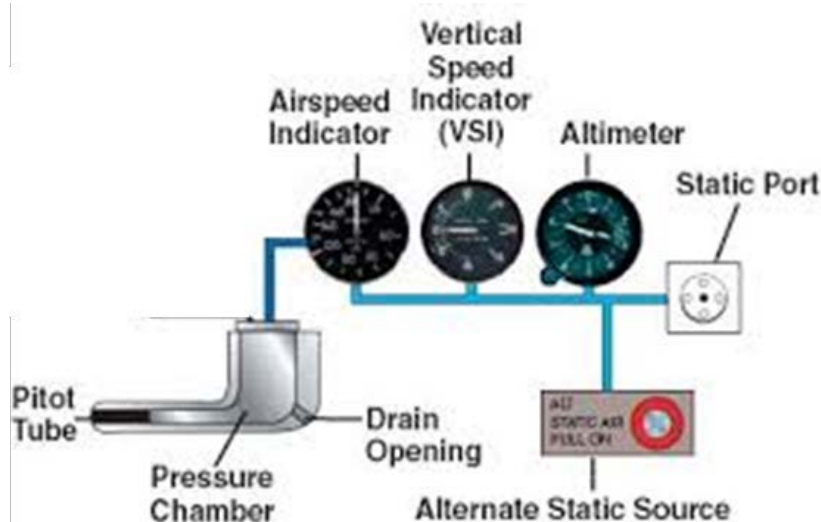


## 1. INTRODUCTION

This competition is designed to test the skills of each participating team in their understanding of and ability to troubleshoot an aircraft Pitot-Static system. Barfield recommends participants fully understand a basic aircraft Pitot-Static system (shown below) and potential issues that could be found. The faults found during this procedure will test this knowledge.



**Figure 1 BASIC AIRCRAFT PITOT-STATIC SYSTEM**

To ensure Teams which have yet to compete in this competition do not gain an unfair advantage by observing the earlier competitors, Barfield may have unidentified members of our team monitoring spectators in the testing area. Any team members or associates to a team identified to be loitering in the Pitot-Static area may result in a 3 min penalty being assessed when the team actually completes the competition. This penalty may be done without a warning to the offending party found in the testing area and is at Barfield's, AMC and/or the judge's discretion.

