

**To:** Bay Area Compliance Lab Corporation  
**From:** Jason Funderburk, LiveTV  
**Date:** 3/27/2003  
**Re:** WADL Aircraft Segment Installation Description

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I lieu of an Installation or Users Manual this document will describe the installation of the Aircraft Segment of the Wireless Aircraft Data Link (WADL) system manufactured and installed on commercial aircraft by LiveTV. The WADL Aircraft segment is to be tested by BACL for compliance under FCC Part 15C.

The WADL Aircraft Segment is certified by the FAA for installation on Airbus A-320 and A-319 aircraft. Currently held certifications are:

**A-320** Supplemental Type Certification ST01447NY Granted: 11 February 2002

**A-319** Supplemental Type Certification ST00788SE Last Amended: 3 December 2002

During the installation process all physical installation steps, inspections, and checkout procedures are documented on LiveTV generated Work Orders. An example set of work orders for the A-319 are shown in an attachment to this document. The installation and certification processes are described in general in the sections below.

#### **Statement of Professional Installation and Certification**

Aircraft Segment Statement: The WADL Aircraft Segment must be professionally installed because each installation is custom suited to meet the demands of the specific environment. The FAA requires a Supplemental Type Certificate (STC) for any changes to an existing aircraft type. When an airline acquires WADL Aircraft Segments for installation in a specific aircraft type, the airline's aircraft engineering personnel meet with LiveTV engineers to jointly develop an installation drawing package. A tray location is identified and selected from available options in the avionics equipment bay. The best way to get power to the tray is determined and a circuit breaker is assigned in the flight deck. Interfaces to other avionics equipment and aircraft discretes are similarly identified and installed. All new wiring must comply with strict federal regulations and standards for installation.

A location for the aircraft antenna is chosen on the top side of the aircraft taking into account availability, accessibility, electromagnetic compatibility, and aerodynamic efficiency. Once defined, new drawings are created that define how the aircraft skin is penetrated and a doubler plate installed for antenna mounting, structural support, and environmental sealing. A nearby location for the LNA/PA is chosen between the passenger cabin and the aircraft skin. The closest stanchion is identified and the method of mounting the LNA/PA is documented. The RF Cable is then pulled through the aircraft to its destination. The cable is routed and restrained in compliance with specified installation standards. The cable is cut to length and terminated at both ends. The power level at the input to the RF Assembly is checked to make sure that it is within the input dynamic range of the amplifier. All details of the modification are carefully documented and inspected by the FAA.

The installation is verified by using an installation test set to verify functionality. A variety of ground tests are performed to assess the electromagnetic compatibility of the newly installed equipment with existing flight critical equipment. An STC Aircraft Test is then performed to verify the electromagnetic compatibility of the newly installed equipment with existing flight critical equipment. At the conclusion, an STC package consisting of the drawing package and test data is prepared. The STC package is then submitted for review by the FAA. Upon their approval, an STC for the defined type of aircraft is granted. Once granted, the STC is only valid for that specific aircraft type. If the airline desires to install the WADL Aircraft Segment in another type of aircraft, the process is repeated. All aircraft of a specific type are modified in exactly the same fashion based on the STC drawing package. Installations are carefully inspected and discrepancies are documented and properly corrected.

The installation and controls process are such that the system will always be configured as per the installation design. The FAA certification requires that all cables and system pieces be in place per installation drawing, else the aircraft is not allowed to fly. The air transport industry carefully controls the configuration of installed avionics equipment. The FAA issues a Supplemental Type Certificate for the aircraft on the basis of the newly installed, tested, and approved equipment. Any changes to the installation or hardware baseline would require their approval. LiveTV has and will continue to state that tampering with or modifying installed equipment could result in damage to the installed equipment and a violation of FCC regulations.

Conclusion: Taken as a whole the STC process, professional installation per documented Work Orders, and strict FAA regulations with respect to aircraft maintenance and configuration will insure that the system as installed and maintained will remain compliant as defined in FCC Part 15C and verified by the TCB.

