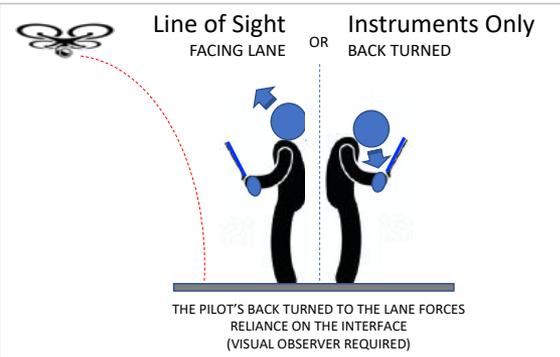


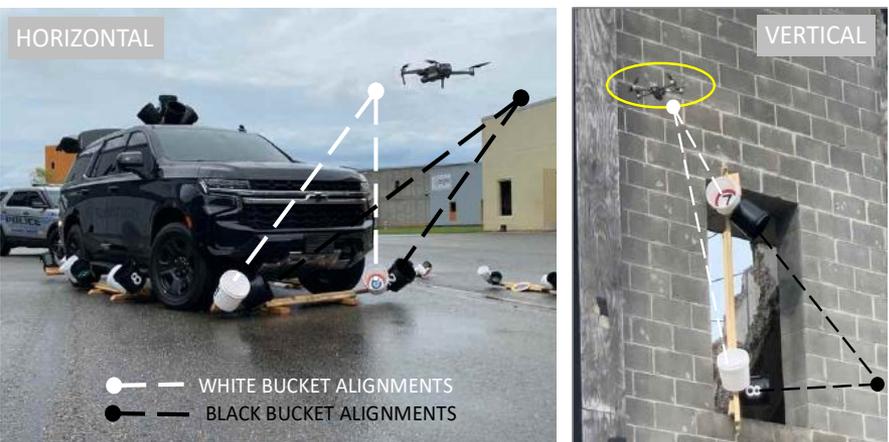
# Teams with Proctor, Pilot & Visual Observer



## Open Area Tests and Scorable Scenarios



## Obstructed Tests and Scorable Scenarios



# Pocket Guide for Aerial Drones

## Proctor Guide

### Open & Obstructed Tests and Scorable Scenarios



*Test Director*  
**Adam Jacoff**  
 Intelligent Systems Division  
 National Institute of Standards and Technology  
 U.S. Department of Commerce

*Sponsor:*  
 Science and Technology Directorate  
 U.S. Department of Homeland Security

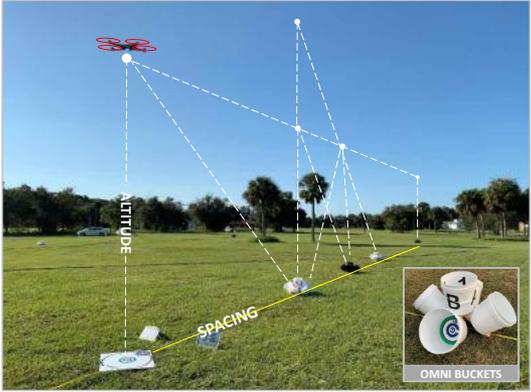
*Website*  
[RobotTestMethods.nist.gov](http://RobotTestMethods.nist.gov)



*Email*  
[RobotTestMethods@nist.gov](mailto:RobotTestMethods@nist.gov)

# Open Area Tests and Scorable Scenarios

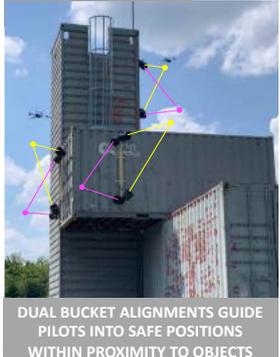
Evaluate safety, capabilities, and proficiency

MEASURE & COMPARE		SCALABLE TEST LANES (ALTITUDE = SPACING)	
 SMALL DRONES	 LARGE DRONES		
 INTERFACES	 PROCEDURES		
 SENSORS	 MANEUVERING		
 OMNI BUCKETS			

The Open Test Lanes and related scenarios are scalable to be used at various altitudes both indoors on a basketball court and outdoors on a football field or parking lot.

