

# BOMBARDIER

Toronto (de Havilland)

**PROPRIETARY INFORMATION**

# PPS 13.10

**PRODUCTION PROCESS STANDARD**

## Installation of DASH 8 AHRU Mounting Tray

- Issue 4
- This standard supersedes PPS 13.10, Issue 3.
  - Vertical lines in the left hand margin indicate changes over the previous issue.
  - Direct PPS related questions to [PPS.Group@aero.bombardier.com](mailto:PPS.Group@aero.bombardier.com) or (416) 375-4365.
  - This PPS is effective as of the distribution date.

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Production Process Standards (PPS)

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Quality

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## Table of Contents

Sections	Page
1 Scope . . . . .	3
2 Hazardous Materials . . . . .	3
3 References . . . . .	3
4 Materials and Equipment . . . . .	3
4.1 Materials . . . . .	3
4.2 Equipment . . . . .	3
5 Procedure . . . . .	4
5.1 General . . . . .	4
5.2 Jacking and Levelling the Aircraft . . . . .	4
5.3 Installation/Alignment of AHRU Tray . . . . .	7
6 Requirements . . . . .	9
7 Safety Precautions . . . . .	9
8 Personnel Requirements . . . . .	9
<b>Figures</b>	
Figure 1 - Aircraft Levelling Provisions . . . . .	5
Figure 2 - Jacking Aircraft . . . . .	6
Figure 3 - Installation Alignment of AHRU Tray . . . . .	8

## 1 Scope

- 1.1 This Production Process Standard (PPS) specifies the procedure and requirements for installing and levelling the Attitude Heading and Reference Unit (AHRU) mounting tray on the DASH 8 aircraft.
  - 1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS must be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.
  - 1.1.2 Refer to [PPS 13.26](#) for the subcontractor provisions applicable to this PPS.
  - 1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

## 2 Hazardous Materials

- 2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto (de Havilland) Environment, Health and Safety Department.

## 3 References

- 3.1 [PPS 13.26](#) - General Subcontractor Provisions.
- 3.2 [PPS 14.01](#) - Torquing Method and Identification

## 4 Materials and Equipment

### 4.1 Materials

- 4.1.1 CSP 343-99 laminated shims.

### 4.2 Equipment

- 4.2.1 Lifting jacks
  - wing jacks (2 req'd) - Tronair Pt. No. 02-8002-0100
  - front fuselage jack - Tronair Pt. No. 02-8003-0132
  - jacking adapters (3 req'd) - Tronair Pt. No. 02-8014-4000
- 4.2.2 SD 6159 levelling fixture.