**Attachment A**

**Example Installation Work Orders**



LiveTV  
WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO. L11R073X

PART No.or A/C TAIL No: <u>N906FR</u> S/N: <u>1684</u> TYPE A/C: <u>A-319</u>			
CUSTOMER: <u>Frontier</u> W.O. NO.: <u>F90300303</u> DATA: <u>STC # ST00788SE, MDL 99FS933-D01 J</u>			
Document Number: LTV933302, Sh. 104, Rev. A.			
Document Number: LTV3092090 Rev. A.			
Document Number: LTV3092113 Rev. N/C.			
ITEM	NARRATIVE <b>"WADL System Elec. Install., Pg. 1 - 2."</b>	MECH	DATE
1	NOTE: This equipment must be installed and operated IAW provided instructions and a minimum 20cm spacing must be provided between computer mounted antenna and a persons body (excluding extremities of hands, wrist and feet) during wireless modes of operation. Optional vehicle mounted antenna must not exceed 6.0 dBi antenna gain and should be professionally installed. This device complies with Part 15 of the FCC Rules. Operation is subject to the complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. CAUTION: Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.		
2	Check to ensure A/C power is off. If necessary, remove the power from the aircraft. Gain access to the 9001VT Terminal Block.		
3	IAW dwg LTV3092113 install WADL System wire support structure at C63 stringer 20R.		
4	IAW dwg LTV3092090 route all system electrical cables.		
5	IAW dwg LTV933302 terminate WADL cable ends.		
6	IAW dwg LTV3092090 install required circuit breakers for the WADL system.		
7	IAW dwgs LTV3092090 and LTV933302 terminate stowed wiring IAW Airbus standard wiring practices and termination sheets.		
8	IAW dwg LTV933302 coil and stow wiring at the 80VU rack area.		
9	Install and route wiring harness between 9001VT to PFS001 disconnect area. Coil and stow at location area 9000VT PFS001 termination area.		
10	IAW dwgs LTV3092090 and LTV933302 install and route coax harness between the WADL antenna and the LNA.		
11	IAW dwg LTV933302, install and route the coax harness between the LNA and the PFS001 rack disconnect.		

SUPERVISOR: \_\_\_\_\_ (print)      SIGN: \_\_\_\_\_ (sign)      DATE: \_\_\_\_\_

Q.C.  
Inspector  
Stamp



LTMVNT-0025 REV A 5/10/02



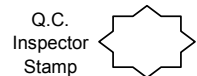
LiveTV  
WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO. L1IR073X

PART No.or A/C TAIL No: _____		S/N: _____	TYPE A/C: <u>A-319</u>	
CUSTOMER: <u>Frontier Airlines</u>		W.O. NO.: <u>F90228302</u>	DATA: _____	

ITEM	NARRATIVE	MECH	DATE
	<b>"wadl system,3.1, elec installation"</b>		
1	Check there is no power on the aircraft, if necessary, remove the power from the aircraft. Gain access to the 9001VT Terminal Block.		
2	Per Harris Dwg 3092113 install WADL system wire support structure at C63 stringer 20R		
3	Per Harris Dwg 3092090 route in all system electrical cables.		
4	Per Harris Dwg 3092095 terminate WADL cable ends.		
5	Per Harris Dwg 3092090 Install required circuit breakers for the WADL systems.		
6	IAW Dwgs 3092090 and 3092095 terminate stowed wiring IAW Airbus standard wiring practices and termination sheets.		
7	IAW Deg 3092095 Coil and Stow wiring at the 80VU rack area.		
8	Install and route wiring harness between 9001VT to PFS001 disconnect area, coil and stow at location area 9000VT PFS001 termination area.		
9	IAW Dwgs 3092090 and 3092095 and PAD 2284-920 and -923 install and route coax harness between the WADL antenna and the LNA		
10	IAW Dwg 2284-920 and -923 Install and route the Coax harness between the LNA and the PFS001 rack disconnect.		

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LTMNT-0025 REV A 5/10/02

March 27, 2003



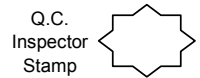
LiveTV  
WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO.L1IR073X

PART No.or A/C TAIL No: <span style="background-color: yellow;">                    </span>		S/N: <span style="background-color: yellow;">                    </span>	TYPE A/C: <u>A319</u>	
CUSTOMER: <u>Frontier Airlines</u>		W.O. NO.: <span style="background-color: yellow;">F90228302</span>	DATA: <u>                    </u>	
ITEM	NARRATIVE	MECH	DATE	
1	NOT USED	X	X	
2	Verify accomplishment WADL System Work order; 2, Mech installation, Items 1 through 10			
3	Verify accomplishment WADL System Work order; 3.1, Elec Instalation, Items 1 through 12			
4	Verify accomplishment WADL System Work order; 4, Close Up, Items 1 through 8			
5	Verify accomplishment WADL System Work order; 5 Activation Items 1 through 9			

SUPERVISOR: \_\_\_\_\_  
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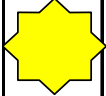
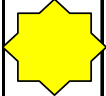
DATE: \_\_\_\_\_



