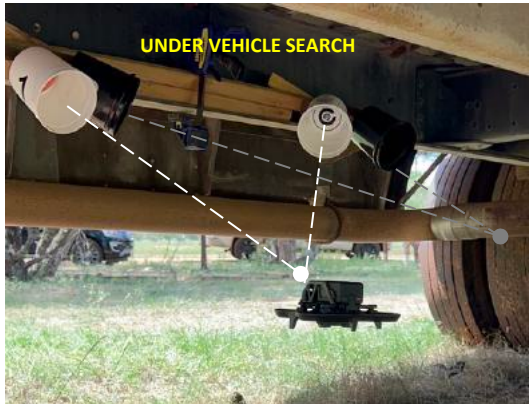# Confined Tests and Scorable Scenarios

Indoors/Outdoors, Lighted/Dark, GPS/No GPS
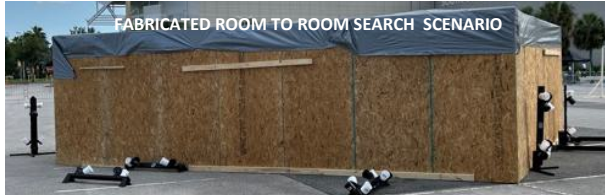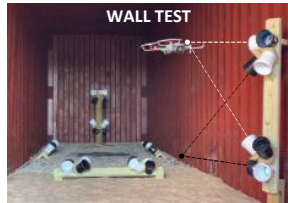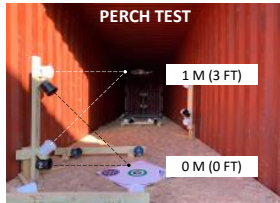
Standard Test Methods for Small Unmanned Aircraft Systems
ASTM International Standards Committee on Homeland Security Applications;
Response Robots (E54.09) | Website: RobotTestMethods.nist.gov

Confined Scenario: Structure Interior Rooms (South)

Safety | Capabilities | Proficiency

| OPEN | OBSTRUCTED | CONFINED |

TOP INDOOR ALTITUDE
2 M (6 FT)

MIDDLE INDOOR ALTITUDE
1 M (3 FT)

MIDDLE INDOOR ALTITUDE
1 M (3 FT)

PERCH
0 M (0 FT)

DRONE

SMALL
DUAL BUCKET
APPARATUS

DRONE

UNDER VEHICLE SEARCH

INSIDE VEHICLE INSPECTION

Confined Tests and Scorable Scenarios

Evaluate safety, capabilities, and proficiency

Confined Scenario: Structure Interior Rooms (South)
Safety | Capabilities | Proficiency

| OPEN | OBSTRUCTED | CONFINED |

PERCH TEST
The drone lands 2 m (6 ft) from the ... ents in various
orientations. A single perch measures the field of view of an independent pan-tilt-zoom
camera. Others may need to re-la... ll the targets in order.

TOP INDOOR ALTITUDE

MIDDLE INDOOR ALTITUDE 1 M (3 FT)
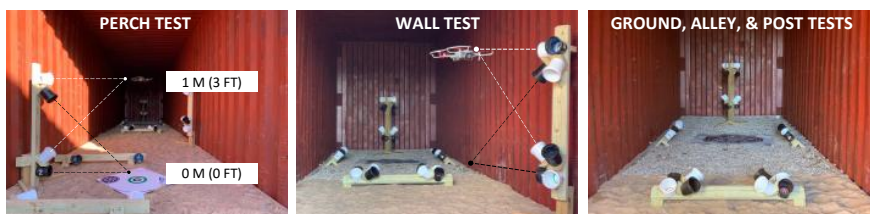
The Confined tests and scorable scenarios enable remote pilots to perform safe and repeatable flight paths indoors room-to-room or in any confined space to inspect objects from very close proximity within the drone's turbulent air. There are 5 different tests that guide remote pilots through various standoff positions, orientations, and perches. These tests can be performed indoors to control lighting, weather, and access to GPS or outdoors as appropriate.