## **2. INSTRUMENT CONFIGURATION – SINGLE SYSTEM (PILOT & COPILOT)**

A. Airspeed 420 knot, Rate of Climb 6000 feet/min, Altimeter 50,000 feet

## **3. GOAL OF THE EXERCISE**

A. Leak test both Pitot and Static system and record results that are within tolerance level.

B. Isolate, ID and Document trouble if found

## **4. ITEMS KNOWN GOOD**

A. Test Equipment and test equipment hoses

B. Nav-Aids Adapters

C. Pitot-Static Ports

D. Both Manifolds for Pilot's side and interconnecting hoses to Pitot-Static probe

E. Both Manifolds for Copilot's side and interconnecting hoses to Pitot-Static probe

F. All plumbing on the rear of the bench

## **5. TOOLS**

A. Copy of Written Procedures

B. Form 611-00052 Test Data Sheet for annotating the test results.

C. DPS1000 Automated Air Data Tester.

D. Tablet Computer for control of DPS1000

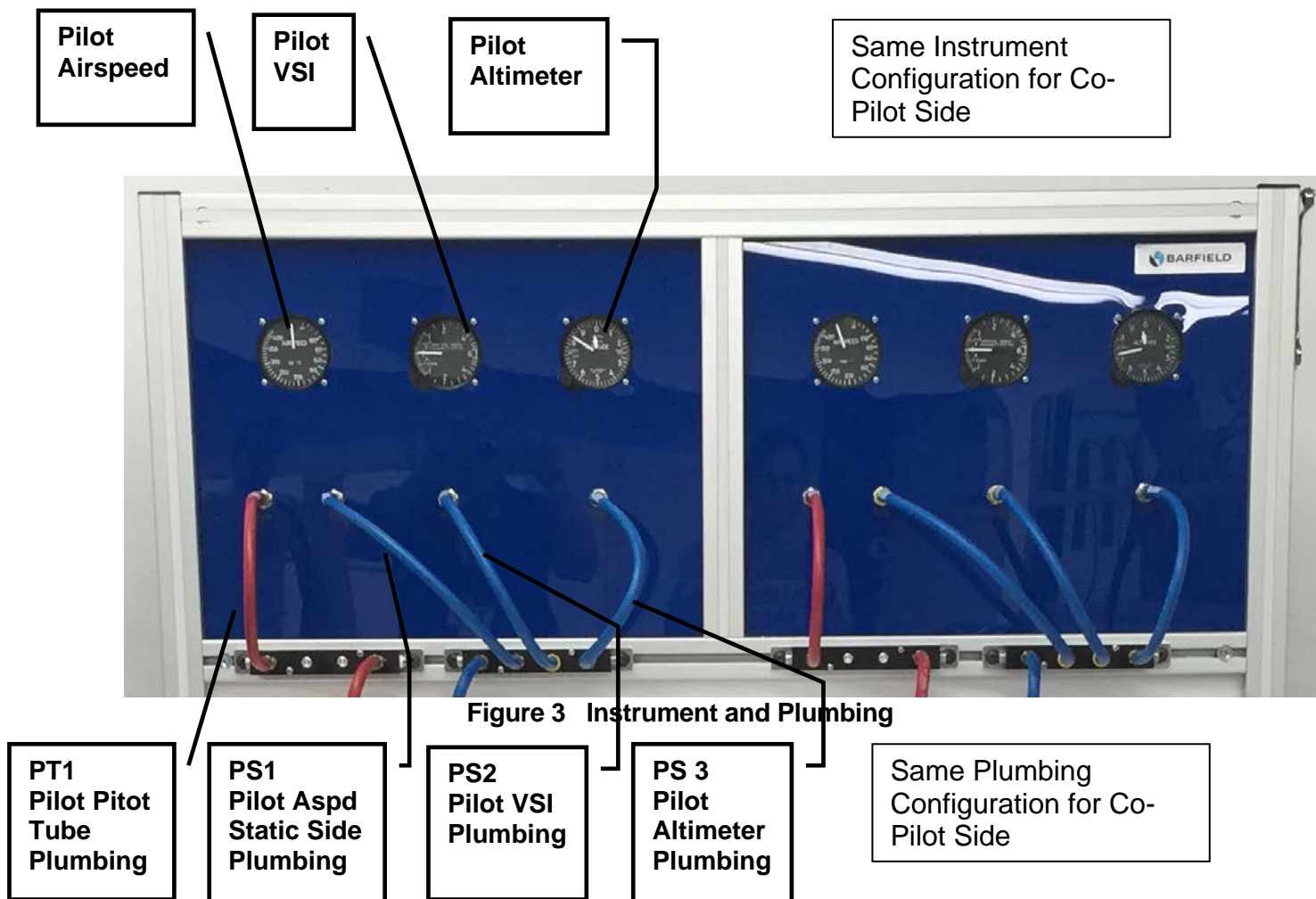
E. Set of Four known-good replacement hoses, PT1 (Red), PS1, PS2, PS3 (Blue)

F. The Airspeed, VSI and Altitude indicators may include potential failures. If an instrument is determined to be unserviceable during testing the participants will inform the judge which indicator is damaged.

G. 9/16' Wrench for replacing hoses.



**Figure 2 PITOT-STATIC TEST BENCH**



## 6. TIMER:

- A. Starting: The Judge will start the timer to begin the event. The timer is started once the Control button on the DPS1000 is selected and the unit transitions into the control mode at the beginning of the Pitot Leak test procedure.
- B. Stopping: The Participants will press the timer button to stop the clock once the Static Leak Test has been successfully completed. Taking the system back down to ground is not necessary. A successful completion is defined as a leak test within the specified tolerances and the Value and Pass/Fail boxes on the 611-00052 have been filled in with data. Once the data has been filled stop the clock.