## 5 Procedure

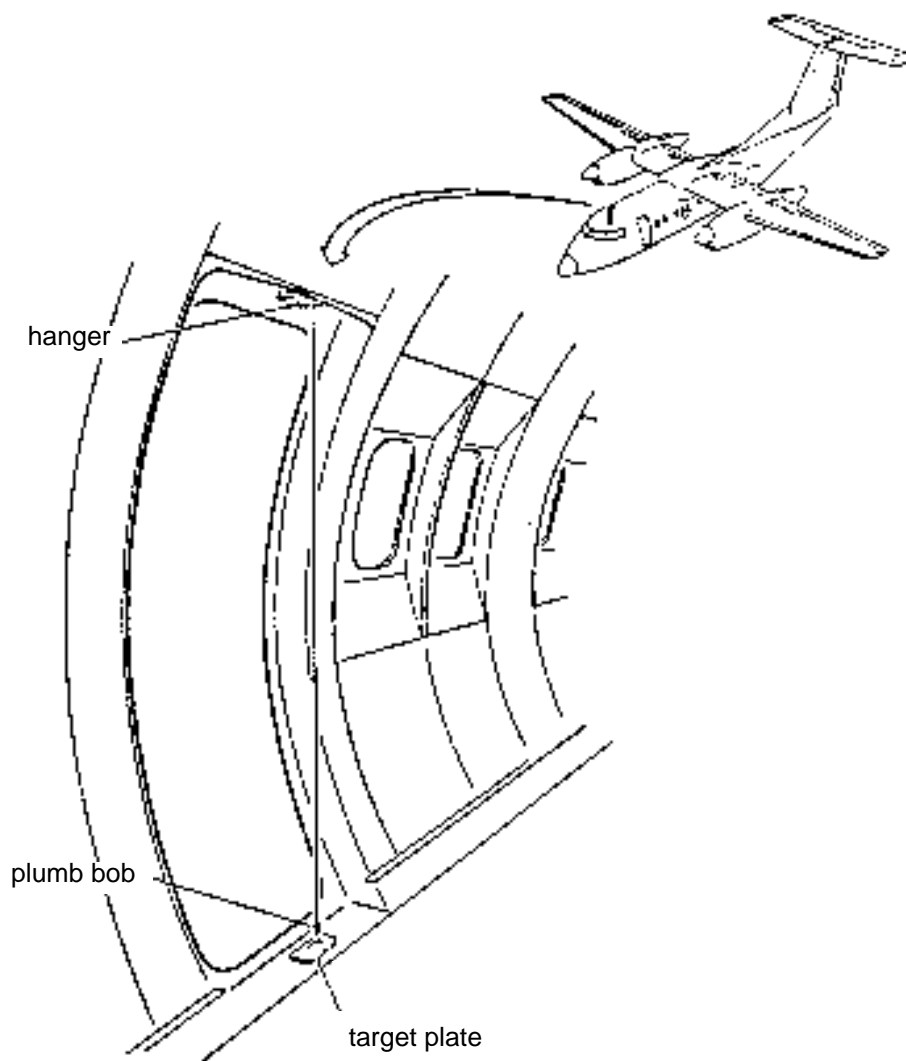
### 5.1 General

- 5.1.1 The purpose of this procedure is to install and align the Attitude Heading and Reference Unit (AHRU) mounting tray in the aircraft to within  $\pm 0.2^\circ$  of the longitudinal and lateral aircraft axes.
- 5.1.2 To accomplish alignment of the tray, the aircraft is levelled, the tray aligned longitudinally with the aircraft and shimmed to level. A pitch UP angle of approximately  $2^\circ$  is then introduced on the aircraft and the tray azimuth adjusted until it is in alignment with the pitch axis. The tray is then locked in position. After removal/replacement of the AHRU, the unit will not require re-alignment of the mounting tray, provided that the tray is not removed or disturbed.
- 5.1.3 In order to ensure alignment of the AHRU tray within the required tolerances it is essential that the procedures specified herein are closely followed.
- 5.1.4 During the shimming and levelling procedure specified herein it is imperative that no personnel other than the operator performing the alignment are working on or in the aircraft, as changes in loading will affect the level readings.

