

No. 2815

## Installation Considerations for Universal's WAAS/SBAS Flight Management System

Revision C to this Service Letter updates installation considerations for WAAS/SBAS FMSs that do not use LP/LPV capabilities. Reference documents were also updated.

**To: Authorized Installation Centers of Universal Avionics WAAS/SBAS Flight Management System**

**Subject: Installation Considerations for the WAAS/SBAS Flight Management System**

### Application

This Service Letter identifies the differences and requirements necessary to replace an existing FMS system (UNS-1C, -1Csp, -1D or -1K), Plus FMS (UNS-1C+, -1Csp+, -1D+ or -1K+) or Super FMS (UNS-1E, -1Esp, -1F or -1L) with a WAAS/SBAS FMS (UNS-1Ew, -1Espw, -1Fw or -1Lw) system.

This Service Letter also compares the Universal WAAS/SBAS FMS systems individual features and requirements. This letter defines ancillary equipment, power requirements and equipment specifications.

### Description

Replacing an existing system with a WAAS/SBAS FMS constitutes a significant upgrade. Aircraft certification will be affected. WAAS/SBAS has been approved under different TSOs and the operating software provides additional capability.

WAAS/SBAS FMSs (UNS-1Ew, 1Espw, -1Fw and -1Lw) have been approved under TSO-C115b and C146c.

**CAUTION: PRIOR TO INSTALLING A WAAS/SBAS FMS, ENSURE WIRING IS COMPATIBLE IN ACCORDANCE WITH APPLICABLE WAAS/SBAS FMS INSTALLATION MANUALS.**

Installation of a WAAS/SBAS FMS as a replacement for an existing FMS system requires several changes that include an antenna, and configuration module. When replacing the existing FMS system with a WAAS/SBAS FMS system, it will be helpful to note the previous configuration to assist in configuring the new system.

The use of the WAAS/SBAS FMS to provide LP/LPV Approach capabilities requires two WAAS/SBAS FMSs or a WAAS/SBAS FMS with a WAAS/SBAS Monitor. This allows for cross-monitoring critical functions used during LP/LPV Approaches and ensures the accuracy and integrity of each of the WAAS/SBAS systems. A WAAS/SBAS LP/LPV Monitor is a 2MCU LRU used in place of a second FMS for installations seeking LPV/LP approval. A single FMS and LP/LPV Monitor installation does not qualify for GPS primary means for RNP-10 or RNP-4.



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The rack and connector used by the UNS-1Fw and UNS-1Lw are the same as those used with previous installations, although, some additional wiring is required, rack keying and configuration module are different and must be changed. On the UNS-1Ew and UNS-1Espw, the connectors remain the same as previous installations.

For installations which do not require LP/LPV capabilities, the WAAS/SBAS FMS may be used as a replacement for SCN 80X/90X series FMSs with the exception of UNS-1Lw installations that are utilizing analog air data inputs for UNS-1K+ (P/Ns 11162-XX-1116 and 11162-XX-1117) and UNS-1L (P/Ns 2116-XX-1116 and 2116-XX-1117) systems; the air data wiring has been moved to the Top Plug of the unit. It is also necessary to replace the configuration module, GPS antenna and reconfigure the rack keying.

When installing WAAS/SBAS FMS that is not intended to be LP/LPV capable, an LNAV/VNAV and LNAV annunciator must be installed. This is required to alert the pilot whether SBAS or baro-corrected altitude is being used for vertical component of the approach. If vertical is not coupled or displayed these annunciators are not required

When installing WAAS/SBAS FMS not intended to be LP/LPV capable, it is not necessary to install the wiring for cross side monitoring.

When installing WAAS/SBAS FMS that is not intended to be LP/LPV capable, specific configuration settings are available to disable LP and LPV approach levels of service. Contact Universal Avionics Product Support for assistance.

The **UNS-1Ew FMS** is a self-contained unit within a single panel-mountable enclosure. The UNS-1Ew is available as either an all-digital or a digital-analog system depending on the complement of boards installed including the CPU, Auxiliary, WAAS/ARINC, WAAS/Analog and optional Analog boards. The enclosure is 6.38" high by 5.75" wide by 9.0" deep and can be mounted on a standard 5.75" DZUS rail. The front of the unit contains a 5-inch diagonal full-color Active-Matrix Liquid Crystal Display (LCD) flat-panel display and an alphanumeric keypad.