MIDDLE INDOOR ALTITUDE 1 M (3 FT)

PERCH 0 M (0 FT)

- DISASTER RESPONSE
- DRONE VIEW
- UNDER VEHICLES
- ROOM-TO-ROOM SEARCH
- DRONE VIEW
- INSIDE VEHICLES

CONFINED | SEARCH

START TIMER

	ALIGNMENT		ACUITY				
NUMBER			PAYLOAD FUNCTIONALITY (PAY)				
LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND							
1	5	1	0				
1A			TR	B	TR	L	BR
2	5	1	0				
2A			L	BR	T	TL	R
3	5	1	0				
3A		-	BR	T	TL	R	BL
4	5	1	0				
4A			T	BL	B	TR	L
5	5	1	0				
5A			BL	R	TL	L	BL
LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND							
6A			TR	B	TR	L	BR
7	5	1	0				
7A			L	BR	T	TL	R
8	5	1	0				
8A			BR	T	TL	R	BL
9	5		0				
9A			T	BL	B	TR	L
10	5	1	0				
10A			BL	R	TL	L	BL
ELAPSED TIME: (MM:SS)	SCORES		/50			/50	

12 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS
13 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE
14 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS
15 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE
16 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS
17 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE
18 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS
19 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE
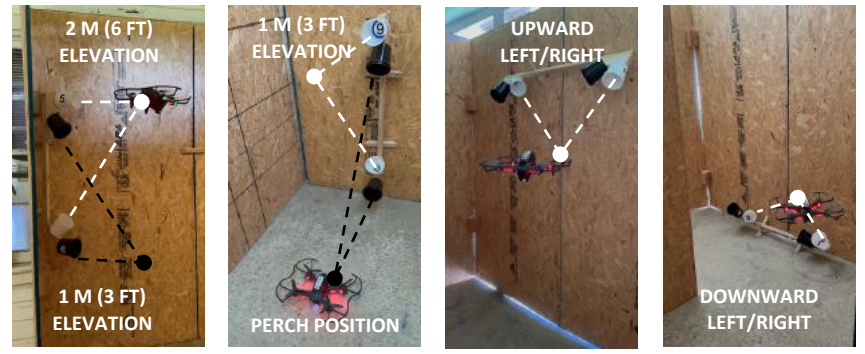20 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS

Confined Room-to-Room Labyrinth
Search tasks with 1 m (3ft) minimum clearances

USE SETS OF 5 "INLINE" DUAL BUCKET RAILS
HORIZONTALS FOR LEFTWARD/RIGHTWARD INSPECTIONS

HIGH/LOW ACCESS HOLES

1 m (3 ft) SQUARE

HIGH

LOW

HIGH

3D FLIGHT PATH

VERTICALS FOR UPWARD/DOWNWARD INSPECTIONS

2 M (6 FT) ELEVATION

1 M (3 FT) ELEVATION

1 M (3 FT) ELEVATION

PERCH POSITION
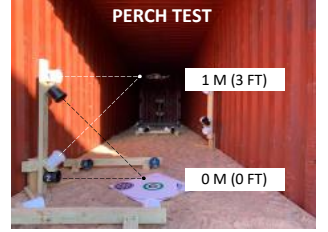
UPWARD LEFT/RIGHT

DOWNWARD LEFT/RIGHT

- Plywood panels attached together form tall self standing "L" walls as test lane alcoves, switchback hallways, and rooms with tasks to identify. A blackout tarp over top makes a ceiling at 2.4m (8ft), or set it up inside a 6m (20ft) shipping container.

- Square access "windows" measuring 1m (3ft) square provide entry/exit and interior high/low pass throughs.

- Split cylinder concrete forms evaluate 2D/3D maps.

Bucket Alignments Define Flight Paths
Designated altitudes, positions, and orientations

PERCH
PAY 6

Confine

Standard Test Methods for Small
ASTM International Standards Committee
Response Robots (E54.09) | Websit

Confined Scenario: Structur
Safety | Capabiliti

OPEN   OBSTRU

WALL
PAY 7

Cor

TOP INDOOR ALTITUDE
2 M (6 FT)

MIDDLE INDOOR ALTITUDE
1 M (3 FT)

MIDDLE INDOOR ALTITUDE
1 M (3 FT)

POST TEST
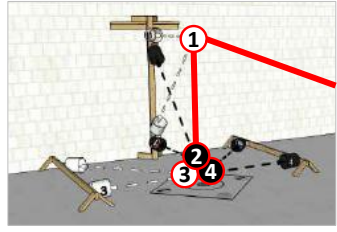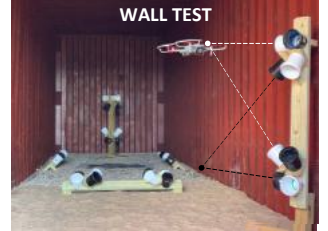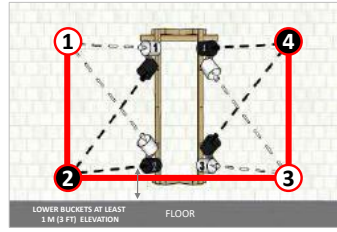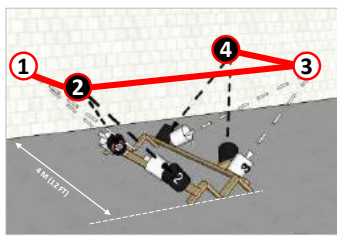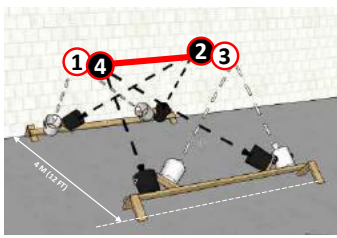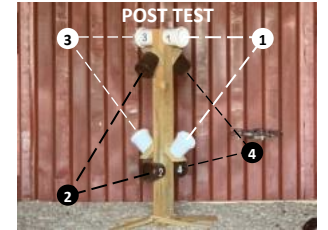
Metrics to Track Over Time

