival
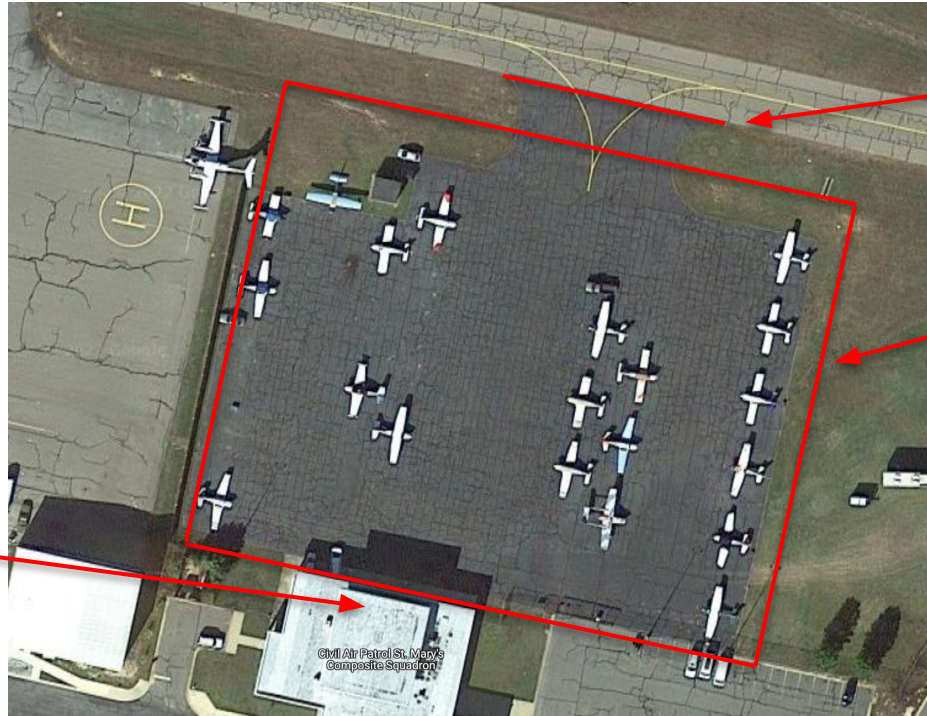
Parking & Pits

Gate & Badge Check

- Badges distributed at check-in

- Must have badge to gain entry

- If you lose or forget the badge,
  you'll be denied entry,
  and there are no extras

- Gate may close to entry and reentry
  outside of the arrival window

Permitted Areas

No crossing without escort

Must stay within pit area unless directed by competition staff

ONLY competition staff may enter terminal building

Must be within permitted area or be escorted by competition staff.
Teams which violate will be disqualified and removed from event.

Foreign Object Debris

- All objects and debris must be cleared
    - In the event of a crash and during team teardowns following their Mission Demonstration
- If Foreign Object Debris is left anywhere on the airfield, teams will be subject to penalties up to and including disqualification

Pits

- Tents for shade

- Table & chairs for your team

- Unload from parking lot

- TBD trailers at tents

- Permitted to emit RF
  (no intentional interference)

- Permitted to power motors
  without propellers attached

- No flying of air vehicles

Team Photos

- Starts at 7:30am

- First thing after arriving & unpacking

- Additional photos & videos taken throughout event

- Professional crew & aerial photography on Thursday afternoon (Fri morning backup)

Safety Inspections

- Starts at 8am

- Immediately after photo

- Must pass by 11am
  or risk disqualification

- Don't attach propellers
  but have them with you

- Inspector will meet you
  at your assigned table

- If you're not there/ready,
  or issues identified,
  inspector will come back later

- Be prepared to demonstrate
  system meets requirements

Safety Inspections

Safety Pilot (if team providing)
FAA TRUST Certificate of Completion

Unmanned Aerial System (UAS)
FAA Vehicle Registration Certificate & ID on external surface of aircraft
Single aircraft, heavier than air, no tethers, up to 55lbs
All batteries are brightly colored. No exotic fuels or batteries
All fasteners have either safety wire, loctite (fluid), or nylon nuts