### 5.2 Jacking and Levelling the Aircraft

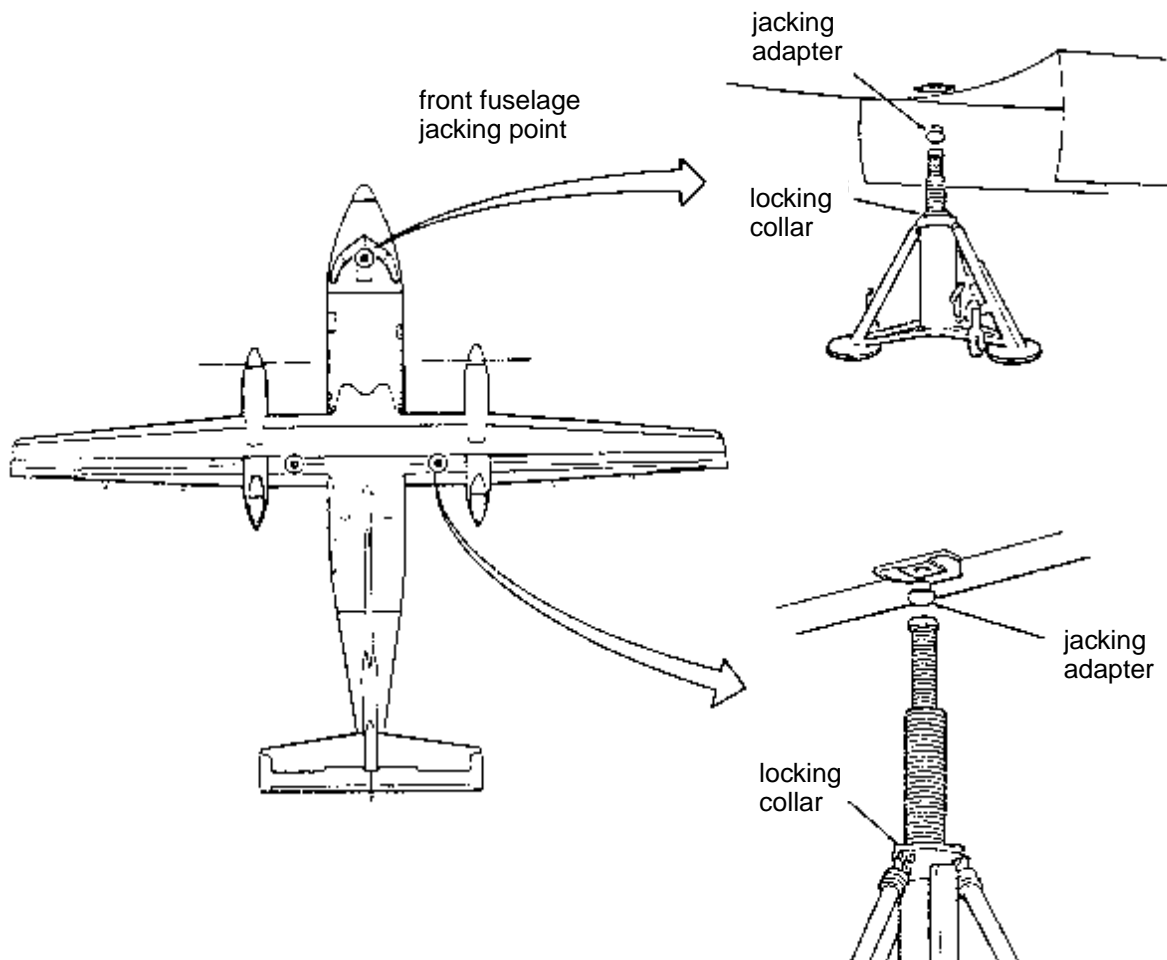
- 5.2.1 Jack and level the aircraft as follows:

- Step 1. Ensure that the aircraft is in a level area with adequate clearance around and above the aircraft with the main and nose landing gear ground locks installed.
- Step 2. If the engines have not yet been installed, add 500 lbs of ballast in the cockpit area.
- Step 3. Remove the front emergency exit door and suspend a plumb bob from the aft side of the hanger bracket on the upper door frame so that the point of the plumb bob just clears the aircraft levelling target plate on the lower door sill (see [Figure 1](#)).
- Step 4. Check that main landing gear and nose landing gear ground locks are in place.
- Step 5. Position the front fuselage jack (Tronair #02-8003-0132) at the front fuselage jacking point.
- Step 6. Position a tail stand 4" - 6" from the adapter on the bottom of the aft fuselage.
- Step 7. Insert a jack adapter (Tronair #02-8014-4000) into the front fuselage jack receptacle and hold it in place.
- Step 8. Raise the jack until it contacts the adapter. Ensure that the jack is centred on the jack adapter ball.



**Figure 1 - Aircraft Levelling Provisions**

- Step 9. Raise the front fuselage jack until the plumb bob aligns with the longitudinal level mark on the target plate within  $1/16"$ , continuously moving the collar of the jack down as you lift the aircraft. As the nose of the aircraft is rising, lower the tail stand so as to maintain a 4" - 6" gap between the tail stand and the bottom of the aft fuselage.
- Step 10. Position a wing jack (Tronair #02-8002-0100) at each wing jacking point
- Step 11. Insert a jack adapter (Tronair #02-8014-4000) into each of the wing jack receptacles and hold them in place.



**Figure 2 - Jacking Aircraft**

- Step 12. Raise the wing jacks until they contact the adapters as shown in [Figure 2](#). Ensure that the jacks are centred on the jack adapter balls.
- Step 13. Raise the wing jack until jack contacts adapter. Ensure that jack is centred on the jacking adapter ball.
- Step 14. Lift the aircraft on the jacks at the three jacking locations at the same time until the main landing gear wheels are 3" - 4" clear of the ground. As the aircraft is rising, raise the tail stand so as to maintain a 4" - 6" gap between the tail stand and the bottom of the aft fuselage.
- Step 15. Adjust the jacks so as to align the plumb bob with the longitudinal and lateral level marks on the target plate within 1/16".
- Step 16. Once lifting and levelling is completed, tighten the lock collars on each jack.