## 7. PITOT SYSTEM LEAK TEST

### A. Aircraft Preparation

- a) Insure the aircraft (bench) is safe at ground level with no trapped pressures or vacuums.

### B. Test Set Preparation

- a) Unit will be powered up and initialization is complete.
- b) Test Set is already safe at ground and in Leak Measure Mode.
- c) Hoses are already connected between Test Set and correct Nav-Aids adapters.

### C. Repairs:

- a) A problem could be experienced at any time during this procedure. If a problem is identified, then attempt to determine the likely failure using best troubleshooting practices or suggestions shown below.
  - Attempt repairs by removing suspect hose(s) and replace with new hose(s) having same designators (PT1, PS1, PS2, PS3).
  - The Airspeed, VSI and Altitude indicators may include potential failures. If the team suspects an instrument is the failed component, inform the judge which indicator is damaged.
- b) Never make or break any connections on the bench or to the test equipment unless the system is safe at ground.
- c) Be especially careful when unfastening hoses as there are always possible situations where trapped pressure could be present.
- d) The team will be assessed a time penalty for Not taking the system to ground before removing a hose and/or for each good hose that is replaced unnecessarily.

### D. Connecting Test Set

- a) Nav-Aid's Adapter already mounted on the Pitot probe under test.
- b) No other Connections are required.

Note: The test begins when the Control button on the DPS1000 is selected and the unit transitions into the control mode and ends when the final leak testing result for the Static Channel is completed.

E. Test

- a) Fill in Team Name in the top box of TEST DATA SHEET P/N 611-00052.
- b) Press the “Control” button to begin testing.
- c) Continuously monitor gauges to verify correct indications.
- d) Configure Test Set to deliver 200 knots airspeed @ MAX 450 Kts..
- e) Once 200 knots have been achieved configure Test Set for Leak Measure.
- f) Set the Leak Rate Timer for 00:00 Wait Time and 01:00 Leak time
- g) The Airspeed must not decrease by more than 2 knots in 1 minute.
- h) Record the test data on the Test Data Sheet form 611-00052
- i) If the leak test passed, then proceed to Section 7 without returning airspeed to ground.
- j) If the leak test failed, then take the Test Set safely to 0 knot. DPS1000 operators can use the Go-To-Ground feature.
- k) Attempt to determine the likely failure using best troubleshooting practices or suggestions shown below.
  - Attempt repairs by removing suspect hose(s) and replace with new hose(s) having same designators (PT1, PS1, PS2, PS3).
  - If the team suspects an instrument is the failed component, inform the judge which indicator is damaged.


**CAUTION:** Never make or break any connections on the bench or to the test equipment unless the system is safe at ground. Be especially careful when unfastening hoses as there are always possible situations where trapped pressure could be present.

**NOTE:** A problem could exist at the hose fittings or anywhere along the body of the hose.

**NOTE:** The team will be assessed a time penalty for each good hose that is replaced unnecessarily or incorrectly identifying a broken indicator.

- l) Repeat Section 7. E. c) through f). PITOT SYSTEM LEAK TEST as needed

F. Complete the Pass/Fail boxes on the Pitot Leak Test 200 Kt. procedure on form 611-00052.

TEST DATA SHEET For Pitot-Static Work Bench P/N 611-00052					
TEAM:					
Reference: Current revision of Test Plan 84-611-00052					
STEP	REQUIREMENT	VALUE/Description	TOL ±	PASS	FAIL
6.E.f)	Pitot Only Leak Test 200 kts		≤ 2 kts		
	Retest Results (if Needed)				
7.D.e)	Static Leak Test 4,000 ft		≤ 100 ft/min		
	Retest Results (if Needed)				
	Other Problems detected?				

## 8. STATIC SYSTEM LEAK TEST

### A. Aircraft Preparation

- a) Set Altitude Baro for **29.92 inHg**.

