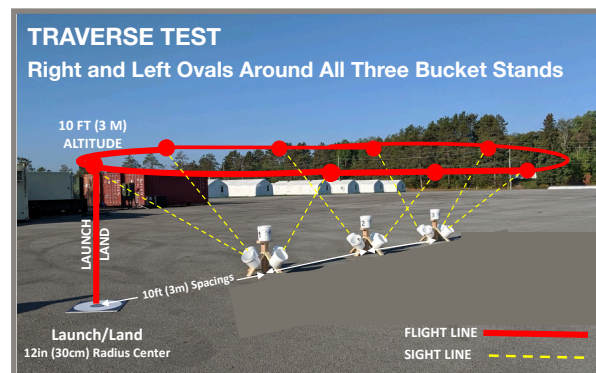
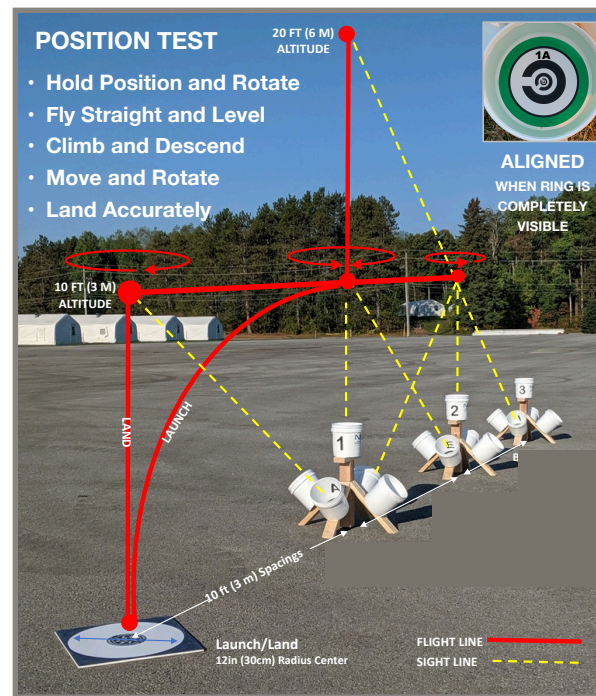
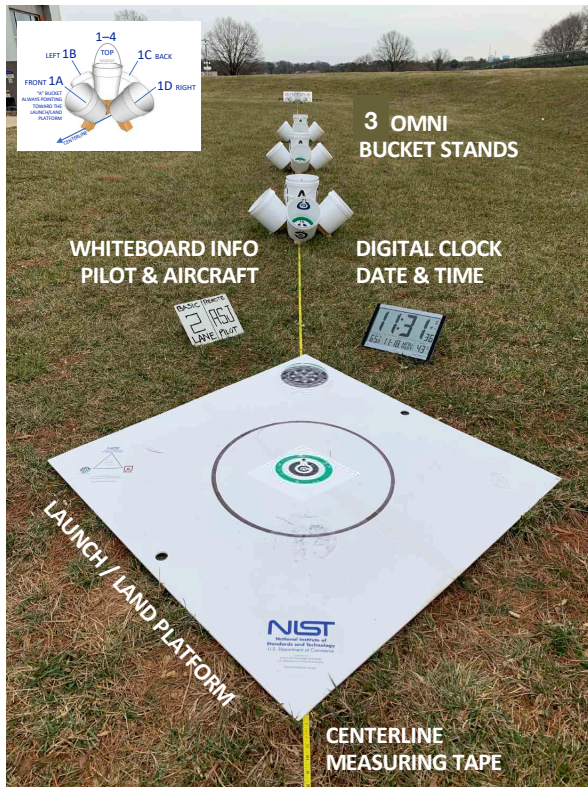


Purpose

These test methods for small unmanned aircraft systems can be used to quantitatively evaluate various system capabilities and remote pilot proficiency. They are being standardized through the *ASTM International Standards Committee on Homeland Security Applications; Response Robots (E54.09)*. They are also referenced as Job Performance Requirements in the *National Fire Protection Association Standard for Small Unmanned Aircraft Systems Used For Public Safety Operations (NFPA 2400)*.

These test methods are primarily intended for vertical takeoff and landing systems with an onboard camera and remote pilot display.



Test Director

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Standard Test Methods for Small Unmanned Aircraft Systems

Basic Proficiency Evaluation for Remote Pilots

Flying safely in our national air space requires knowledge and skill. The FAA's Part 107 written test ensures remote pilots understand air space restrictions and safety precautions. This brochure introduces a basic skills test for remote pilots to evaluate "positive aircraft control" at all times. More comprehensive tests are available online.