### 5.3 Installation/Alignment of AHRU Tray

5.3.1 Install and align AHRU trays as follows (see [Figure 3](#)):

- Step 1. Ensure that the underfloor mounting shelf installation is complete including tightening of shelf mounting screws. On completion of tightening, the mounting shelf screws must have had a paint stripe applied across the fastener head and onto the panel. Do not loosen or move the mounting shelf during the alignment procedure.
- Step 2. Assemble the SD 6159 levelling fixture onto the AHRU mounting tray. The knob on the front of the fixture shall be hand tightened only.
- Step 3. Locate the mounting tray on the underfloor shelf in its mounting position and align the tray parallel to the centreline of the aircraft.
- Step 4. While maintaining the tray alignment, shim the mounting tray with CSP 343-99 laminated shims under the mounting pads until the circular level on the fixture indicates level with respect to both the lateral and longitudinal aircraft axes. Use the minimum thickness of shim required to obtain a level indication.
- Step 5. Install the 4 mounting screws through the mounting holes and shims and tighten the mounting screws to 30 inch pounds according to [PPS 14.01](#).
- Step 6. Re-check the circular level and verify the indication is within  $\pm 0.1^\circ$  (1 circular graduation). Re-shim if necessary. If necessary, adjust the tubular level which is parallel to the lateral axis of the aircraft to indicate level using the thumb nuts.
- Step 7. Mark the exact location of the bubble on the lateral axis level using suitable tape. In the following steps, the tray will be adjusted to return the lateral axis to this reading.
- Step 8. While maintaining the wing jacks in their levelled position, raise the aircraft nose approximately 10" using the nose jack to obtain a pitch up angle of approximately  $2^\circ$ . As the nose of the aircraft is rising, lower the tail stand so as to maintain a 4" - 6" gap between the tail stand and the bottom of the aft fuselage. A pitch up angle of  $2^\circ$  will displace the plumb bob approximately 2" aft of the levelling target station line.
- Step 9. Adjust the mounting tray azimuth (longitudinal alignment on the shelf) as required to return the bubble in the lateral axis level to the position marked on the level in [Step 7](#) and re-tighten the mounting screws. Do not add or remove any shims during azimuth levelling procedure.
- Step 10. Return the aircraft to the level position to centre the plumb bob on target within  $\pm 1/16"$  and check that the circular level indication is within  $\pm 0.2^\circ$  (2 circular graduations) of level. If the circular level indication is not within  $\pm 0.2^\circ$  of level, repeat the levelling and alignment procedure.

- Step 11. On completion of satisfactory installation/alignment of the AHRU mounting tray, remove the levelling fixture from the tray and apply a paint stripe across the tray mounting screws and shims to provide a witness mark to verify that neither the tray nor shims are subsequently moved or replaced.