### B. Test Set Preparation

- a) N/A

### C. Repairs:

- a) A problem could be experienced at any time during this procedure. If a problem is identified, then attempt to determine the likely failure using best troubleshooting practices or suggestions shown below.
  - Attempt repairs by removing suspect hose(s) and replacing with new hose(s) having same designators (PT1, PS1, PS2, PS3).
  - The Airspeed, VSI and Altitude indicators include potential failures. If an instrument is determined to be unserviceable during testing the participants will inform the judge which indicator is damaged.

- b) Never make or break any connections on the bench or to the test equipment unless the system is safe at ground.
- c) Be especially careful when unfastening hoses as there are always possible situations where trapped pressure could be present.
- d) The team will be assessed a time penalty for Not taking the system to ground before removing a hose and/or for each good hose that is replaced unnecessarily.

#### D. Connecting Test Set

- a) N/A

#### E. Test

- a) Configure Test Set to deliver 4,000 feet elevation @ max 5000Ft/min ROC.
- b) Once 4,000 feet Altitude has been achieved then configure Test Set for Leak Measure.
- c) Set the Leak Rate Timer for 00:00 Wait Time and 01:00 Leak time
- d) The Altitude must not decrease by more than 100 feet in 1 minute.

**CAUTION:** Observe instruments and be ready to resume control if necessary.

- e) Record the test data on the worksheet 64-611-00052.
- f) **If the leak test passes then proceed to Section 9.**
- g) **If the leak test failed, then take the system safely to ambient pressure.**  
**The DPS1000 operators can use the Go To Ground feature.**
- h) Attempt to determine the likely failure using best troubleshooting practices or suggestions shown below.
  - Attempt repairs by removing suspect hose(s) and replacing with new hose(s) having same designators (PT1, PS1, PS2, PS3).
  - If the team suspects an instrument is the failed component, inform the judge which indicator is damaged.

**CAUTION:** Never make or break any connections on the bench or to the test equipment unless the system is safe at ground. Be especially careful when unfastening hoses as there are always possible situations where trapped pressure could be present.


**CAUTION:** Never use Snoop on instruments, fittings, lines or hoses which are at vacuum.



NOTE: The team will be assessed a time penalty for each good hose that is replaced unnecessarily or incorrectly identifying a broken indicator.

- i) Repeat Section 8. E. a) through d) STATIC SYSTEM LEAK TEST as needed

**9. COMPLETE THE PASS/FAIL BOXES ON THE STATIC LEAK TEST 5,000 FT. PROCEDURE ON FORM 611-00052**

TEST DATA SHEET For Pitot-Static Work Bench P/N 611-00052					
TEAM:					
Reference: Current revision of Test Plan 84-611-00052					
STEP	REQUIREMENT	VALUE/Description	TOL ±	PASS	FAIL
6.E. f)	Pitot Only Leak Test 200 kts		≤ 2 kts		
	Retest Results (if Needed)				
7.D.e)	Static Leak Test 4,000 ft		≤ 100 ft/min		
	Retest Results (if Needed)				
	Other Problems detected?				

**10. PRESS THE TIMER BUTTON TO STOP THE CLOCK UPON COMPLETING THE LEAK TEST**



## 11. TIME ADJUSTMENTS/PENALTIES

STEP	REQUIREMENT	VALUE
	Total Time Elapsed	
A	Each corrective replacement after the second will add	+1 Min per corrective action
B	Accurately diagnosing specific Failures found in tests	- 1 Min deduction
C	Damage to indicators, Disqualification. Result will be 15 min, +other deductions above and +10 Min for damaging indicator.	15 Min +above addition + 10 Min
D	Not following test procedure 84-611-00052-150412-5 or following any of the Cautions outlined in the procedure.	+ 2 Min Addition
E	Hose replacements do not show correct designator (PT1, PS1, PS2, PS3). Parts on an aircraft must always be replaced with the correct part numbers	+ 1 Min Addition
F	Missing any designated problems within test	+ 2 Min Addition
G	Other discrepancies as determined by Barfield Inspector.	+2 Min per
H	Team members or associates identified to be loitering in the Pitot-Static area can be assessed a 3 min penalty by judges.	+ 3 Min Addition