UAS Return to Home/Land (RTH/RTL)
Activatable by the safety pilot and the ground station
After 30 sec comms loss, the aircraft must RTH/RTL
After 3 min comms loss, the aircraft must terminate flight *Fixed wing: throttle closed, full up elevator, full right rudder, full aileron, and full flaps down.*

Safety Inspections

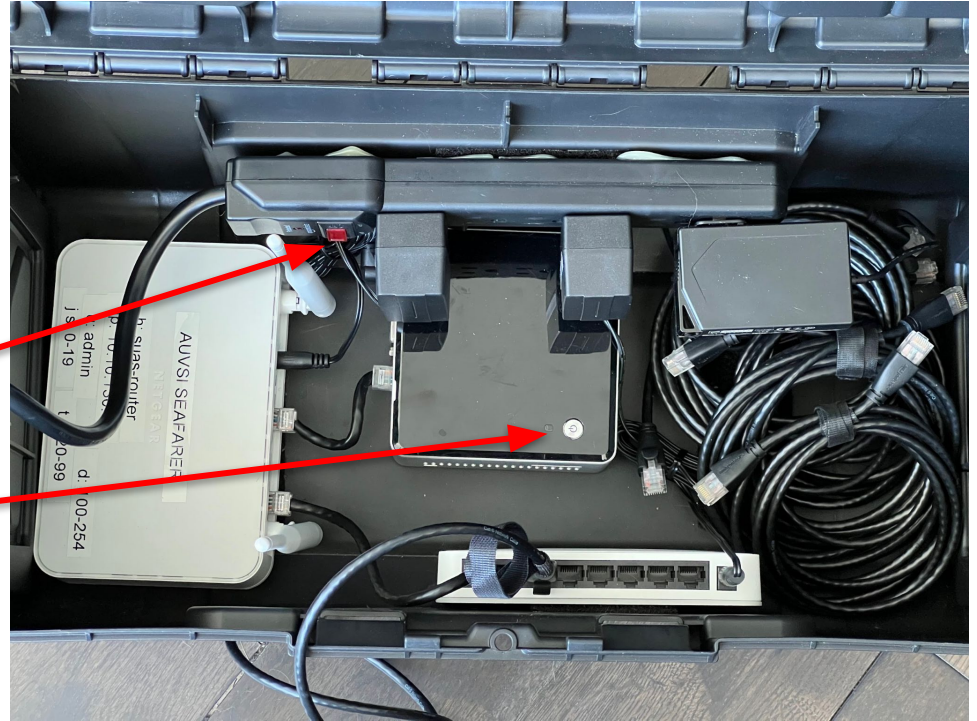| Air Drop Payload & Unmanned Ground Vehicle (UGV) |
|---|
| **Entire drop payload weight up to 64oz**
Includes everything leaving the UAS- the UGV, water bottle, drop mechanism (e.g. parachute). |
| **Drive termination activatable by safety pilot or the ground station** |
| **After 30 sec comms loss, automatic drive termination** |
| **After leaving air drop boundary, automatic drive termination** |
| **Ground Station** |
| **Map with flight boundaries and UAS position** |
| **UAS speed in KIAS or ground speed in knots** |
| **UAS altitude in feet MSL** |
| **One motor vehicle or trailer** |

Testing Interop

- Wednesday from 4pm-6pm,
  Thursday 8:30am-11am

- Plug ethernet cord
  coming out of box into your system

- Can you connect
  to the interop network?

- Can you login
  with your username & password?