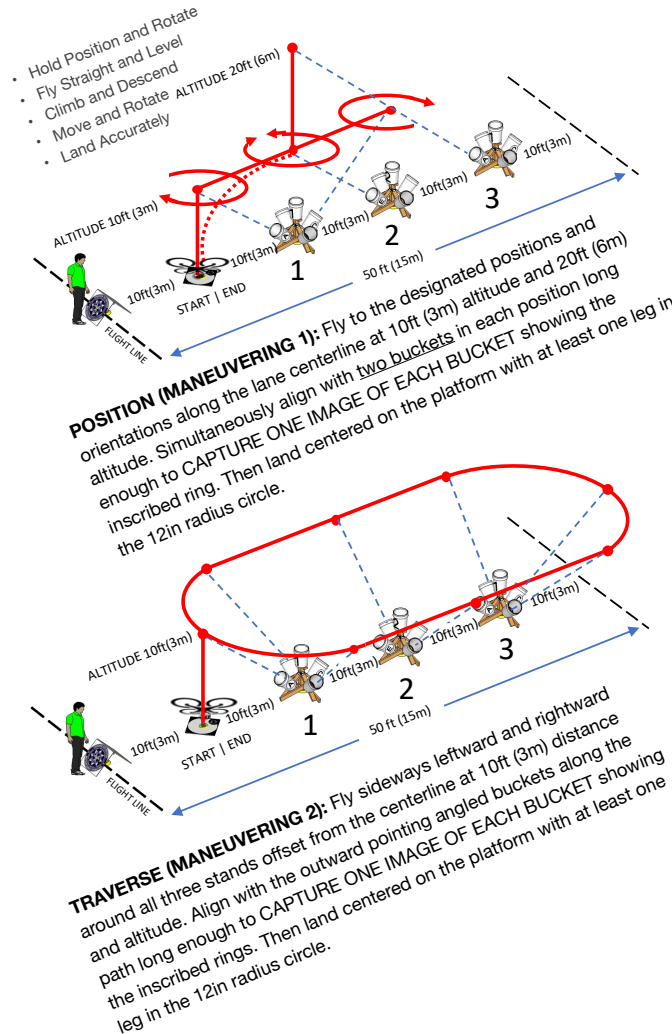
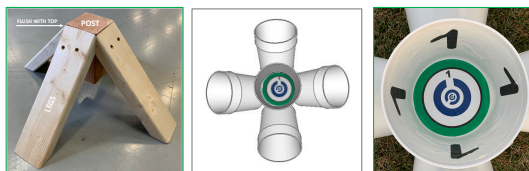
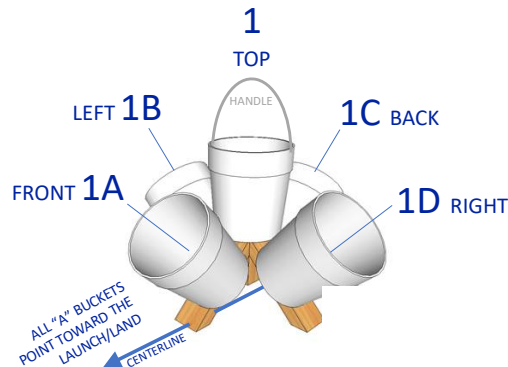
These standard test methods provide a reproducible way to train and measure remote pilot proficiency for professionals and recreational pilots. Organizations can establish their own minimum proficiency requirements to improve operations while reducing risk to ground personnel and manned aircraft in the area.

Website: RobotTestMethods.nist.gov

Version: 2020F

Summary of Tests

The Position and Traverse tests are performed sequentially by a remote pilot in direct line of sight, or with the pilot's back turned to represent flying beyond visual line of sight with an assisting visual observer. The aircraft flies the designated flight paths to align with one or more white buckets. Each alignment requires a single image of the inscribed green ring inside the bottom of the buckets. Perform all 40 alignments and accurate landings within the designated time limit. Visual acuity targets evaluate camera pointing and zooming capabilities along with color, thermal, hazmat labels, or other objects. Faults resulting in an end-of-trial include extreme deviations from the intended flight path or contact with the apparatus, ground, or safety enclosure.



Test Lane Fabrication

Omni Bucket Stands , Launch/Land Platform, Measuring Tape Centerline

- (QTY 01) 15m (50ft) measuring tape centerline
- (QTY 01) square panel with 30cm (12in) radius circle
- (QTY 03) 10x10x15cm (4x4x6in) posts
- (QTY 12) 5x10x30cm (2x4x12in) legs with 45deg tapers
- (QTY 30) 7.5cm (3in) screws attach legs to post – 2 per
- (QTY 30) 4cm (1-1/2in) screws attach buckets – 2 per
- (QTY 15) 7.5-liter (2-gallon) white buckets
- (QTY 52) 20cm (8in) round polyester weatherproof labels. Download and print targets and lettering from the online [USAGE GUIDE](#) or at [RobotTestMethods.nist.gov](#).
- A thick black marker can also be used to inscribe 2.5cm (1in) rings inside buckets with written letters and numbers.