# Obstructed Tests and Scorable Scenarios

Evaluate safety, capabilities, and proficiency

 VEHICLE INSPECTION	 STRUCTURE INSPECTION	 DUAL BUCKET ALIGNMENTS GUIDE PILOTS INTO SAFE POSITIONS WITHIN PROXIMITY TO OBJECTS
 OBJECT INSPECTION		

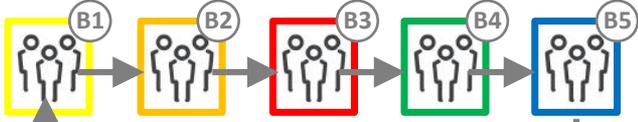
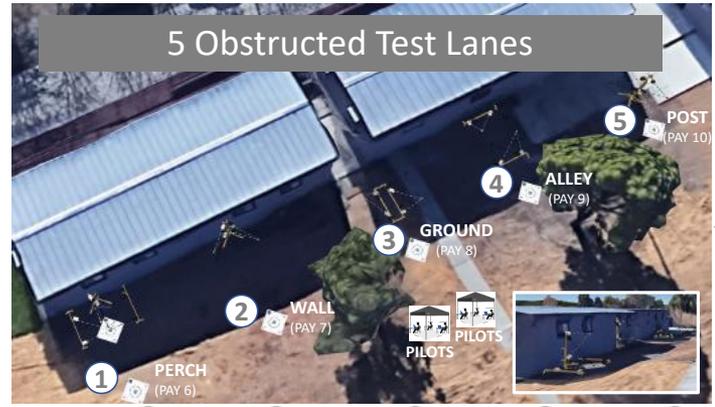
The Obstructed Test Lanes and related scenarios enable remote pilots to fly safe and repeatable flight paths to inspect objects from close proximity.

# Groups Switch Lanes at Halftime

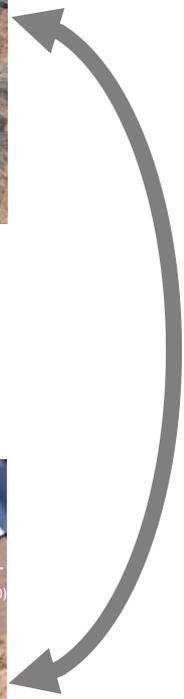
2-1/2 hour time periods at Open and Obstructed



TEAMS FLY NEXT TEST EVERY 20 MINUTES



TEAMS MOVE EVERY 20 MINUTES



# Day 3: Scoring Trials in Test Lanes

Simulated Daytime Training/Evaluation

Simulated training/evaluation day with captured trial scores using all 5 Open Test Lane flight paths and all 5 Obstructed Test Lane flight paths.

## 1 HR Final Quiz

- Review any questions/issues
- Conduct online quiz then discuss answers
- Flight safety briefing from facility representative

## 3 HR Scoring Trials in TEST LANES

GROUP A in **OPEN** | GROUP B in **OBSTRUCTED**

5 minute trials x all 5 tests = <30 minutes per pilot  
Hand in forms and online Proctor Attestations

## 1 HR Meal/Briefing

## 3 HR Scoring Trials in TEST LANES

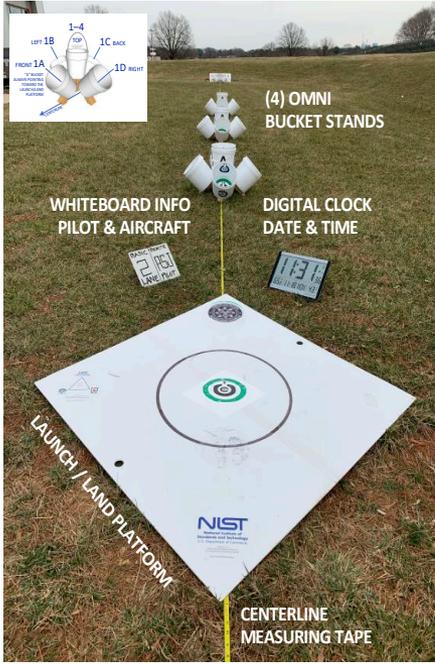
GROUP A in **OBSTRUCTED** | GROUP B in **OPEN**

5 minute trials x all 5 tests = <30 minutes per pilot  
Hand in forms and online Proctor Attestations