Measure System Capabilities and Pilot Proficiency

Complete: ... every bucket and land accurately according to the procedure. The objective is scoring ALL points possible for your aircraft without making mistakes.

Score: For complete trials, track your scores over time. The average of your last five trials is an excellent measure of your proficiency of the aircraft and interface used.

Efficiency (Optional): For complete trials with maximum scores, recording the elapsed time can help identify the most efficient systems and techniques. Time limited trials can be used across multiple tests to maintain a schedule and similarly fatigue novices and experts.

Separate Scores: ALIGNMENT and ACUITY

Track and Compare Scores Using the Same Drone

EXAMPLE PASS/FAIL SCORES

	A	B	C	D	E	F
ALIGNMENT	45	50	65	70	70	70
ACUITY	27	36	34	45	54	41

SCORE — ALIGNMENT 50, ACUITY 30

TEAM ROTATIONS

PERSON TEAM ROTATION

ON DECK — DRONE READY TO FLY

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND

WALL | FENCE | OBSTACLE

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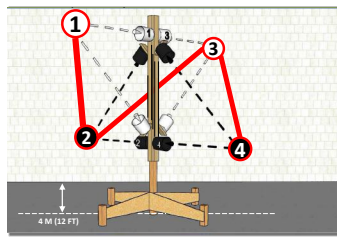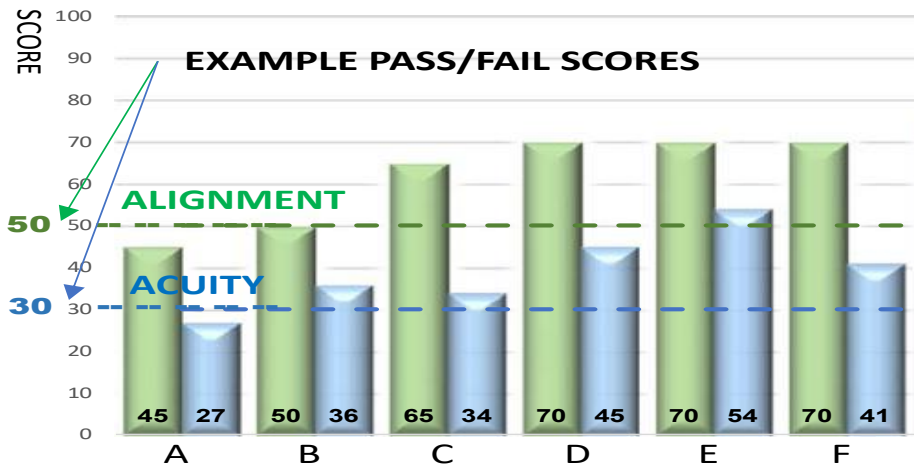- Three person teams work too, but require some time between each rotation to prepare the next aircraft.

PILOT
- Maintain control of the aircraft.
- Call out each bucket alignment and acuity target gap.

PROCTOR

VISUAL OBSERVER (VO)
- Maintain sight with the aircraft and surroundings.
- Repeat the Pilot's intention of movement to confirm.
- Call out corrections and warnings.

PERCH TEST

The drone lands 2 m (6 ft) from the wall ... A single perch measures camera. Others may need to re-launch.

TOP VIEW

WALL | FENCE | OBSTACLE

WALL TEST

... within 2-3 m (6-10 ft) of the wall at 45 degrees from forward of the aircraft to align with buckets and identify features upward and downward. This approximates tasks inside elevated windows and doors.

