

**ORION AIRCRAFT SERVICES**

17069 Lambert Road, Lone, CA 95640  
209-274-9160 FAX 209-274-4132

W. David Wardall, Principal, FAA DER

October 18, 2012

Ms. Melanie Dovano, First Vice President-Western Market  
Comerica Bank  
333 West Santa Clara Street, 12<sup>th</sup> Floor  
San Jose, CA 95109-2249

Dear Ms. Dovano:

In accordance with your E-mail dated October 3, 2012, 5:26 PM, please find enclosed one original copy of Report No. OAS 12-917-2. This Report covers the on-site inventory of T-20, spare parts and Ground Support Equipment (GSE) located at the IMP Group, Aerospace Division facility in Halifax, Nova Scotia, Canada. The report also includes a review of the original aircraft logbook records and a review of the master Work Order index listing of some 3,710 Work Orders. A photo documentation of the aircraft, removed parts and components, and GSE is attached.

Sincerely,

A handwritten signature in black ink that reads "W.D. Wardall". The signature is written in a cursive style with a long horizontal flourish extending to the right.

W. David Wardall, FAA DER Structures Engineer, FAA A & P, I. A.

## **ORION AIRCRAFT SERVICES**

17069 Lambert Road, Ione, CA 95640  
209-274-9160 FAX 209-274-4132

W. David Wardall, Principal, FAA DER

### **Report No. OAS 12-917-2**

Background: This report covers the on-site airframe inspection and inventory of Aero Union Tanker 20, and inventory of spare parts and ground support equipment. Tanker 20 was undergoing a Depot Level Phase Inspection in late 2010 and early 2011 at the IMP Group, Aerospace Division, located in Halifax, Nova Scotia, Canada. IMP is a Lockheed Martin authorized factory service center for the P-3 series aircraft. In March of 2011, Aero Union directed effort and shop resources to focus on T-27 for the upcoming summer 2011 fire season. This left T-20 in a "hold" state until the T-27 was delivered on/around September 30, 2011. During the same period of time, the US Forest Service cancelled the Aero Union contract and a subsequent stop work order was issued on T-20 by Aero Union.

#### **Aircraft Inventory**

T-20 has been substantially disassembled to provide access to the wing center section and wing outer panel torque box structures, and horizontal and vertical stabilizers. The landing gear, engines, propellers, all nacelle structures, wing leading edges, trailing edges, wing-to-fuselage fillets, retardant tank & associated fairings, flaps, rudder, ailerons and elevators have been removed. The APU was installed. What appears to be serviceable nose and main landing gear have been temporarily reinstalled to make the aircraft capable of careful towed movement. In a walk around inspection, the following components were accounted for: all flight controls, four propellers, wing leading and trailing edges, fillet fairings, retardant tank and fairings, crates and boxes of other related components and parts, four engine nacelles and engine exhaust tailpipe ducts (all disassembled from the wing). Because of the extent of disassembly of the airframe and very close stacking of many removed parts, walk around access was restricted. Wing leading edge and trailing edge structures appeared to be on racks around the plane. The Quick Engine Change (QEC) mounts, associated cowling and engines were not present. The four engines were reported to be at Rolls Royce. The main gear wheels and main landing gear were freshly painted indicating that they were probably overhauled. The nose gear was also freshly painted indicating that it was recently overhauled. The two nose wheels were painted red and I was advised by IMP maintenance personnel that Aero Union provided two non-airworthy nose wheels to make the aircraft movable. Inspection of the inside of the fuselage showed the storage of aircraft wing structure and other removed parts. Inspection of the cabin indicated that the Loads Monitoring equipment was complete and intact. The cockpit voice recorder was installed. The ELT was removed and not observed. A visual inspection of the flight deck from the cabin door indicated that no avionics had been removed. Access to the flight deck was

## **ORION AIRCRAFT SERVICES**

restricted due to the amount of parts boxes blocking the door. One Craftsman base unit tool box unit was bolted down in the main cabin as a fly-away tool box for the plane. Some minor tools and a nitrogen regulator were in the tool box. See photos for visual inventory of the airframe and components. A review of a 262 page index of some 3,710 Work Orders showed minor cannibalization of some engine and airframe parts to get T-27 delivered. Selected component serial numbers from parts on or near the aircraft:

<u>Line</u>	<u>Description</u>	<u>Part Number</u>	<u>Serial Number</u>	<u>Quantity</u>
1.	Nose gear	901907-101	C30-103S	1
2.	L main gear	901020-1	5046-10	1
3.	R main gear	901020-1	5053-128	1
4.	Propeller	54H60-77	N227443	1
5.	Propeller	54H60-77	N220132NR	1
6.	Propeller	54H60-77	N221940	1
7.	Propeller	54H60-77	N232334	1

### **Ground Support Equipment**

35 pieces of Aero Union Ground Support Equipment (GSE) were found at the IMP facility. The following GSE was inventoried on the inside of the hangar near the airframe:

<u>Line</u>	<u>Description</u>	<u>AUC Number</u>	<u>AUC serial Number</u>	<u>Quantity</u>
1.	Nacelle stand, wood			4
2.	Six level vertical storage shelf	AU-17		1
3.	Six level vertical storage shelf	AU-18		1
4.	RADS II Tank install dolly	AU-9		1
5.	RADS II Tank install dolly	AU-10		1
6.	RADS II Tank install dolly	AU-11		1
7.	RADS II Tank install dolly	AU-12		1

The following GSE was inventoried on the outside of the hangar:

<u>Line</u>	<u>Description</u>	<u>AUC Number</u>	<u>AUC serial Number</u>	<u>Quantity</u>
8.	Engine/QEC stand, metal	AU-22	8-037B	1
9.	Engine/QEC stand, metal	AU-23	8-037NS	1
10.	Engine/QEC stand, metal	AU-21	8-037E	1
11.	Engine/QEC stand, metal	AU-20	8-037A	1
12.	Wing work stand, fixed, short base	AU-15		1
13.	Bridge between items 12 & 14	AU-15A		1

## **ORION AIRCRAFT SERVICES**

14.	Wing work stand, fixed, med. base	AU-15B		1
15.	Bridge between items 14 & 16	AU-15C		1
16.	Wing work stand, fixed, tall base	AU-15D		1
	Note- items 12-16 make up one complete wing work stand unit			
17.	Wing work stand, fixed, short base	AU-16		1
18.	Bridge between items 17 & 19	AU-16A		1
19.	Wing work stand, fixed, med. base	AU-16B		1
20.	Bridge between items 19 & 21	AU-16C		1
21.	Wing work stand, fixed, tall base	AU-16D		1
	Note- items 17-21 make up one complete wing work stand unit			
22.	B-1 Stairs stand w/ AUC large decal	AU-16		1
23.	B-1 Stairs stand, recent paint job	AU-5	5-001A	1
24.	B-1 Stairs stand, poor condition	AU-7		1
25.	B-1 Stairs stand, poor condition	AU-8		1
26.	B-4 Maintenance platform	AU-1		1
27.	B-4 Maintenance platform	AU-3		1
28.	B-4 Maintenance platform	AU-4		1
29.	Leading Edge Cowl rack w/ 5' "T" risers, 3' x 20'	AU-17		1
30.	B-5 Tall maintenance platform	AU-13	4-044A	1
31.	B-5 Tall maintenance platform	AU-14	4-044	1
32.	Nacelle stand, wood			1
	Note- one aluminum fixed set of stairs w/ blue & red painted hand rails in this lot of GSE is not AUC property			

## **Aero Union Furnished Spare Parts Inventory**

The following spare parts were found on the hangar floor and in the parts room:

- A) There were two long crates approximately 55-ft. long. The first box was pretty much closed and the first eight ft. long lid was removed for examination. This crate contained five new 50-ft. plus wing plank assemblies on the inside of the crate plus one plank lose on the top of the crate. The exposed new plank had the following information ink stamped at the inboard end by the manufacturer: TECT Aerospace; (part No.) 900604-1; (serial number) AU0108. See Photos.
- B) The second 55-ft. long crate contained three new 54-ft. approximately long spar caps bearing the following ink stamped information on each spar cap: Cap #1, TECT Aerospace (Part Number) 925250-2; (serial number) 0115; Cap #2, BAE Systems (Part Number) 901055-1; (serial number) AU0101; Cap #3, TECT Aerospace (Part Number) 901062-1; (serial number) 0104. See Photos.

## **ORION AIRCRAFT SERVICES**

- C) Stored on AUC six level vertical storage shelf unit were several shorter wing planks with marking "AU-17" on the stand. This stand contains 27 each wing center section wing planks approximately 130-inches long. The IMP Staff advised that the planks may be IMP property. I opened the bubble wrap and retrieved an Aero Union Stock Card listing the part data. The Stock Card had an AUC logo on it. See photos. The IMP personnel conceded that the 27 center section wing planks were in fact AUC property. The wing planks were stored on two different levels of the six-level storage cart. See photos. Another level had at least 15 pieces of +/- 6-ft. long extrusions including skate angles and nacelle longerons.
- D) In the parts room: one small three level cart with several small boxes of small parts and fasteners; and eight rows of small bin boxes with fasteners. See photos.

