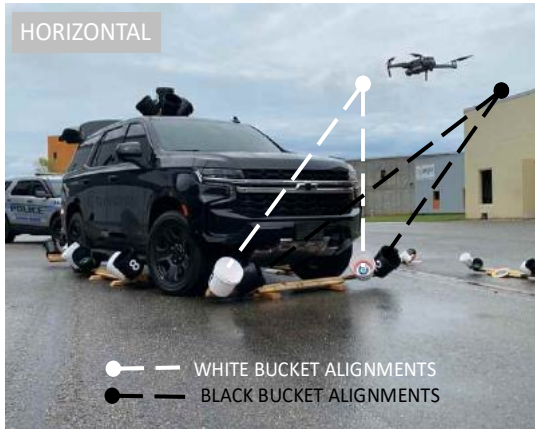
Scorable Obstructed Scenarios

Day and Night Trials



NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY U.S. DEPARTMENT OF COMMERCE

Science and Technology

Pocket Guide for Aerial Drones

OBSTRUCTED

Tests and Scenarios

LEVEL 4

STANDARD TEST METHODS · RESPONSE ROBOT CAPABILITIES · CHALLENGE · TRAIN · EVALUATE · AERIAL · GROUND · AQUATIC · NIST

Test Director

Adam Jacoff

Intelligent Systems Division
National Institute of Standards and Technology
U.S. Department of Commerce

Sponsor:

Systems Engineering & Standards Division
Science and Technology Directorate
U.S. Department of Homeland Security

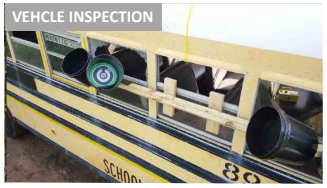
Website
RobotTestMethods.nist.gov

Email
RobotTestMethods@nist.gov

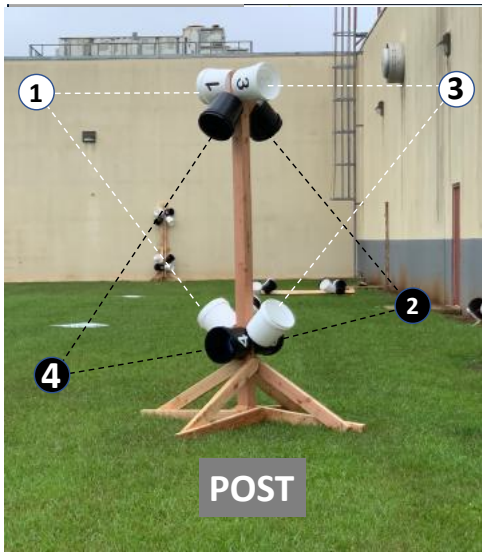
Version 2023E

Obstructed Test Lanes and Scenarios

Evaluate safety, capabilities, and proficiency



The Obstructed Test Lanes and related scenarios enable remote pilots to fly safe and repeatable flight paths to inspect objects from close proximity. There are 5 different tests that guide remote pilots through various standoff positions, orientations, and perches at 2-3 m (6-10 ft) from objects. These tests can be performed outdoors or indoors to control lighting, weather, and access to GPS.



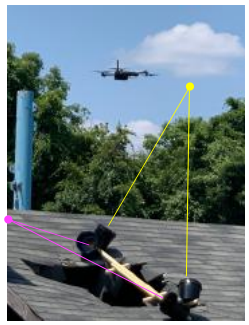
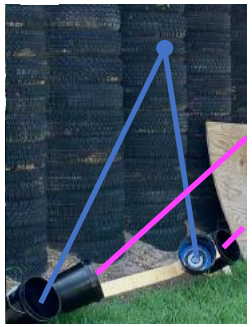
OBSTRUCTED | SEARCH	BUCKETS	ALIGNMENT	ACUITY
START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
1 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	1	5 1 0	
2 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	1A		TR B TR L BR
3 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 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	5	5 1 0	
10 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	5A		BL R TL L BL
11 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	6	5 1 0	
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 1 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

Obstructed Search Scenarios

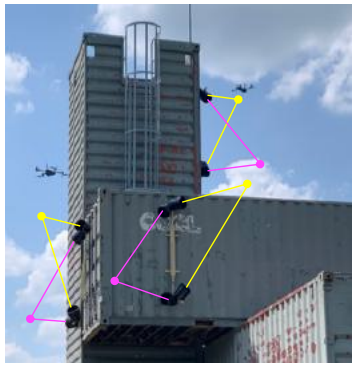
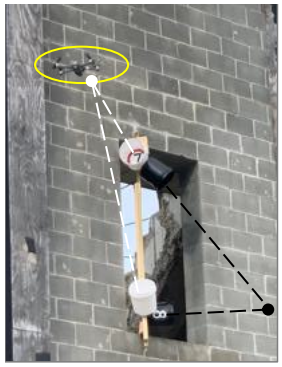
Day and Night Trials