- Can you retrieve sample mission?
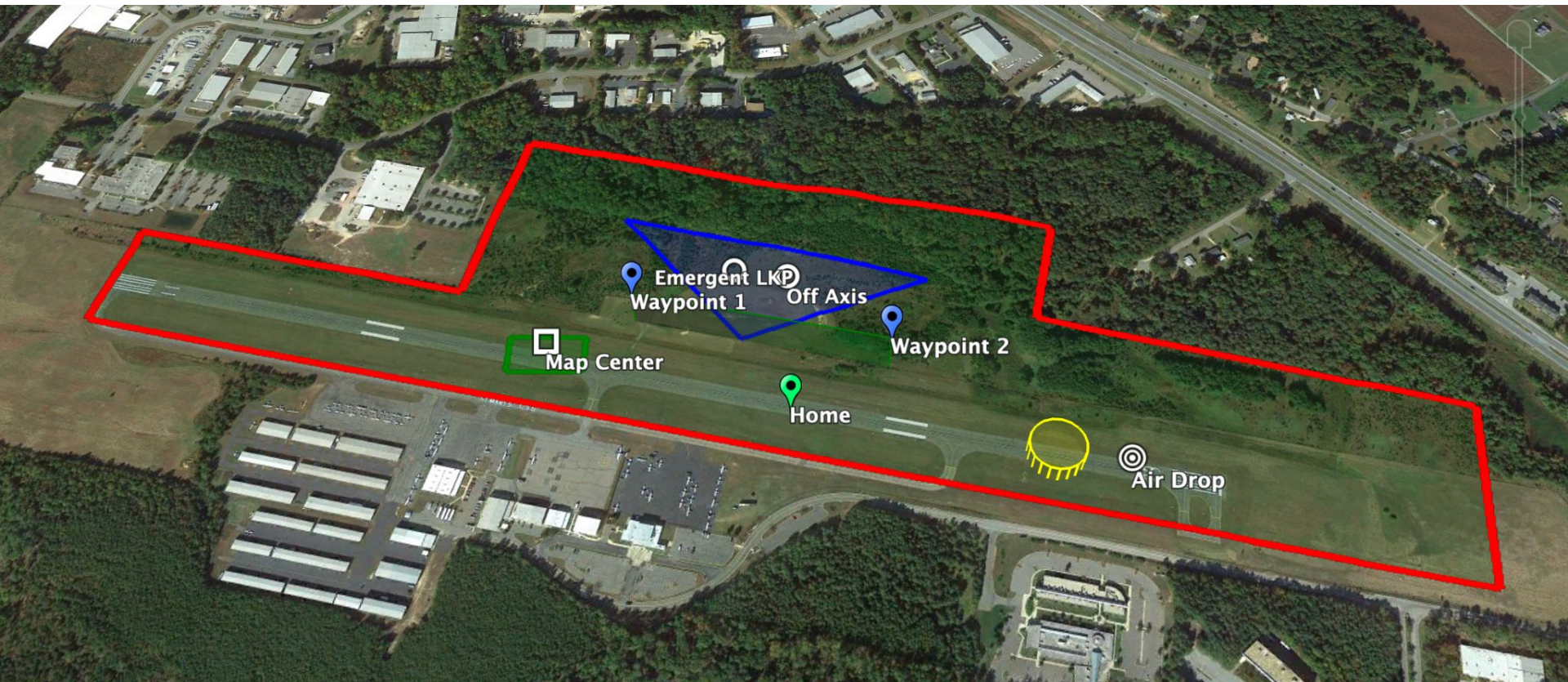 (it's not the real one)

Interop Test Hardware

- **Don't** touch internals, rearrange or unplug things, attach your own cables, etc

- Need to manually start server at power-on

- Verify power is on

- Verify computer is on

- Get Phill if not working

Test Mission (Not the Real One)

Mission Demonstrations

- Starts Thursday at 12pm, ends at 5pm

- Airspace & runway cleared by 5:30pm

- Teams flown in flight order

- Delays for wind & weather

- Delays for air traffic

Notice of On-Deck

- Judge will notify team at your table
  that you are on-deck and next to load
  for travel to flight-line