### **Aircraft Status and Condition**

T-20 was inducted into a major Depot Level General and Phase Inspections, including compliance with Navy Airframe Bulletin 356, Rev. B. The aircraft is fully opened up (somewhat disassembled). All of the initial visual and NDT inspections have been completed. Most of the damage to the wings and horizontal stabilizer have been cut out and cleaned up, the new forward L & R lower spar caps are installed, but only minimal fasteners installed to make the aircraft movable. All four nacelle structures have been removed from the wings and have moderate fatigue cracks in various structural and sheet metal components. No repair work has been performed on the nacelle structures. The right forward and both aft paddle frames are cracked and will need to be replaced. The (what appears to be airworthy) nose and main landing gear are installed. The wing nacelles, leading, trailing edges and fillet fairings are removed down to the bare wing box. All flight control surfaces are removed and present. This aircraft has 18,000 hours and has 48 years of accrued service. First, the plane was operated by the US Navy and Spanish Navy in warm moist humid environments. This resulted in stress corrosion, intergranular corrosion and galvanic corrosion. Next, the aircraft entered aerial firefighting service. The airframe has extensive site damage from stress corrosion cracking and fatigue cracks from the high "G" retardant aerial firefighting flight loads and "low level flight" low cycle fatigue wing loading. The horizontal stabilizer (H-stab) has 35 defects on the lower right H-stab, 24 defects on the upper right H-stab, 10 defects on the lower left H-stab and 11 defects on the upper left H-stab. Several of the defects are for small cracks in plank seam joint fastener holes that may clean up with first and second oversize fasteners (high strength steel Hi-Loc brand fasteners). However, there remains significant damage to many primary structural members. The wings have significant stress corrosion cracking and intergranular corrosion. There are at least 40 damage sites on each wing, many of these damage sites are fastener holes that should clean up with first or second oversize Hi-Loc type fasteners. However, there are some areas where the planks have to be cut, the damage removed and engineered repairs installed. The master index list of Work Orders does include a brief description for each Work Order for the work effort. About 1,606 initial inspection, survey, NDT and repair/overhaul

## **ORION AIRCRAFT SERVICES**

Work Orders have been completed. Approximately 1,772 Work Orders remain open in various states of completion.

The annual inspection was opened on Work Order No. 654329. The Final Maintenance Release is open on Work Order No. 644194. The Damage Tolerance Work Order No. is 677915.

### **Aircraft Records Inspection**

Airframe Logbook- The Airframe logbook is a small general aviation logbook with brief entries for most maintenance and inspections referring to an Aero Union Work Order. There was a logbook note that the aircraft was operated by the Spanish Navy. The first Aero Union logbook entry was entered on March 20, 2002, to establish civil logbook records.

3/20/2002, FAA Special Airworthiness Certificate Issued for N920AU, Serial Number 150513.

3/29/2002, ACTT 16,064.6 Annual inspection completed, ASPA inspection completed, install RADS II retardant tank.

4/24/2002, Aircraft painted at Goodner, Mena, AR.

2/8/2005, ACTT 16,839, Remove Hamilton Standard electronic propeller control system and return aircraft to its original propeller control system.

3/24/2005 ACTT 16,839, FAA Restricted Category Airworthiness Certificated issued.

6/2/2009 ACTT 18,448.3, PDM Depot Level General and Phase I, II, III inspections performed; portions of AFB 356 accomplished as modified for the light weight aircraft fatigue inspection. Annual inspection performed.

2/17/2010, Logbook Audit of original military and AUC records. Reference "Total Landing Calculator" worksheet dated 2/16/2010, corrected ACTT 18,367.98, total landings 16,101.

4/28/2010 ACTT 18, 637.98, Static, altimeter and transponder tests and certifications.

4/27/2010 ACTT 18,638, Annual inspection completed

<Last Logbook Entry>

Propeller Logbooks- There were four propeller logbooks

From T-27, No. 1 position, serial number N227443; model 54H60, blade serial numbers 798014; 798015; 798016; and 798017. Removed from T-27 on IMP WO # 655841. Last logbook entry dated 3/31/2010, TT 11,167.2; TSO 1,447.4, T-27, ACTT 18,068.2.

**ORION AIRCRAFT SERVICES**

From T-27, No. 3 position, serial number N220132; model 54H60, blade serial numbers 776421; 776422; 776423; and 776424. Removed from T-27 on IMP WO # 655844. Last logbook entry dated 3/31/2010, TT 15,663.4; TSO 5,454.5, T-27, ACTT 18,068.2.

From T-27, No. 4 position, serial number N232334NR; model 54H60, blade serial numbers 816613; 816614; 816615; and 816616. Removed from T-27 on IMP WO # 655845. Last logbook entry dated 3/31/2010, TT 11,099.0; TSO 6,258.2, T-27, ACTT 18,068.2.

From T-20, No. 4 position, serial number N221940; model 54H60, blade serial numbers 826429; 826431; 826432; and 826433. Removed from T-20. Last logbook entry dated 4/27/2010, TT 12,010.6; TSO 2,548.8, T-20, ACTT 18,638.0.

APU Logbook-

Model: GTCP 95-2; Serial Number: P34325  
4/27/2010, Hobbs: 4,281.1; TT 6,520.8; TSO 3,399.8; AC TT 18,448.3 (T-20).

<Last Logbook Entry>

Flight Operations Logbook-

From KBGR to CYHZ on 9/30/2010, Logbook Page No. 21220 Aircraft TT 18,823.81.

<Last Logbook Entry>