START TIMER

---

5 Different Orbits in Every Land
(S) = 10ft, 20ft, 30ft, or ...

#	Task		ACUITY							
6	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS				BR	T	R	BL
7	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0				
8	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A				T	BL	B	TR	L
9	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	5	5	1	0				
10	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	5A				BL	R	TL	R
	10 POSITIONS (20 BUCKETS) LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND								
12	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	6A				TR	B	TR	L	BR
13	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	7	5	1	0				
14	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	7A				L	BR	T	TL	R
15	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	8	5	1	0				
16	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	8A				BR	T	TL	R	BL
17	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	9	5		0				
18	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	9A				T	BL	B	TR	L
19	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	10	5	1	0				
20	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	10A				BL	R	TL	L	BL
	ELASPED TIME: (MM:SS)	SCORES	/50						/50

Confined Vehicle Inspection Scenarios

Day and Night Trials

TEAM ROTATIONS **VO** **PILOT** **PROCTOR**

3 PERSON TEAM ROTATION

PILOT → PROCTOR → VO

ON DECK

USE SETS OF 5 "INLINE" DUAL BUCKET RAILS

DISTRIBUTED THROUGHOUT THE SCENARIO

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 intended 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.

DISASTER RESPONSE

CONFINED ACCESS

INSIDE VEHICLES OR ROOM-TO-ROOM

5 Different Orbits in Every Lane
(S) = 10ft, 20ft, 30ft, or other

WHITE BUCKETS

The WALL and ALLEY test shown embedded in a room-to-room search scenario closet and bath tub. The pairs of of white and black buckets require exposure control to discern details. Also shown is a more complex overturned subway rail car disaster. All such scenarios get embedded with scoring tasks totaling 100 points.

SEARCH AND INSPECT OBJECTS UNDER VEHICLES

IDENTIFY DETAILS ON OBJECTS OF INTEREST

SUCCESSFULLY ALIGNED DRONE VIEW

	G		H		I		J		K		L		M	
	75	20	80	21	80	46	80	44	81	49	100	52	100	55

20

Alignn... Scoring

[5] Acuity targets A-B-C-D inside bottom of all
[2] Perch acuity targets inside and bottom of A

e wall guided by dual bucket alignments in various
res the field of view of an independent pan-tilt-zoom
unch, rotate, and land to identify all the targets in order.

B 1, 2, 3, 4

The drone lands 2 m (6 ft) from the wall in various orientations. A single perch measures the field of view of an independent pan-tilt-zoom camera. Others may need to re-launch...

TOP VIEW

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

WALL | FENCE | OBSTACLE

ALIGN WITH BUCKETS TO CAPTURE IMAGES

10 ALIGNMENT RINGS TOTAL 50 POINTS

10 Positions – 20 Buckets – 100 Total Points

LAUNCH FORWARD REVERSE FORWARD LAND

LAUNCH   1 2 3 4   3 2 1   2 3 4   LAND

SCORED ONLY WHILE LANDED

ft) of the wall at 45 degrees... aircraft to
tures upward and downward. This approximates inspection
doors.

CAPTURE IMAGES OF THE INSCRIBED RINGS AND PERCH ACCURATELY
increasingly small Concentric Cs gaps to identify the
correct (1 of 8) orientations.

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

The drone flies within 2-3 m (6-10 ft) of the wall at 45 degrees from forward of the aircraft to align with buckets and identify features upward and downward. This approximat... tasks inside elevated windows and doors.

TOP VIEW

WALL | FENCE | OBSTACLE

- First align with each PERPENDICULAR B... to capture a SINGLE ALIGNMENT IM... inscribed ring.

- Score captured images with
    - UNBROKEN RINGS (5 points)
    - BROKEN RINGS (1 point)
    - NO RINGS (0 points, strike through line)

- Accurate landings are not scored.

- Verification of captured alignment images can be during the trial when obvious or after the trial to eliminate discussions during the trial. Images can also be stored for documentation.

Page 13

CONFINED | POST

START TIMER	NUMBER		

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

#		POS	ALIGNMENT			ACUITY (PAY)				
1	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	1	5	1	0					
2	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	1A				TR	B	TR	L	BR
3	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	2	5	1	0					
4	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	2A				L	BR	T	TL	R
5	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	1	0					
6	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECT...	3A	-	-	-	BR	T	TL	R	BL
7	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0					
8	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A				T	BL	B	TR	L
9	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	1	0					
10	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A				BR	T	TL	R	BL

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

#		POS								
12	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	2A				L	BR	T	TL	R
13	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	1	5	1	0					
14	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	1A	-	-	-	TR	B	TR	L	BR
15	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	2	5	1	0					
16	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	2A				L	BR	T	TL	R
17	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5		0					
18	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A				BR	T	TL	R	BL
19	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0					
20	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A				T	BL	B	TR	L
ELASPED TIME: (MM:SS)		SCORES						/50		/50

(TR) TOP RIGHT
(R) RIGHT
(BR) BOTTOM RIGHT

Post (PAY 10)
Confined Test Lane

10 POSITIONS (20 BUCKETS) — **LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND**

WALL | FENCE | OBSTACLE

TOP VIEW
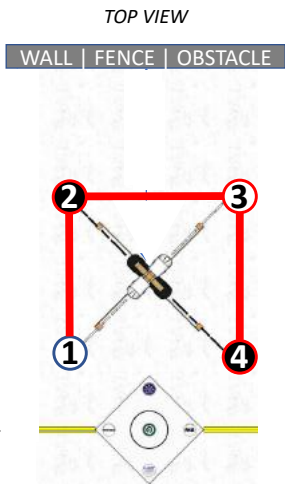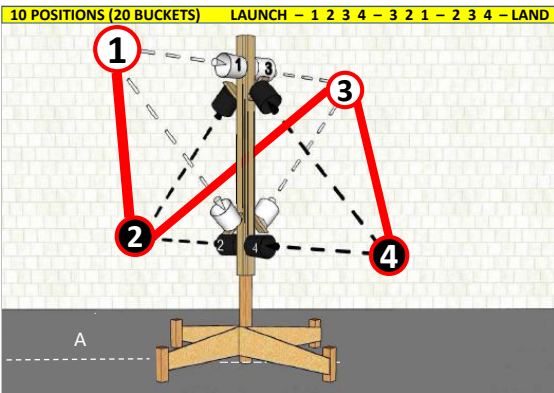
- Fly inside the 2m (6ft) wide alcove between the post and the main wall.
- Inspect vertical object features upward and downward.

- Align with each ANGLED BUCKET to IDENTIFY ACUITY TARGETS using camera zoom and exposure controls.
- Call out as many of the Concentric C gap directions as possible (1 pt each).
- Fly facing away from the test lane or scenario with a Visual Observer to evaluate flying interface only as if beyond visual line of sight.

Pilot with Interface — FACING AWAY
Visual Observer — FACING AIRCRAFT

SCORING

Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS through the pilot interface. Images are optional for documentation but use the answer key for scoring.

7

Teams Rotate Through Each Role

PERCH TEST

Each Pilot flies a 3-minute trial with help from others.

A 3-4 person team completes all 5 tests in 2 hours.

The drone lands 2 m (6 ft) from the wall guided by dual bucket alignments in various orientations. A single perch measures the field of view of an independent pan-tilt-zoom camera. Others may need to re-launch, rotate, and land to identify all the targets in order.

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

WALL | FENCE | OBSTACLE

TOP VIEW

TEAM ROTATION	VO	PILOT	PROCTOR

FACING AWAY FROM THE TEST LANE

PILOT ➡ PROCTOR ➡ VO

ON DECK

GET DRONE READY TO

10 Positions = 20 Buckets = 100 Total Points

Four person teams always have one person getting their aircraft ready to launch right after the previous lands.

Three person teams can do too, but require some time between each rotation to prepare the next aircraft.

WALL TEST

The drone flies within 2-3 m (6-10 ft) of the wall at 45 degrees from forward of the aircraft to align with buckets and identify features upward and downward. This approximates tasks inside elevated windows and doors.

TOP VIEW

WALL | FENCE | OBSTACLE

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

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.

CONFINED | ALLEY

START TIMER								
10 POSITIONS (20 BUCKETS) LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND								
1	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	1	5	1	0			
2	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	1A				TR	B	TR	L	BR
3	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	2	5	1	0			
4	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	2A				L	BR	T	TL	R
5	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	3	5	1	0			
6	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	3A	-	-	-	BR	T	TL	R	BL
7	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	4	5	1	0			
8	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	4A				T	BL	B	TR	L
9	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	3	5	1	0			
10	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	3A				BR	T	TL	R	BL

10 POSITIONS (20 BUCKETS)   LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

11		2						
12	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	2A				L	BR	T	TL	R
13	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	1	5	1	0			
14	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	1A	-	-	-	TR	B	TR	L	BR
15	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	2	5	1	0			
16	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	2A				L	BR	T	TL	R
17	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	3	5		0			
18	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	3A				BR	T	TL	R	BL
19	*PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE*	4	5	1	0			
20	*ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS*	4A				T	BL	B	TR	L
ELAPSED TIME: (MM:SS)		**SCORES**			**/50**			**/50**

8   17

Alley (PAY 9)
Confined Test Lane

TOP VIEW

WALL | FENCE | OBSTACLE
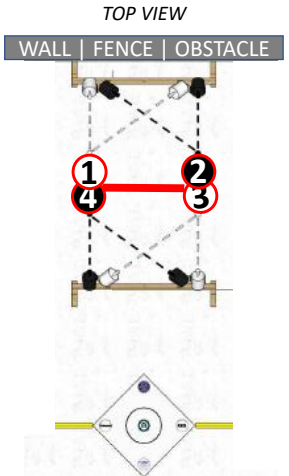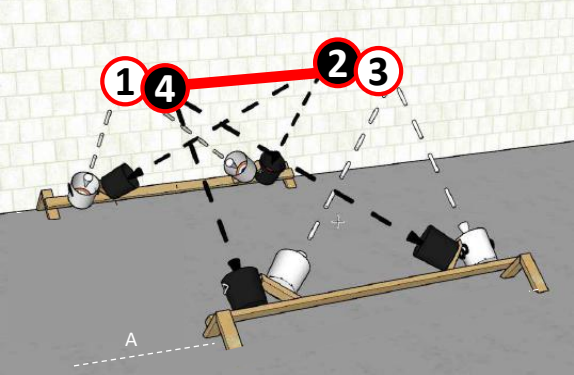
- Fly inside the 2m (6ft) wide alcove with the main wall at in front of the aircraft (0 degrees) and behind the aircraft (180 degrees).

- Inspect horizontal object features leftward and rightward.

SCORING

Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS through the pilot interface. Images are optional for documentation but use the answer key for scoring.

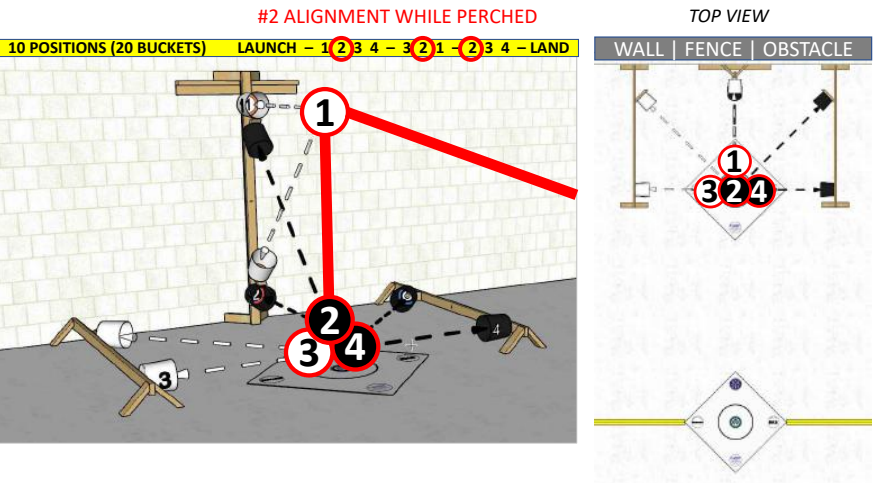# Teams Sequence Through Scenarios
Each Pilot flies a 15-minute scenario, sequencing through 3 objectives for 5 minutes each.
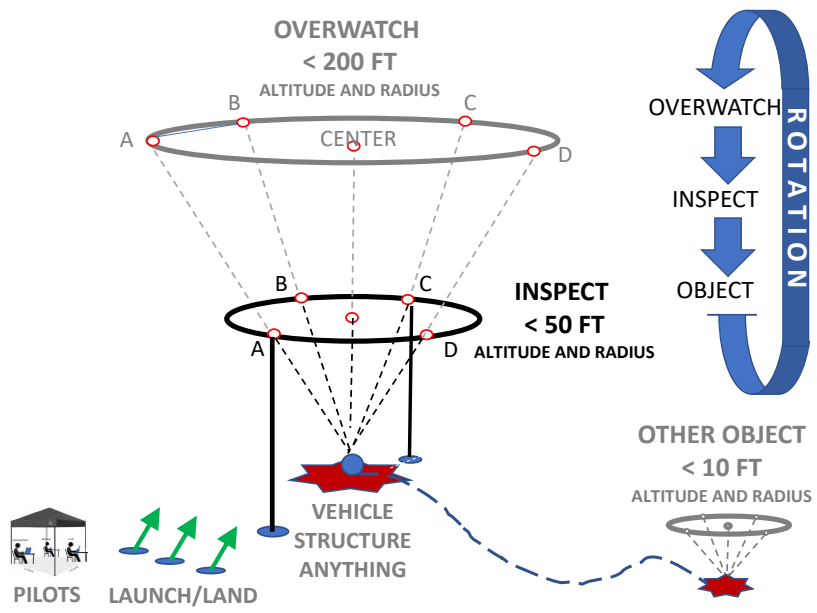
- This scenario mechanization enables embedded bucket scoring tasks to be performed similarly by all participating Pilots. So the results are comparable within the same scenario layout. Additional tactics can be overlayed onto these scenarios at your facility.

- Up to 3 teams concurrently fly different scenario objectives from safe distances and altitudes apart.

- Teams move as necessary to maintain sight lines with their aircraft and communications with other teams. The overwatch team leads communications.

- Scenarios restart every 20 minutes with a different rotation of Pilot, Proctor, and VO.

Perch (PAY 6)

Confined Test Lane

PERCH TEST

The drone lands 2 m (6 ft) from the wall in various orientations. A single perch measures the field of view of an independent pan-tilt-zoom camera. Others may need to re-launch, rotate, and land to identify all the targets in order.

TOP VIEW

WALL | FENCE | OBSTACLE

the wall guided by dual-bucket alignments in various orientations, measures the field of view of an independent pan-tilt-zoom camera. Others may need to re-launch, rotate, and land to identify all the targets in order.

#7 ALIGNMENT WHILE PERCHED

10 POSITIONS (20 BUCKETS)	LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

LAUNCH   1 2 3 4   3 2 1   2 3 4   LAND

SCORED ONLY WHILE LANDED

Fly and perch inside the 2 m (6ft) wide alcove with ground obstacles on both sides.

- Inspect vertical and horizontal object features upward, downward, leftward and rightward.

- BUCKET #2 MUST BE ALIGNED WHILE PERCHED, but all others can be aligned/identified either while perched or hovering as if inspecting underbody objects of interest.
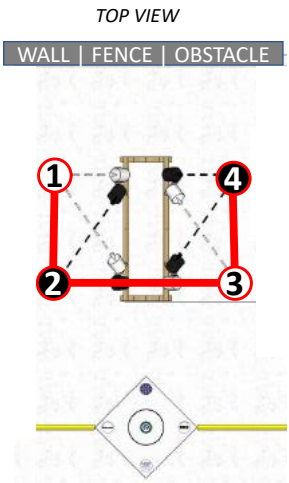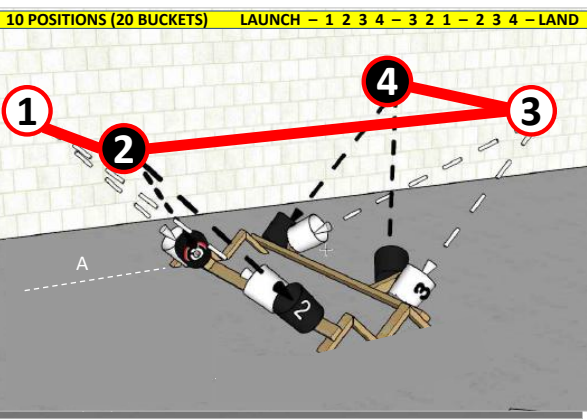
SCORING

Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

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Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS through the pilot interface. Images are optional for documentation but use the answer key for scoring..

WALL TEST
The drone flies within 2-3 m (6-10 ft) of the wall at 45 degrees from forward of the aircraft to align with buckets and identify features upward and downward. This approximates tasks inside elevated windows and doors.

10 POSITIONS (20 BUCKETS)	LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND

LOWER BUCKETS AT LEAST 1 M (3 FT) ELEVATION   FLOOR

TOP VIEW

WALL | FENCE | OBSTACLE

	ALIGNMENT			ACUITY	
	TR	B	TR	L	BR
	L	BR	T	TL	R
	BR	T	TL	R	BL
	T	BL	B	TR	L
9 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	1	0	
10 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A	BR	T	TL	R	BL
	L	BR	T	TL	R
	TR	B	TR	L	BR
	L	BR	T	TL	R
	BR	T	TL	R	BL
19 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0	
20 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A	T	BL	B	TR	L

START TIMER

8 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS   4A

ELASPED TIME: (MM:SS)	SCORES	/50	/50

Ground (PAY 8)

Confined Test Lane

the wall guided by dual bucket alignments in various
res the field of view of an independent pan-tilt-zoom
unch, rotate, and land to identify all the targets in order.

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND

ft) of the wall at 45 degrees from forward of the aircraft to
tures upward and downward. This approximates inspection
doors.

SCORED ONLY WHILE LANDED

Fly inside the 2m (6ft) wide alcove with the main wall at
90 degrees from forward of the aircraft
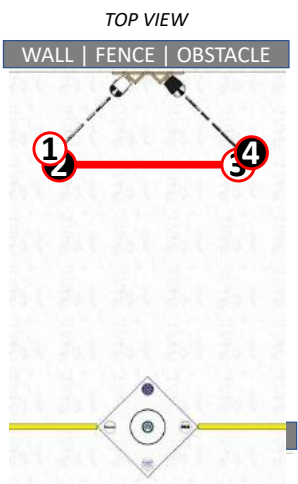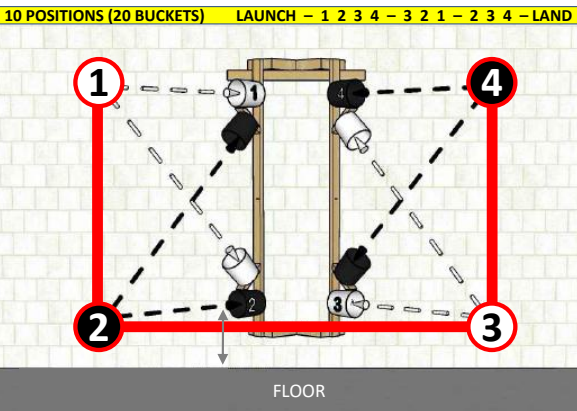
- Inspect horizontal object features leftward and

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND

4 M (12 FT)

Page 13

Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS
through the pilot interface. Images are optional for
documentation but use the answer key for scoring.

PERCH TEST

The drone lands 2 m (6 ft) from the wall
orientations. A single perch measures the field of view of an independent pan-tilt-zoom
camera. Others may need to re-launch, rotate, and land to identify all the targets in order.

TOP VIEW
TOP VIEW
WALL | FENCE | OBSTACLE
WALL | FENCE | OBSTACLE

The drone flies within 2-3 m (6-10 ft) of the wall at 45 degrees from forward of the aircraft to
align with buckets and identify features upward and downward. This approximates
tasks inside elevated windows and doors.

TOP VIEW
WALL | FENCE | OBSTACLE

4 M (12 FT)
4 M (12 FT)

kets (50 Total):
o CAPTURE A SINGLE
coring during or after

		ALIGNMENT (MAN)	PAYLOAD FUNCTIONALITY (PAY)	ACUITY (PAY)

START TIMER

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND

#				Acuity
1				
2			B	TR	L	BR
3			WHILE PERCHED
4			BR	T	TL	R
5			
6			T	TL	R	BL
7			
8			BL	B	TR	L
9	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	1	0	
10	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A		BR	T	TL	R	BL

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND   WHILE PERCHED

| 12 | ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS | 2A | | L | BR | T | TL | R |
| 13 | PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE | 1 | 5 | 1 | 0 | LAND |

10 POSITIONS (20 BUCKETS)   LAUNCH − 1 2 3 4 − 3 2 1 − 2 3 4 − LAND

14				B	TR	L	BR
15			WHILE PERCHED
16			BR	T	TL	R
17			
18			T	TL	R	BL
19			
20			BL	B	TR	L

/50   /50

Wall (PAY 7)

Confined Test Lane

...e wall guided by dual bucket alignments in various ...res the field of view of an independent pan-tilt-zoom ...nch, rotate, and land to identify all the targets in order.

| 10 POSITIONS (20 BUCKETS) | LAUNCH – 1 2 3 4 – 3 2 1 – 2 3 4 – LAND |

FLOOR

...ft) of the wall at 45 degrees from forward of the aircraft to ...tures upward and downward. This approximates inspection ...oors.

SCORED ONLY WHILE LANDED

Fly inside the 2m (6ft) wide alcove with the main wall at 45 degrees from forward of the aircraft.

- Inspect vertical object features upward and downward.

SCORING

Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS through the pilot interface. Images are optional for documentation but use the answer key for scoring.

P...
Th... rom the v...
o... measures...
ca... o re-laun...

TOP VIEW

WALL | FENCE | OBSTACLE

W...
The drone flies within 2-3 m (6-10 ft) o... align with buckets and identify feature... tasks inside elevated windows and do...

TOP VIEW

WALL | FENCE | OBSTACLE

	FUNCTIONALITY (PAY)		CORRECTLY IDENTIFIED BY CIRCLE (DURING THE TRIAL)				
1							
2			R	B	TR	L	BR
3							
4				BR	T	TL	R
5							
6			R	T	TL	R	BL
7							
8				BL	B	TR	L
9							
10				T	TL	R	BL
11							
12				BR	T	TL	R
13							
14				B	TR	L	BR
15							
16	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	2A			L	BR	T	TL	R
17	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	0				
18	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A			BR	T	TL	R	BL
19	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0			
20	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A			T	BL	B	TR	L
ELASPED TIME: (MM:SS)	SCORES		/50				/50