## ½ HR After Action Briefing and Survey

# Day and Night Operations

Evaluate using repeatable hovers and orbits

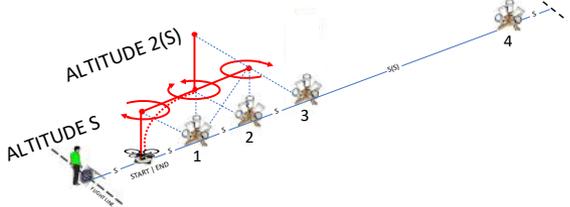


# Open Area Test Lanes

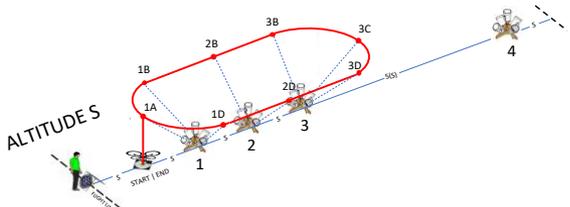
Day and Night Trials



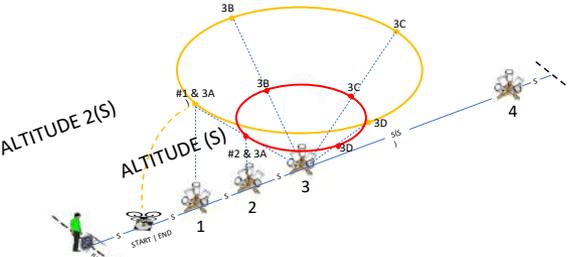
**POSITION**  
MAN/PAY 1



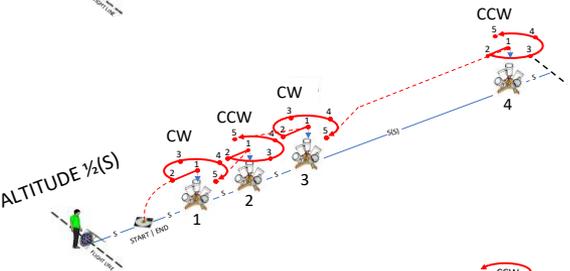
**TRAVERSE**  
MAN/PAY 2



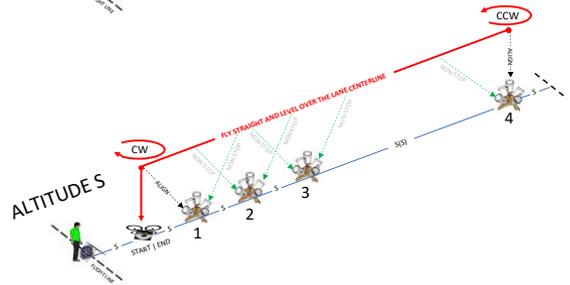
**ORBIT**  
MAN/PAY 3



**INSPECT**  
MAN/PAY 4



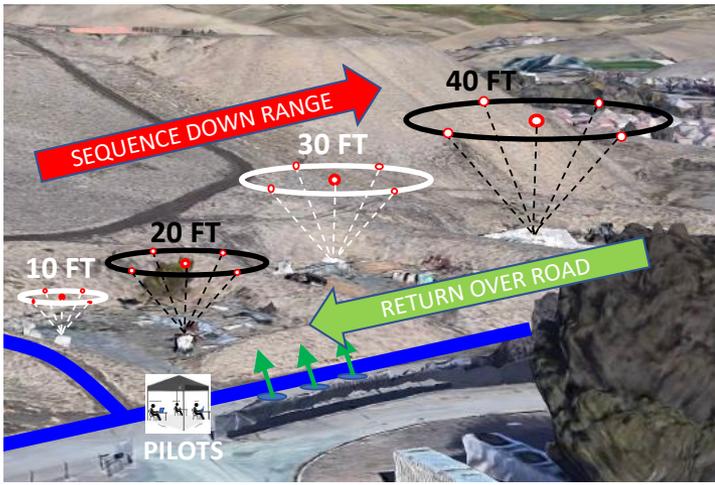
**RECON**  
MAN/PAY 5



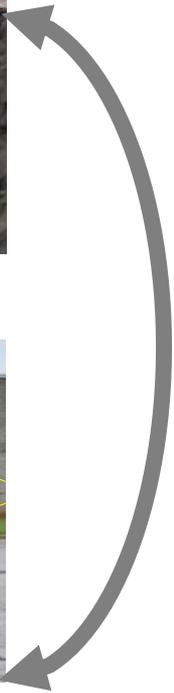
# Groups Switch Lanes at Halftime

2-1/2 hour time periods at Open and Obstructed

## OPEN SCENARIOS



## OBSTRUCTED SCENARIOS



# Day 2: Familiarization in Scenarios

Day and Night

Familiarization flights in OPEN and OBSTRUCTED SCENARIOS. Practice flying interface-only with a visual observer. Day and night operations.