USE SETS OF 5 “OFFSET” DUAL BUCKET RAILS

HORIZONTALS DISTRIBUTED WITH OBJECTS OF INTEREST


VERTICALS IN ELEVATED WINDOWS AND ON STRUCTURES


- Teams concurrently fly separate objectives set up at safe distances and/or altitudes apart (with a clearly designated and safe return path).
- Each pilot flies for 15 minutes across 3 different objectives for 5 minutes each. Teams move as necessary to maintain sight lines and communication.
- Scenarios restart with a different rotation of Pilot, Proctor, and VO.

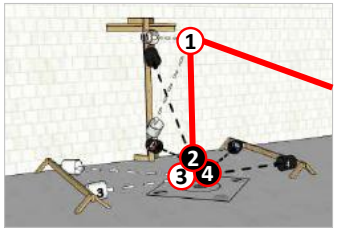
Bucket Alignments Define Flight Paths

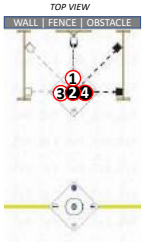
Designated altitudes, positions, and orientations

PERCH

PAY 6

ALL GROUND BUCKETS POINT TOWARD CENTER OF LANDING

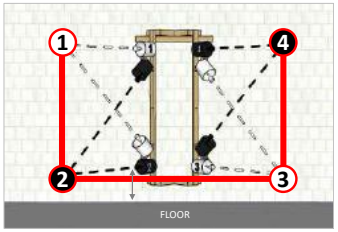


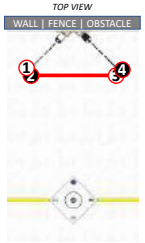


WALL

PAY 7

BOTTOM BUCKETS ARE CENTERED 60cm (24in) ABOVE GROUND

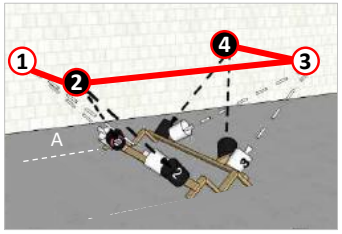


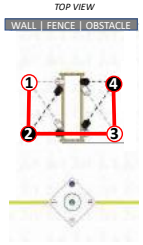


GROUND

PAY 8

DISTANCE FROM WALL
10cm (4in): A = 90cm (3ft)
20cm (8in): A = 120cm (4ft)

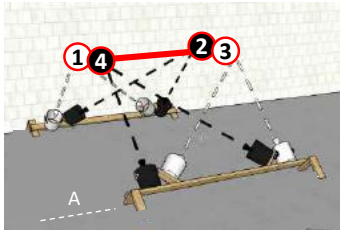


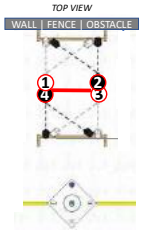


ALLEY

PAY 9

DISTANCE FROM WALL
10cm (4in): A = 2m (6ft)
20cm (8in): A = 4m (12ft)

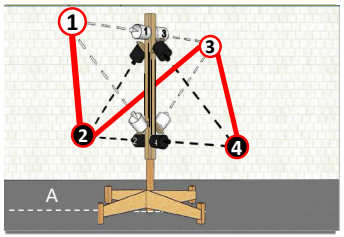


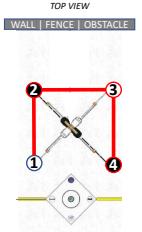


POST

PAY 10

DISTANCE FROM WALL
10cm (4in): A = 2m (6ft)
20cm (8in): A = 4m (12ft)