- If you are not at your table,
  we will not track you down

- If you miss your opportunity
  you will be disqualified

Loading UTVs for Transport

- Load equipment & people onto trailers for transport to flight-line

- Competition staff drive UTV & trailer to your flight-line tent

- Teams allowed to bring one vehicle & trailer to the flight-line

Setup Time

- 15 minutes to set up

- Unload into dedicated tent with table & chairs

- Receive interop cable and tent-specific mission ID

- Pre-mission brief
  - Last 5 min of setup period
  - Summary of planned tasks
  - Identification of Team Lead & Safety Pilot
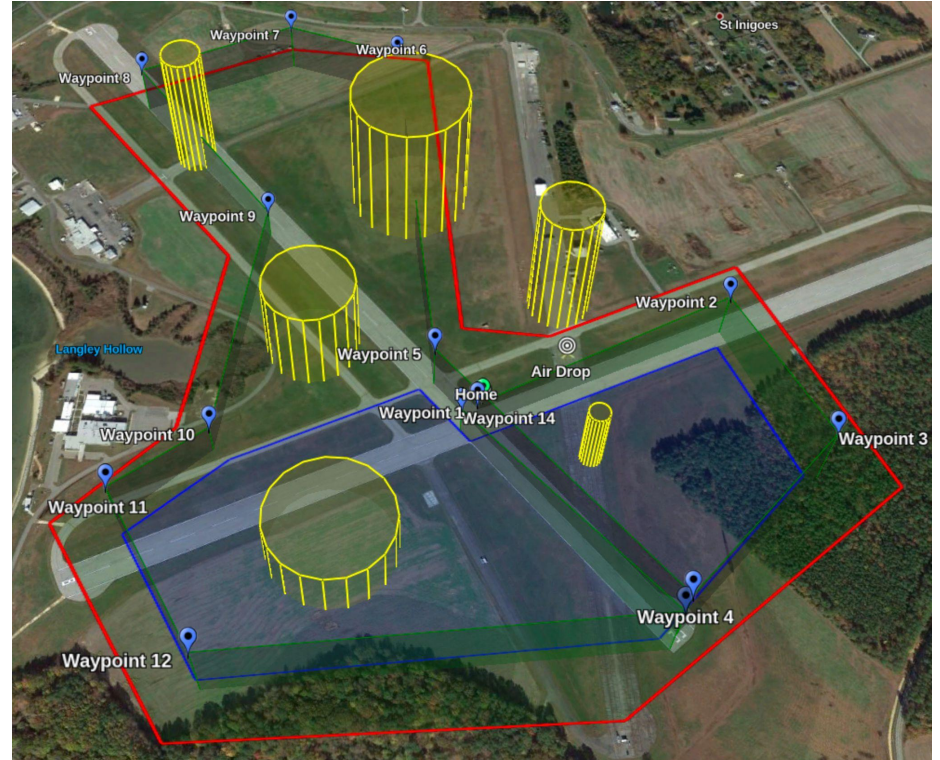 - Other information judges should know