## 1 HR Pre-Flight Briefings

- Review previous day, issues, questions
- Introduce flight plan for the day
- Flight safety briefing from facility representative

## 3 HR Day Flights in SCENARIOS (90 min. each side)

GROUP A in **OPEN** | GROUP B in **OBSTRUCTED**  
 1730 – 1745 Switch Groups A & B  
 GROUP A in **OBSTRUCTED** | GROUP B in **OPEN**

## 1 HR Meal/Briefing (Then Sunset or Lights Out)

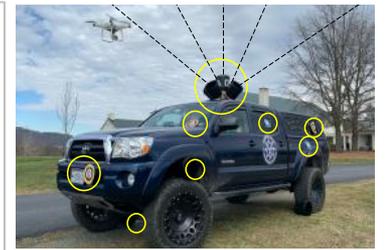
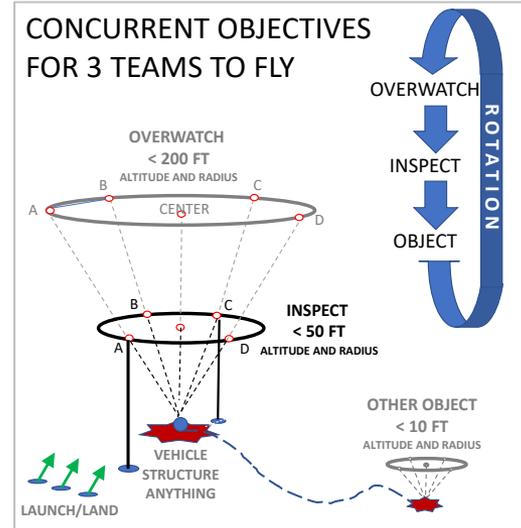
## 2 HR Night Flights in SCENARIOS (60 min. each side)

GROUP A in **OPEN** | GROUP B in **OBSTRUCTED**  
 2130 – 2145 Switch Groups A & B  
 GROUP A in **OBSTRUCTED** | GROUP B in **OPEN**

## 1 HR After-Action Briefing

# Open Area Scenarios

Day and Night Trials

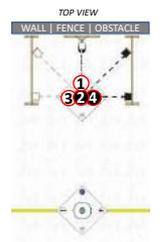
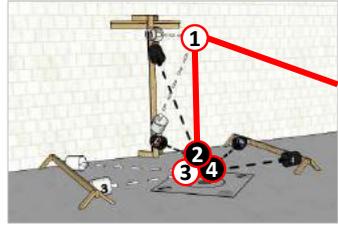


# Obstructed Test Lanes

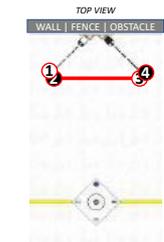
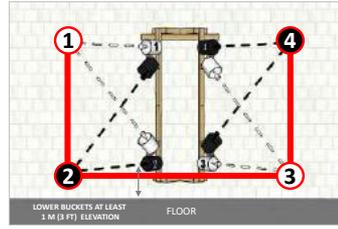
Day and Night Trials



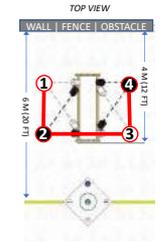
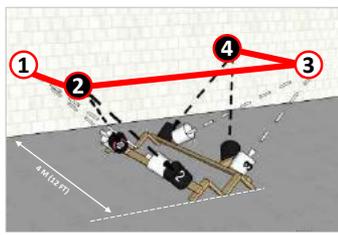
**PERCH**  
PAY 6



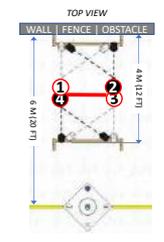
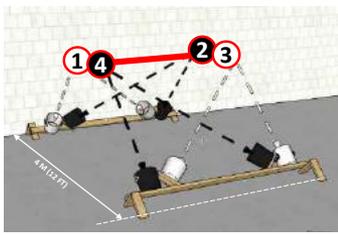
**WALL**  
PAY 7



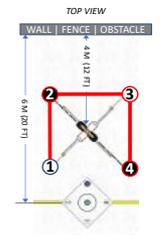
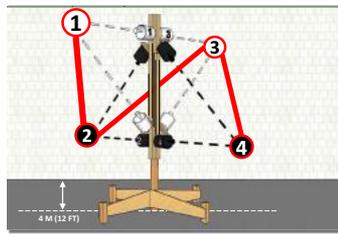
**GROUND**  
PAY 8