BASIC PROFICIENCY FORM (10 MINUTE TIME LIMIT)

Pilot:	
Org:	
Email:	
Zip Code:	Date (MM/DD/YY):
Make:	Model:

CAPTURE ONLY ONE IMAGE OF EACH BUCKET – CIRCLE ALIGNED IMAGES AND LANDINGS

CAPTURE PRE-LAUNCH CLOCK IMAGE – LAUNCH TIME (HH:MM:SS)		:	:
POSITION TEST – FLYING ALONG CENTERLINE		CIRCLE ALIGNED	
1	LAUNCH AND HOVER OVER STAND #1 TO ALIGN WITH	1 & 2A	
2	YAW <u>LEFTWARD</u> 360° OVER STAND #1 TO ALIGN WITH	1 & 2A	
3	YAW <u>RIGHTWARD</u> 360° OVER STAND #1 ALIGN WITH	1 & 2A	
4	CLIMB VERTICALLY OVER STAND #1 TO ALIGN WITH	1 & 3A	
5	DESCEND VERTICALLY OVER STAND #1 TO ALIGN WITH	1 & 2A	
6	PITCH FORWARD OVER STAND #2 TO ALIGN WITH	2 & 3A	
7	PITCH BACKWARD OVER STAND #1 TO ALIGN WITH	1 & 2A	
8	PITCH FORWARD OVER STAND #2 THEN YAW <u>LEFT</u> 180°	2 & 1C	
9	PITCH FORWARD OVER LANDING THEN YAW <u>RIGHT</u> 180°	L & 1A	
10	LAND IN CIRCLE (ONE OR MORE LEGS) – WORTH 2 POINTS	1pt & 1pt	
TRAVERSE TEST – FLYING LEFTWARD		CIRCLE ALIGNED	
11	HOVER OVER THE LAUNCH PLATFORM TO ALIGN WITH	1A	
12	ORBIT 90° LEFTWARD AROUND STAND #1 TO ALIGN WITH	1B	
13	ROLL LEFTWARD TO STAND #2 TO ALIGN WITH	2B	
14	ROLL LEFTWARD TO STAND #3 TO ALIGN WITH	3B	
15	ORBIT 90° LEFTWARD AROUND STAND #3 TO ALIGN WITH	3C	
16	ORBIT 90° LEFTWARD AROUND STAND #3 TO ALIGN WITH	3D	
17	ROLL LEFTWARD TO STAND #2 TO ALIGN WITH	2D	
18	ROLL LEFTWARD TO STAND #1 TO ALIGN WITH	1D	
19	ORBIT 90° LEFTWARD AROUND STAND #1 TO ALIGN WITH	1A	
20	LAND IN CIRCLE (ONE OR MORE LEGS) – WORTH 1 POINT	1pt	
TRAVERSE TEST – FLYING RIGHTWARD		CIRCLE ALIGNED	
21	HOVER OVER THE LAUNCH PLATFORM TO ALIGN WITH	1A	
22	ORBIT 90° RIGHTWARD AROUND STAND #1 TO ALIGN WITH	1D	
23	ROLL RIGHTWARD TO STAND #2 TO ALIGN WITH	2D	
24	ROLL RIGHTWARD TO STAND #3 TO ALIGN WITH	3D	
25	ORBIT 90° RIGHTWARD AROUND STAND #3 TO ALIGN WITH	3C	
26	ORBIT 90° RIGHTWARD AROUND STAND #3 TO ALIGN WITH	3B	
27	ROLL RIGHTWARD TO STAND #2 TO ALIGN WITH	2B	
28	ROLL RIGHTWARD TO STAND #1 TO ALIGN WITH	1B	
29	ORBIT 90° RIGHTWARD AROUND STAND #1 TO ALIGN WITH	1A	
30	LAND IN CIRCLE (ONE OR MORE LEGS) – WORTH 1 POINT	1pt	
CAPTURE CLOCK IMAGE AFTER LANDING – LAND TIME (HH:MM:SS)		:	:
STOP THE TIMER OR CALCULATE RESULT – ELAPSED TIME (MM:SS)		:	:
_____/ 40 MINIMUM PASSING SCORE – TOTAL SCORE (POINTS)			
CIRCLE ONE: FAIL (SCORE TIME SAFETY) OR PASS			