Metrics to Track Over Time

Measure System Capabilities and Pilot Proficiency

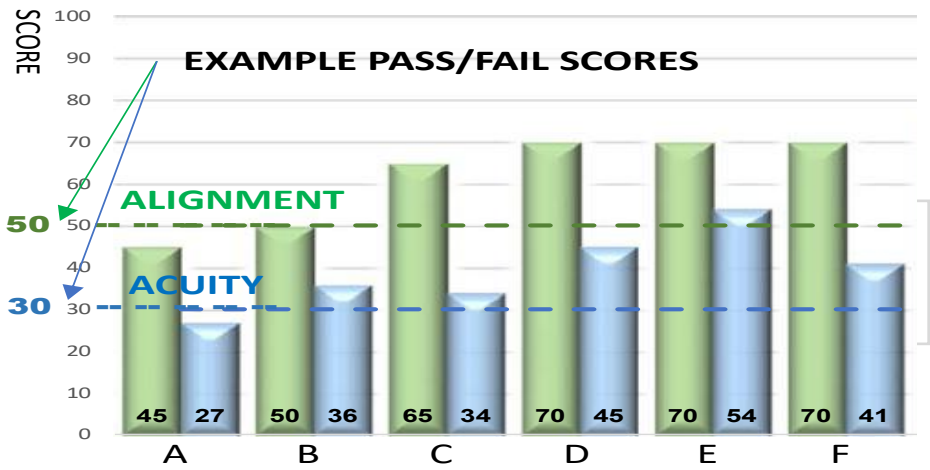
Completeness: Align with every bucket in the sequence and land accurately according to the procedure. The objective is scoring ALL points possible for your aircraft without making mistakes.

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

Efficiency (Optional): For complete trials with maximum scores for a particular aircraft, 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



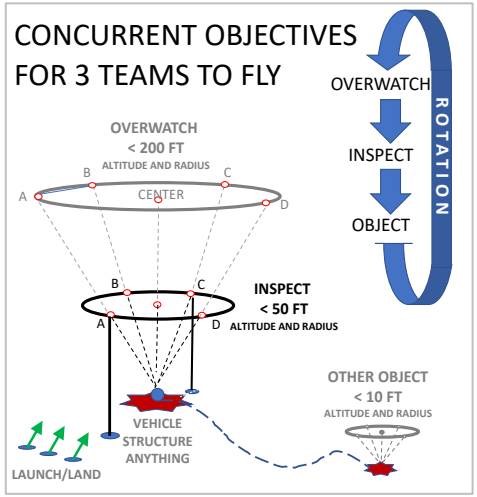
OBSTRUCTED | VEHICLE	BUCKETS	ALIGNMENT	ACUITY
START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
1 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	1	5 1 0	
2 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	1A		TR B TR L BR
3 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	2	5 1 0	
4 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	5	5 1 0	
10 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	5A		BL R TL L BL
11 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	6	5 1 0	
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 1 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

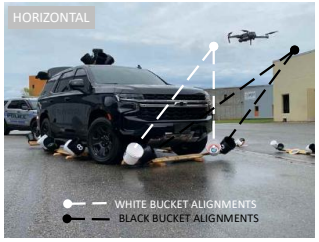
Obstructed Vehicle Inspection Scenarios

Day and Night Trials

USE SETS OF 5 “INLINE” DUAL BUCKET RAILS

DISTRIBUTED THROUGHOUT THE SCENARIO



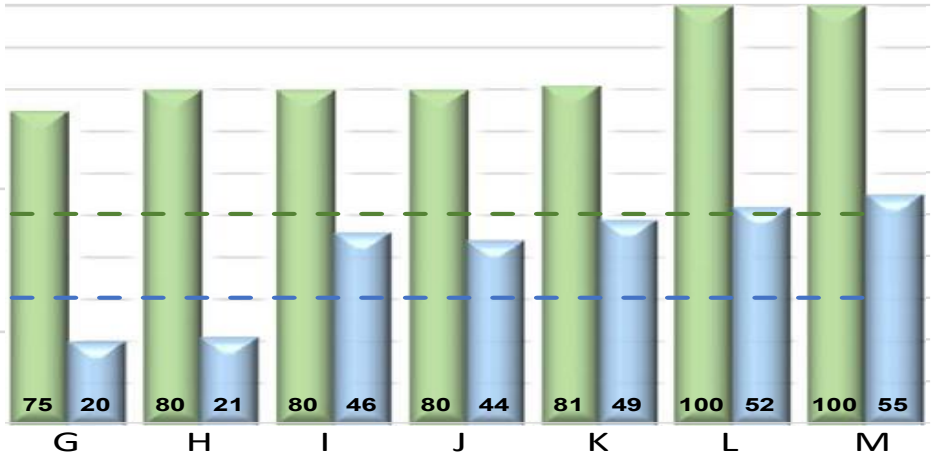


Day and Night Operations

Evaluate using repeatable hovers and orbits

The WALL test shown with alternating pairs of white and black buckets to increase the need for exposure control.

The POST test shown at night with only the white buckets illuminated with red headlamps.



Scoring Alignment Points

Capture images of alignment rings to verify

ALIGN WITH BUCKETS AND LAND ACURATELY

10 ALIGNMENT RINGS TOTAL 50 POINTS

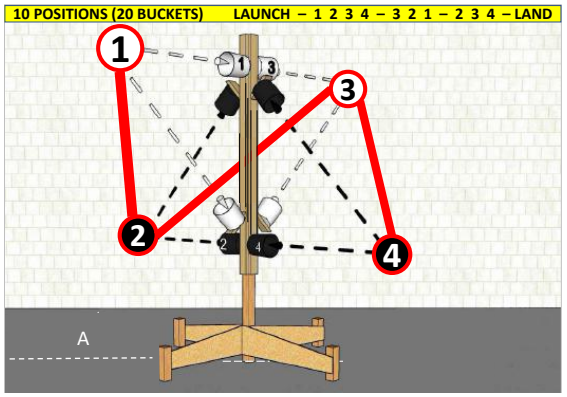
CAPTURE IMAGES OF THE INSCRIBED RINGS AND LAND ACCURATELY.

- First align with each PERPENDICULAR BUCKET to capture a SINGLE ALIGNMENT IMAGE of the 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.

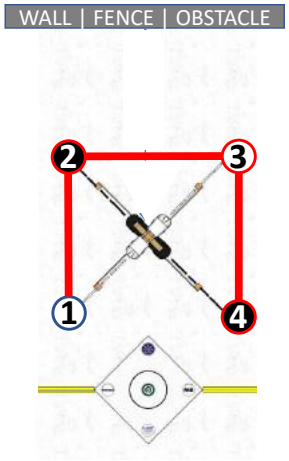
OBSTRUCTED | POST	BUCKETS	ALIGNMENT	ACUITY
START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
1 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	1	5 1 0	
2 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	1A		TR B TR L BR
3 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	
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
11 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	
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 1 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

Post (PAY 10)

Obstructed Test Lane



TOP VIEW



- Fly between the post and a wall or obstacle.
- 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.

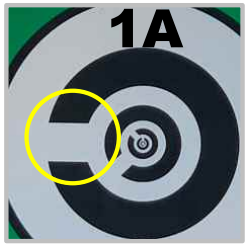
Acuity Points in Angled Buckets (50 Total):
Align with each angled bucket to IDENTIFY ACUITY GAPS through the pilot interface. Images are optional for documentation but use the answer key for scoring.

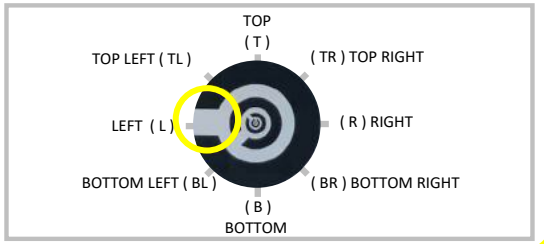
Scoring Acuity Points

Identify increasingly small visual acuity targets

ALIGN THEN CONTROL ZOOM AND EXPOSURE

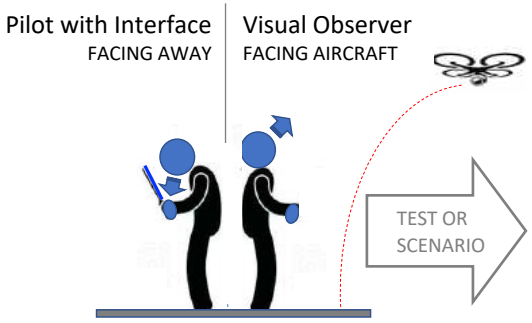
10 ACUITY TARGETS TOTAL 50 POINTS





REPORT GAP DIRECTIONS RELATIVE TO THE BUCKET NUMBER (TOP)

- Then 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.



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.

TEAM ROTATIONS

VO PILOT PROCTOR

FACING AWAY FROM THE TEST LANE

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.

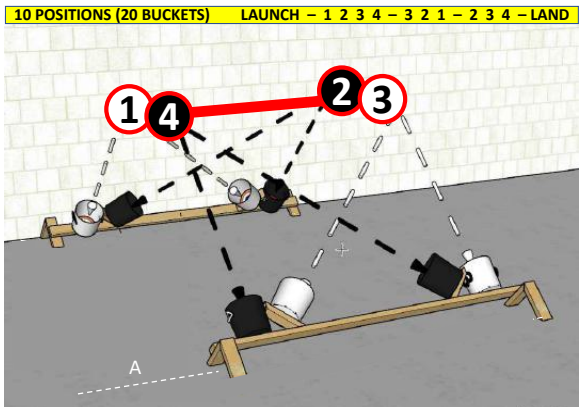
VISUAL OBSERVER (VO)

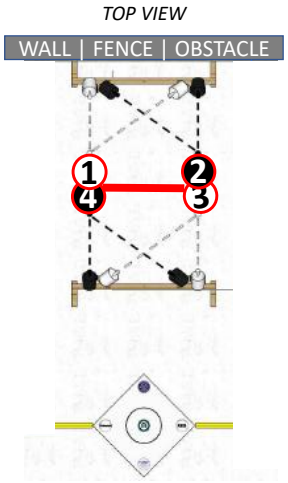
- Maintain sight with the aircraft and surroundings.
- Repeat the Pilot's intention of movement to confirm.
- Call out corrections and warnings as necessary.

OBSTRUCTED | ALLEY	BUCKETS	ALIGNMENT	ACUITY
START TIMER :	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
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
11 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	
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 1 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

Alley (PAY 9)

Obstructed Test Lane





- Fly near a wall or obstacle in front of the aircraft (0 degrees) and behind the aircraft (180 degrees).
- Inspect horizontal object features leftward and rightward.

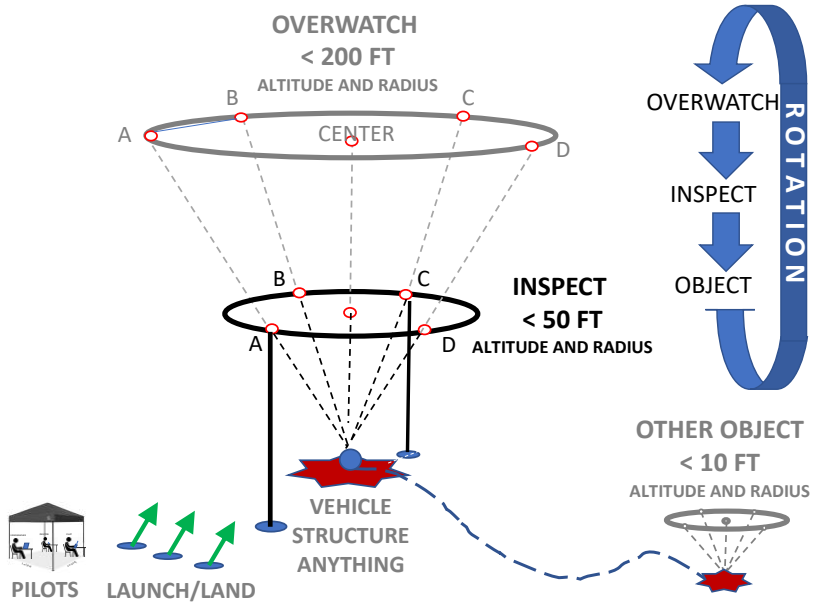
SCORING

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

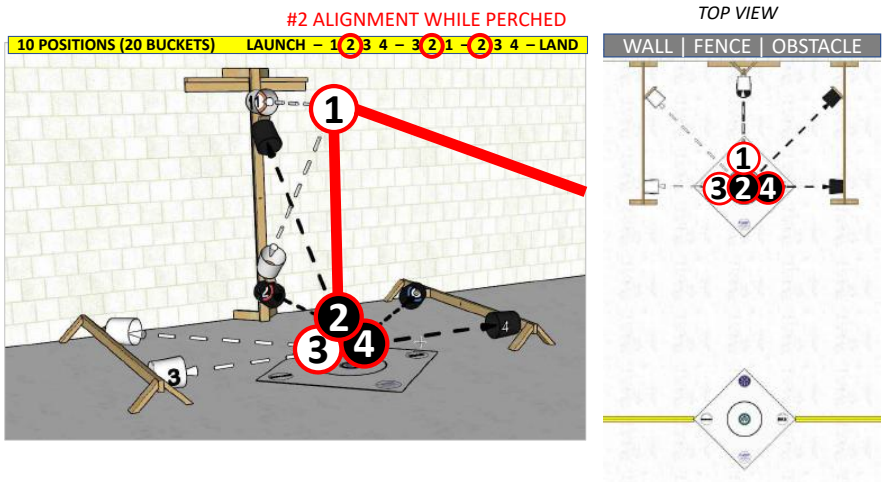
Each Pilot flies a 15-minute scenario, sequencing through 3 objectives for 5 minutes each.



- 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)

Obstructed Test Lane



- Fly and perch near a wall or obstacle in front of the aircraft 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

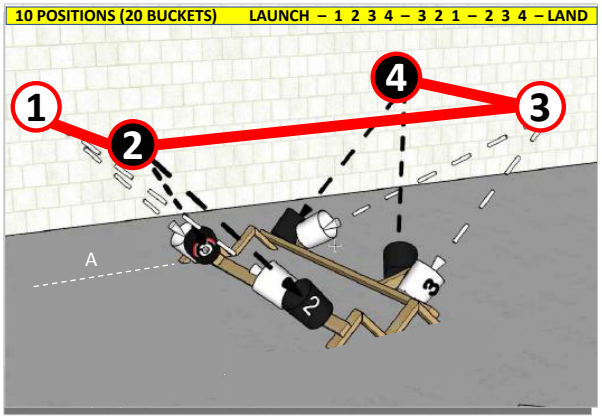
Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

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..

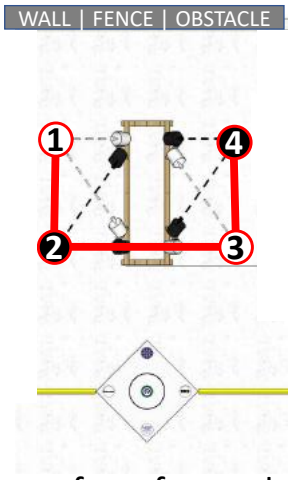
OBSTRUCTED | GROUND	BUCKETS	ALIGNMENT	ACUITY
START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
1 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	1	5 1 0	
2 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	1A		TR B TR L BR
3 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 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
11 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	
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 1 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

Ground (PAY 8)

Obstructed Test Lane



TOP VIEW



- Fly near a wall or obstacle at 90 degrees from forward of the aircraft.
- Inspect horizontal object features leftward and rightward.

SCORING

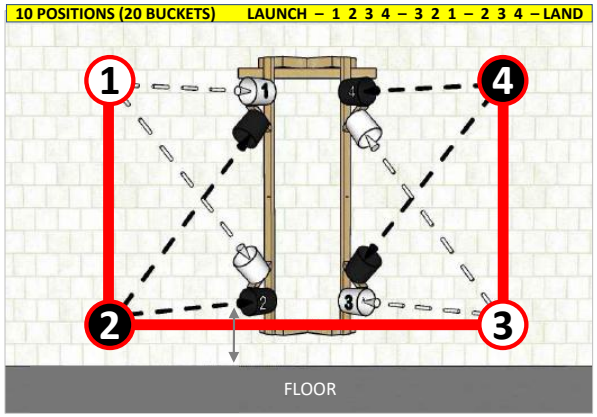
Alignment Points in Perpendicular Buckets (50 Total):
Align with each perpendicular bucket to CAPTURE A SINGLE IMAGE OF THE ALIGNMENT RING for scoring during or after the trial.

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.

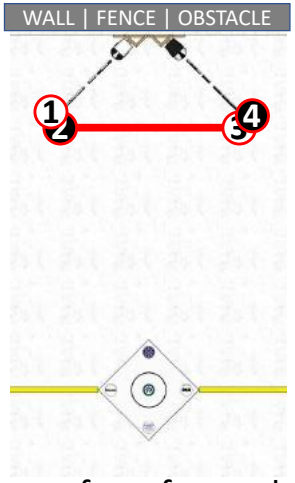
OBSTRUCTED | PERCH	BUCKETS	ALIGNMENT	ACUITY
START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
1 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	1	5 1 0	
2 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	1A		TR B TR L BR
3 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	WHILE PERCHED
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
11 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	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	
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	WHILE PERCHED
16 *ANGLED BUCKET:* CALL OUT ACUITY GAP DIRECTIONS	2A		L BR T TL R
17 *PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	3	5 1 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

Wall (PAY 7)

Obstructed Test Lane



TOP VIEW



- Fly near a wall or obstacle 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.

	OBSTRUCTED | WALL	BUCKETS	ALIGNMENT	ACUITY
	START TIMER	NUMBER	IMAGE POINTS (5 OR 1 POINT)	CIRCLE GAPS (1 POINT EACH)
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
11	*PERPENDICULAR BUCKET*: ALIGN AND CAPTURE IMAGE	2	5 1 0	
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 1 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