**ALLEY**  
PAY 9



**POST**  
PAY 10

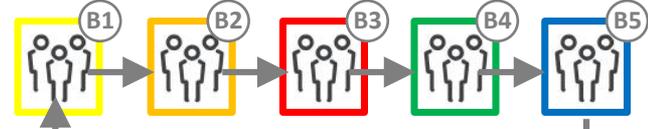
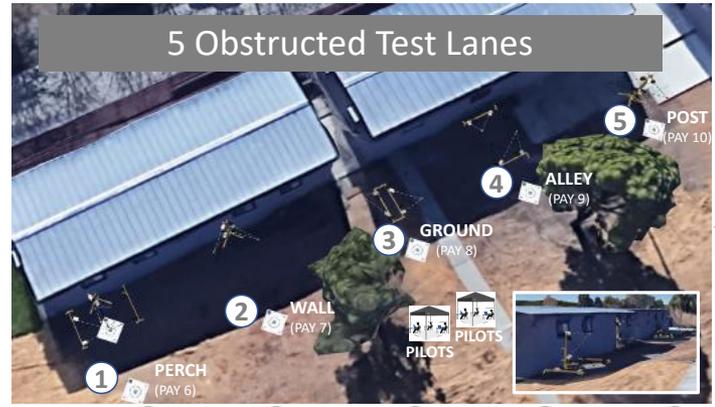


# Groups Switch Lanes at Halftime

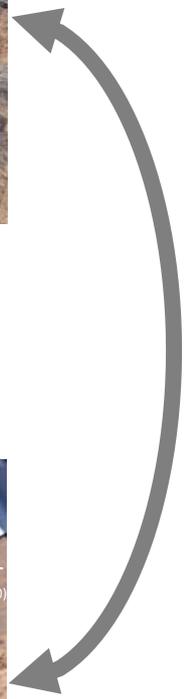
2-1/2 hour time periods at Open and Obstructed



TEAMS FLY NEXT TEST EVERY 20 MINUTES



TEAMS MOVE EVERY 20 MINUTES





# Day 1: Familiarization in Test Lanes

Day and Night

Familiarization flights in OPEN and OBSTRUCTED TEST LANES. Practice flying interface-only with a visual observer. Day and night operations.

## 1 HR Pre-Flight Briefings

- Review Open and Obstructed test lanes
- Review Payload Functionality scoring
- Review Interface Only pilot view (like BVLOS)
- Flight safety briefing from facility representative
- Break into 4-person teams with Proctor codes

## 3 HR Day Flights in TEST LANES (90 min. each side)

3 minute trials x all 5 tests = <20 minutes per pilot

GROUP A in OPEN | GROUP B in OBSTRUCTED

Switch Groups A & B

GROUP A in OBSTRUCTED | GROUP B in OPEN

## 1 HR Meal/Briefing (Then Sunset or Lights Out)

## 2 HR Night Flights in TEST LANES (60 min. each side)

3 minute trials x all 5 tests = <20 minutes per pilot

GROUP A in OPEN | GROUP B in OBSTRUCTED

Switch Groups A & B

GROUP A in OBSTRUCTED | GROUP B in OPEN

## 1 HR After-Action Briefing

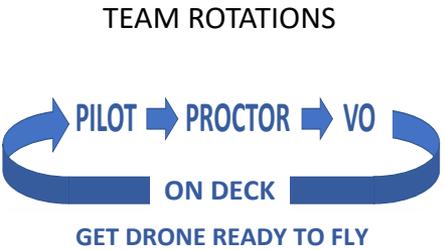
# Obstructed Search Scenarios

Day and Night Trials



# Teams Rotate Through Each Role

Each Pilot flies a 5-minute trial with help from others.  
A 3-4 person team completes all 5 tests in 2 hours.



Four person teams always have one person getting their aircraft ready to launch right after the previous lands.  
Three person teams work too, but require some time between each rotation to prepare the next aircraft.

## PILOT

- Maintain control of the aircraft.
- Call out each intention of movement before doing so.
- Call out each bucket alignment and acuity target gap.

## PROCTOR

- Fill in the form header.
- Read the test procedures to the Pilot.
- Confirm, record, and attest to scoring after the trial.

## VISUAL OBSERVER (VO)

- Maintain sight with the aircraft and surroundings.
- Repeat the Pilot's intention of movement to confirm.
- Call out corrections and warnings as necessary.

# Groups of Teams Switch at Halftime

Open lane teams don't move. Obstructed lane teams need to move at the same time.

**Group A** 5 teams with 3-4 pilots each. Distribute aircraft with lights and thermal cameras across teams.

A1 A2 A3 A4 A5

**Group B** 5 teams with 3-4 pilots each. Distribute aircraft with lights and thermal cameras across teams.

B1 B2 B3 B4 B5