Setup Time

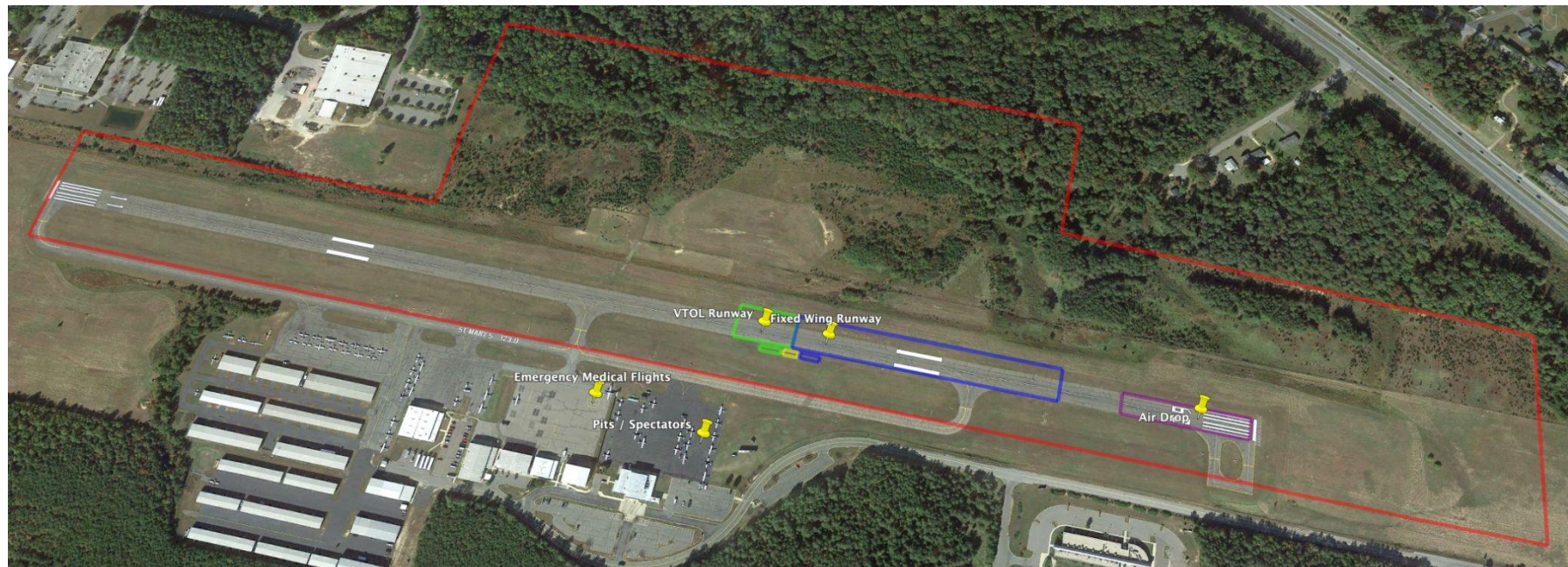| Setup Time (15min) |
|---|
| **Mission ID**
Teams are given a mission ID at setup time based on the assigned flight line tent. |
| **Interop Cable**
Teams get an ethernet cable from judges at setup time to send/receive data from interop. |
| **Up to 8 Operators**
Up to 8 student competitors. Teams can have a non-student safety pilot, but counts as one of the 8 operators, and that person cannot advise/help. The faculty advisor cannot advise, only observe. |
| **GCS Display**
Must always be visible to judges. Must show flight boundaries and UAS. Must show altitude in MSL feet. Must show speed in KIAS or knots ground speed. |
| **Pre-Mission Brief**
The last 5min must include the brief with planned tasks and identify Team Lead and Safety Pilot. |

Mission Time

- Up to 40 minutes total
    - Up to 30 minutes of flight,
      ends when relinquish airspace
    - Up to 10 minutes of post-process,
      ends when hand back interop cable
    - Points for faster mission,
      penalty for too long
- Timeout
    - Can be called by team lead
      before capturing first waypoint
    - Will last at least 10 minutes
    - Penalty for calling timeout

Mission Time

Mission Time (40min)
Timeout (10min)   *Stops the mission clock. Can be taken at flight-line before the UAS captures its first waypoint.*
Air Drop Accuracy   *The aircraft must not fly below the min altitude during drop. Teams may only perform drop once. To receive points, the UGV and water bottle must land without damage.*
UGV Drove to Location   *UGV stops within 10ft of the specified location without going out of bounds.*
Flight Time (30min)   *When the team occupies the runway or airspace.*
Post-Process Time (10min)   *Starts once airspace relinquished, ends once interop cord returned to judges.*
Operational Excellence   *Subjective measure of team performance.*

Flight Boundary

Flight Boundary

- Boundary is perimeter and altitude bounds

- Altitude bounds are
  75ft AGL (217ft MSL) to 400ft AGL (542ft MSL)

- Can only go below 75ft during takeoff and landing,
  but not over the other team's runway

- Out of bounds yields flight termination
  and no mission points!

- Upon out of bounds,
  must immediately take manual control,
  return to runway and land

Flight Termination

- If your aircraft leaves bounds and is determined to be a danger to airport equipment or aircraft, Safety Judges will inform the Safety Pilot to manually take over.
- If you cannot maneuver away from the bounds/equipment, the safety judge will order you to **immediately terminate your flight** and ground your vehicle
- For fixed-wing aircraft, this may mean a controlled crash

Runways

Runways

- VTOL and Fixed Wing / Rolling Runways

- Can takeoff & land on tarmac,
  or grass area to north (across from tents)

- Cannot be below 75ft over other team's runway
  or you are out of bounds!

Safety Pilot

- Must comply with the FAA rules

- Must always have
  unaided visual line-of-sight to vehicle

- No FPV without additional safety pilot

- Must take manual control
  at first sign of problems

- Must communicate to safety judge
  whenever transitioning between auto/manual

Safety Pilot & Judge

Flight Time
Minimum Autonomous Flight (3min)   *UAS must fly autonomously for at least 3 minutes to receive any mission points. The team must tell the safety judge when the UAS transitions between auto and manual modes.*
Safety Pilot Takeovers   *The number of safety pilot takeovers into manual flight. Manual takeoff and manual landing will each count as a takeover. Hand launch with autonomous climbout counts as autonomous takeoff. After every 2 min of manual flight, add an additional manual takeover.*
Out of Bounds   *Whether UAS meaningfully went out of the perimeter, went below 75ft AGL (217ft MSL), or above 400ft AGL (542ft MSL). Teams can go below 75ft when taking off or landing, but cannot do so over the other runway to be used by another team. Flying below 75ft over other runway is out of bounds. Upon going out of bounds, the mission is terminated, they must return to land, and no points.*
Things Falling Off Aircraft Penalty (TFOA)   *Whether parts fell off the UAS during flight. An unintended air drop counts as TFOA.*
Crashed   *Whether the UAS crashed.*

Air Traffic Mission Pause

- Onsite emergency crews for
  medical & law enforcement
  requiring airspace from time to time

- 10 minute notice of pending takeoff or landing

- Teams have 5 minutes to land

- Mission paused without penalty

- Teams given 5 minutes
  during which permitted to refuel
  but not modify aircraft or process data

Teardown & Transport

- Post-mission debrief with judges

- 10 minutes to teardown
  including loading of UTV trailer

- Competition staff drive UTV
  back to the pits for unloading

Friday & Saturday Demonstrations

- Arrive & setup 6am-7am

- Demonstrations starts at 7:30am, ends at 5pm

- Airspace & runway cleared by 5:30pm

- Teams flown in flight order

- Delays for wind & weather

- Delays for air traffic

Group Photo

- Taken after the last flight

- Typically Saturday afternoon

- No set time, must be present!

- Will not wait for teams!

Awards Banquet

- Dinner

- Keynote Speaker

- Presentation of Awards

- Business casual attire

- Must be present to collect awards and scholarships

- Have payment info (who check is payable to)

Flight Order Selection

- Teams are flown in flight order

- Two Runways, VTOL and Fixed Wing,
  with separate flight orders

- Teams will now be called up
  in random order weighted by Design Paper & FRR scores
  to select team's runway and position in the flight order

- When you hear your name,
  place your team in flight position

- Note the arrival time for the flight position

Arrival Times for Thursday

When to arrive at airport, park, and begin unloading

Flight Number	Arrival Time
01 to 05	6:00 AM to 6:10 AM
06 to 10	6:10 AM to 6:20 AM
11 to 15	6:20 AM to 6:30 AM
16 to 20	6:30 AM to 6:40 AM
20+	6:40 AM to 6:50 AM

Arrival times for Friday and Saturday will be sent via Google Groups
Check spam folder or groups website if you haven't received it by 9pm