The **UNS-1Espw FMS** contain the same features as the UNS-1Ew. It is an all-digital FMS with the exception of roll steering and discrettes and includes CPU, Auxiliary, WAAS/ARINC and WAAS/Analog boards. Dimensions are smaller than the UNS-1Ew, measures 6.38" high by 5.75" wide by 7.6" deep and can be mounted on a standard 5.75" DZUS rail.

The **UNS-1Fw and UNS-1Lw NCUs** are contained in a 2MCU box. Both NCUs contain seven slots for removable circuit boards. The NCUs can be configured as either an all-digital or a digital-analog system depending on the complement of boards installed including, the CPU, Auxiliary, WAAS/ARINC, WAAS/Analog and optional Analog boards although the UNS-1Fw has twice the number of ARINC ports available as the UNS-1Lw. These NCUs are mounted separately from their CDUs.

The **LP/LPV Monitor** is a 2MCU LRU used to augment a single WAAS/SBAS capable FMS installation in which it acts as a second GPS sensor and monitor during LPV approach operations. The LP/LPV Monitor was developed for use in aircraft that have only one WAAS/SBAS FMS but require LP/LPV capabilities. The LP/LPV Monitor functions as an independent sensor and WAAS/SBAS subsystem to meet the Severe-Major requirements for LPV approach types. The LP/LPV Monitor does not require a CDU or configuration module.



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The **DTU-100 Data Transfer Unit**, base part number (P/N) 1406/1407, is interfaced to the WAAS/SBAS FMSs via 10base-T Ethernet. The **DTU**, base P/N 1403/1405 is not compatible with the WAAS/SBAS FMS. If a 1403/1405 DTU was used in the existing installation, wiring changes are required to provide Ethernet connectivity for the DTU-100.

The **Solid State Data Transfer Unit (SSDTU)**, base P/N 1408/1409, was designed to replace the DTU-100 and its Zip disk technology with newer flash memory technology: the Universal Serial Bus (USB) “Thumb Drive” and the Secure Digital (SD) data storage devices. The SSDTU contains an Ethernet bus, which consists of an eight port Ethernet switch used to exchange data between up to eight UASC Ethernet network compatible LRUs such as the FMS, TAWS, Vision-1, UniLink, UCDC and ASU. Also available is the Portable SSDTU that has the same features as the cockpit mounted SSDTU. Though not required, Universal does recommend replacing the DTU and DTU-100 with the SSDTU.

**WAAS/SBAS GPS Antenna**, P/N 10708 is used for WAAS/SBAS FMS. If replacing an existing FMS system that has GPS, the antenna must be replaced with the P/N 10708 antenna. None of the previous antenna part numbers, 10705, 10706, etc., are compatible with the WAAS/SBAS FMS GPS. The 10708 antenna has the same “footprint” and can directly replace the 10704, 10705 and 10706 antennas without any modifications. This antenna is approved under TSO-C190.

**WAAS/SBAS GPS/Sirius Antenna**, P/N 10709 is a dual element antenna that provides reception for WAAS/SBAS GPS and WSI InFlight weather. This antenna is ideal for aircraft that have limited locations for antennas. The 10709 antenna is electrically interchangeable with the WAAS/SBAS GPS antenna P/N 10708. Although, when the 10709 antenna is used as a replacement, the aircraft must be modified to accept the additional connector that is used for reception of Sirius radio signals. This antenna is approved under TSO-C190.

**WAAS/SBAS GPS/XM Antenna**, P/N 10710 is a dual element antenna that can provide reception for WAAS/SBAS GPS and XM Weather and Radio. This antenna is ideal for aircraft that have limited locations for antennas. The 10710 antenna is electrically interchangeable with the WAAS/SBAS GPS antenna P/N 10708. Although, when the 10710 antenna is used as a replacement, the aircraft must be modified to accept the additional connector that is used for reception of XM Weather and Radio signals. This antenna is approved under TSO-C190

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### Equipment Compatibility

| Unit<br>Basic Part Number          | UNS-1EW             | UNS-1E <sup>spw</sup> | UNS-1FW         | UNS-1LW         |
|------------------------------------|---------------------|-----------------------|-----------------|-----------------|
| 5-Inch Flat Panel CDU 1018-( )     | Yes<br>(Notes 2, 5) | Yes<br>(Notes 2, 5)   | Yes<br>(Note 2) | Yes<br>(Note 2) |
| 4-Inch Flat Panel CDU 1117-( )     | Yes<br>(Notes 3, 5) | Yes<br>(Notes 3, 5)   | Yes<br>(Note 3) | Yes<br>(Note 3) |
| MCDU 1025-( )                      | Yes                 | Yes                   | Yes             | