

Test Methods for Evaluating Aerial Drones Safety | Capabilities | Proficiency RobotTestMethods.nist.gov



VERSION 2023A



Perform the designated flight paths to triangulate around dual bucket rails in various orientations. Align with perpendicular buckets then angled buckets. Use zoom and exposure control to identify targets inside the buckets.

- All sequences have 1–10 positions with 20 alternating white and black buckets to score:
- Score ALIGNMENT POINTS by capturing a SINGLE IMAGE of the inscribed rings to verify alignments during or after the trial: UNBROKEN RINGS (5 pts), BROKEN RINGS (1 pt).
- Score ACUITY POINTS by identifying and calling out the 5 increasingly small VISUAL ACUITY TARGET GAPS (1 pt each).
- Faults for extreme deviations from the intended flight path or contact with any object ends the trial to ensure safety.
- Timer starts at launch and ends after the last task is completed. Trial time limits are typically set to 5 minutes each (25 minutes to complete all 5 tests) although organizations may set their own trial time limits and passing scores.

Confined Room-to-Room Labyrinth

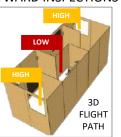
Search tasks with 1 m (3ft) minimum clearances

USE SETS OF 5 "INLINE" DUAL BUCKET RAILS

HORIZONTALS FOR LEFTWARD/RIGHTWARD INSPECTIONS







VERTICALS FOR UPWARD/DOWNWARD INSPECTIONS









- Fabricated room-to-room search scenario with inspect tasks that can be replicated to track and compare scores.
- Self-standing plywood corner walls define 1.2m (4 ft) switchback hallways with a blackout tarp ceiling over top at 2.4m (8ft). Fits inside a 6m (20ft) shipping container.
- Square access "windows" measuring 1m (3ft) square provide entry/exit and interior high/low pass throughs.

Confined Vehicle Inspection Scenarios

Day and Night Trials

USE SETS OF 5 "INLINE" DUAL BUCKET RAILS

DISTRIBUTED THROUGHOUT THE SCENARIO









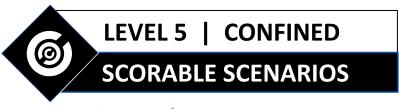




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Pilot LAST Name	
Pilot FIRST Name	
Pilot Organization	
Drone Make	
Drone Model	
Facility Location	
Date (YYYY/MM/DD)	Team #:
PROCTOR NAME	

BUCKET	DIAMETER —		VISIBILITY		WIN	D	PILOT	VIEW	TI	ME LIMI	т —
2 IN (5 CM)	4 IN (10 CM)	LIGHTED 300+ LUX	DIM 1-300 LUX	DARK < 1 LUX	AVERAGE MPH	GUSTS MPH	LINE OF SIGHT FACINE LANE OPTIONAL V.O.	INTERFACE ONLY BACK TO LANE MANDATORY V.O.	5 _{MIN}	10 MIN	MIN
(CIRCLE ONE)		(CIRCLE ONE)		(FILL IN)		(CIRCI	(CIRCLE ONE or FILL IN)				

ALIGNMENT SCORE: Circle points for images with UNBROKEN RINGS (5 pts), BROKEN RINGS (1 pt), Draw a line through all incomplete. **ACUITY SCORE:** Circle correctly identified GAP DIRECTIONS in the answer key (1 pt each).

	BUCKETS	ALIC	ACUITY							
START TIMER (CAPTURE CLOCK IMAGE) : :	NUMBER	IMAGE POINTS (5 OR 1 POINT)			CIRCLE GAPS (1 POINT EACH)					
1 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 1	5	1	0						
2 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	ıs 1A				TR	В	TR	L	BR	
3 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMA	AGE 2	5	1	0						
4 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	as 2A				L	BR	Т	TL	R	
5 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMA	AGE 3	5	1	0						
6 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	as 3A	÷	-	-	BR	T	TL	R	Bl	
7 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMA	AGE 4	5	1	0		1				
8 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	4A				Т	BL	В	TR	L	
9 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMA	AGE 5	5	1	0						
10 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	s 5A				BL	R	TL	L	BI	
11 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 6	5	1	0						
12 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	6A				TR	В	TR	L	BF	
13 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 7	5	1	0						
14 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	rs 7A				L	BR	T	TL	R	
15 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 8	5	1	0		1	1			
ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	IS 8A				BR	T	TL	R	Bl	
17 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 9	5	1	0						
18 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	ıs 9A				Т	BL	В	TR	L	
19 PERPENDICULAR BUCKET: ALIGN AND CAPTURE IM	AGE 10	5	1	0	WHILE PERCHED					
20 ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTION	10A				BL	R	TL	L	Bl	
STOP TIMER. RECORD SCORES AND ELAPSED TIME		_		/50					/50	
RECORD SCORES AND ELAPSED TIME				/50	<u> </u>				/!	

ELAPSED TIME (MM:SS)

		BUCKETS	ALIGNMENT			ACUITY					
START TIMER (CAPTURE CLOCK IMAGE) : :		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	В	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	Т	TL	R	
5	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	3	5	1	0						
6	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	3A	-	-	-	BR	Т	TL	R	BL	
7	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	4	5	1	0		1		ı		
8	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	4A				Т	BL	В	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	В	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	Т	TL	R	
15	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	8	5	1	0						
16	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	8A				BR	Т	TL	R	BL	
17	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	9	5	1	0						
18	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	9A				Т	BL	В	TR	L	
19	PERPENDICULAR BUCKET: ALIGN AND CAPTURE IMAGE	10	5	1	0	WHILE PERCHED					
20	ANGLED BUCKET: CALL OUT ACUITY GAP DIRECTIONS	10A				BL	R	TL	L	BL	
STOP TIMER. RECORD SCORES AND ELAPSED TIME.					/50					/50	

ELAPSED TIME (MM:SS)