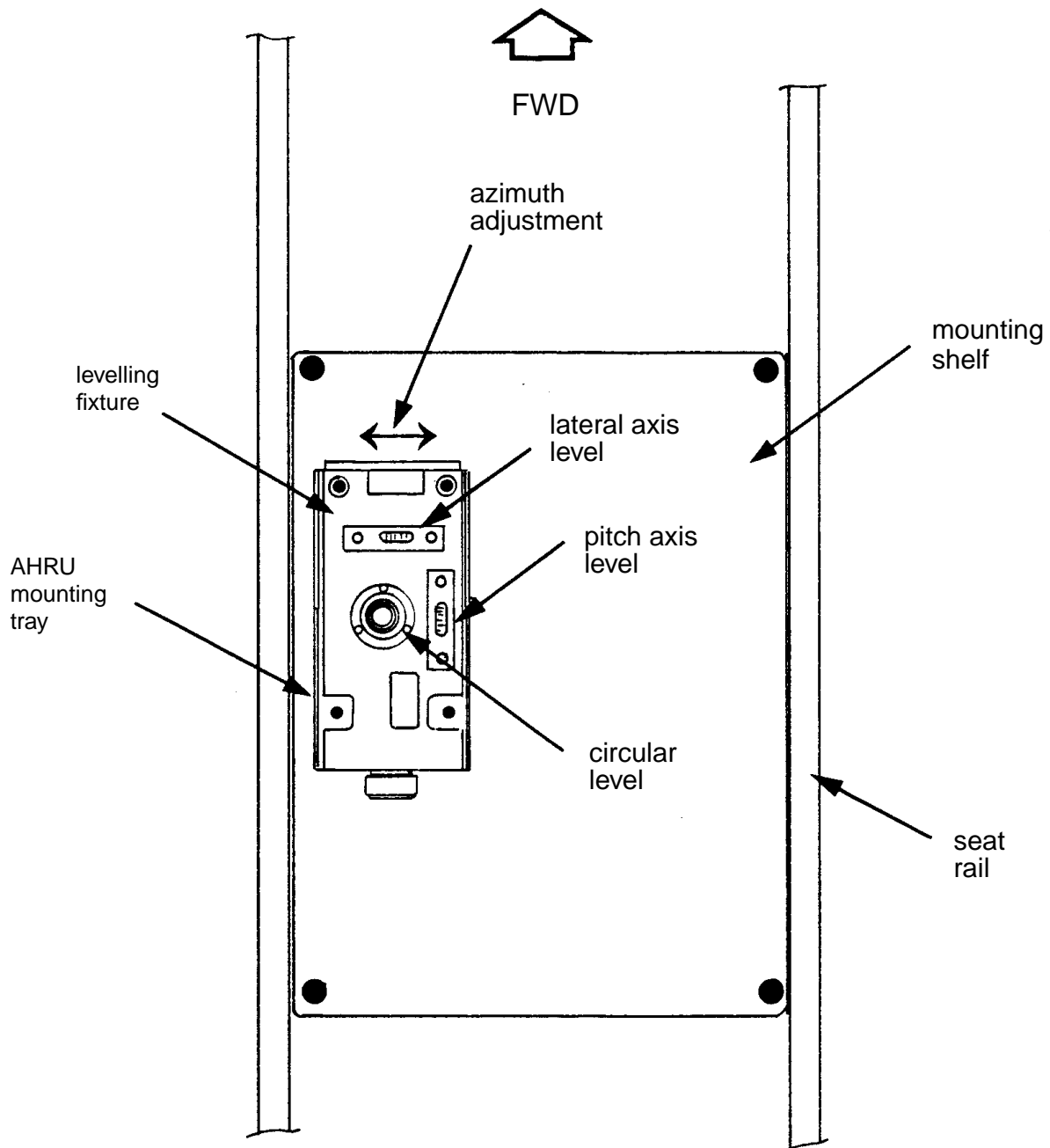


Figure 3 - Installation Alignment of AHRU Tray



## 6 Requirements

- 6.1 Before installing/aligning the AHRU tray, the aircraft must be levelled to within  $\pm 1/16"$  of centre on the levelling target in the front emergency exit door sill.
- 6.2 After shimming, the AHRU tray must be level to within  $\pm 0.1^\circ$  (1 graduation on the circular level).
- 6.3 After azimuth alignment and re-levelling of the aircraft, the AHRU mounting tray must be level within  $\pm 0.2^\circ$  (2 graduations on the circular level).
- 6.4 On completion of installation and alignment of the AHRU mounting tray, the shelf attachment bolts, shims and the mounting tray screws must all be marked with a paint stripe to provide a visual check that neither the screws nor shims are removed or replaced after levelling according to the procedure specified herein.

## 7 Safety Precautions

- 7.1 **Observe general shop safety precautions when performing the procedure specified herein.**
- 7.2 **Ensure that main and nose landing gear ground locks are installed before jacking of the aircraft.**
- 7.3 **Ensure lifting jack extensions are locked in place at all times except when operating the jacks.**
- 7.4 **If at any time during the procedure specified herein the aircraft structure should inadvertently touch the tail stand, ensure contact at the front fuselage jacking point, lower the aircraft and add ballast in the cockpit area.**

## 8 Personnel Requirements

- 8.1 Personnel responsible for installation and alignment of DASH 8 AHRU mounting trays must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.