LTMNT-0025 REV A 5/10/02



LiveTV  
WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO. L1IR073X

PART No.or A/C TAIL No: _____		S/N: _____	TYPE A/C: <u>A-319</u>	
CUSTOMER: <u>Frontier Airlines</u>		W.O. NO.: <u>F90228302</u>	DATA: _____	
ITEM	NARRATIVE	MECH	DATE	
	<b>"wadl system,2,mech installation"</b>			
1	Remove cargo liner sidewalls to gain access to frame C51 RH. <b>Note: N/A this step and steps 2, 3, and 4 if the JAES (new) rack is installed.</b>			
2	per harris dwg 3092107, install the wadl rack support structure in accordance with Airbus SRM chapter 51 airframe standard practices			
3	per harris dwg 3092089 install the wadl structure components			
4	per harris dwg 3092091 install the wadl system components			
5	Gain access to the aircraft ceiling center line by removing the overhead ceiling panels between C60 and C61			
6	per Harris dwg 3092110 install the antenna structure between C60 & C61 and stringers 1L and 1R. Ensure all workmanship is in accordance with Airbus SRM chapter 51 airframe standard practices.			
7	per harris dwg 3092110 install the wadl antenna.			
8	Inspection: Inspect wadl antenna installation and doublers			
9	per Harris dwg 3092112 install wadl LNA structure between C59 and C60, stringers 4R/5R. In accordance with Airbus SRM CH 51 airframe standard practices			
10	Inspection: Inspect wadl LNA support structure installation.			

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LTMNT-0025 REV A 5/10/02

March 27, 2003



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INSPECTION FORM  
REPAIR STATION NO. L1IR073X

PART No.or A/C TAIL No: _____		S/N: _____	TYPE A/C: <u>A-319</u>	
CUSTOMER: <u>Frontier Airlines</u>		W.O. NO.: <u>F90228302</u>	DATA: _____	
ITEM	NARRATIVE	MECH	DATE	
	<b>"wadl system,5,activation"</b>			
1	Gain access as required to perform the following tests			
2	<b>Not Used</b>	X		X
3	per Harris dwg 3092090 remove collars and close all WADL circuit breakers.			
4	per Harris dwg 3092082 Apply power to the aircraft and perform the wadl system functional test.			
5	Ensure all tools and any foreign material are removed from all areas that were accessed for the wadl system..			
6	Inspection: Ck areas for insulation blankets and foreign materials.Give OK to close when inspection completed.			
7	Close all access panels opened in item 1.			
8	make the following logbook entry to cover the WADL activation: <b>"THE WIRELESS DATA LINK HAS BEEN ACTIVATED IN ACCORDANCE WITH PART 5 OF EO 2302095."</b>			
9	Prepare the aircraft for return to service.			
				

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LTVMNT-0025 REV A 5/10/02



March 27, 2003



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WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO. L1IR073X

PART No.or A/C TAIL No: _____		S/N: _____	TYPE A/C: <u>A-319</u>	
CUSTOMER: <u>Frontier Airlines</u>		W.O. NO.: <u>F90228302</u>	DATA: _____	
ITEM	NARRATIVE	MECH	DATE	
	<b>"wadl system,3.2, elec installation"</b>			
11	IAW dwg 2284-920 and -923 terminate Coax cable. Terminate all wiring in accordance with Airbus Standard wiring Practices.			
12	Ensure all wiring for WADL and CSS circuit breaker provision is installed IAW Dwgs 3092090 and 3092095 and PAD dwgs 2284-920 and 2284-923			
	<b>NOT USED</b>			
	<b>NOT USED</b>			
	<b>NOT USED</b>			
	<b>NOT USED</b>			
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LTMNT-0025 REV A 5/10/02



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WORK ORDER and IN PROGRESS  
INSPECTION FORM  
REPAIR STATION NO. L1IR073X

PART No.or A/C TAIL No: _____		S/N: _____	TYPE A/C: <u>A-319</u>
CUSTOMER: <u>Frontier Aiorlines</u>		W.O. NO.: <u>F90228302</u>	DATA: _____
ITEM	NARRATIVE	MECH	DATE
	<b>"wadl system,4 close up"</b>		
1	Perform continuity check on any existing aircraft wires that were disturbed during the wadl installation.		
2	Ensure that all tools and any foreign material is removed from all work areas that were accessed for the WADL Installation.		
3	In the aft cargo work areas inspect the insulation blankets prior to closing the area for; clean & dry, not damaged, Velco tape, attachment studs, and drain holes are clean.		
4	Inspection: Okay to close work area panels		
5	Close all panels removed for the WADL system installation		
6	Make the following log book entry to cover this modification as a MAJOR alteration of this aircraft: <b>"THIS AIRCRAFT HAS BEEN MODIFIED BY E.O. 2302095 INSTALLING THE WIRELESS DATA LINK IN ACCORDANCE</b>		
7	Complete the attached weight change notification form.		
8	Prepare the aircraft for service		

SUPERVISOR: \_\_\_\_\_  
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SIGN: \_\_\_\_\_  
(sign)

DATE: \_\_\_\_\_

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LTMNT-0025 REV A 5/10/02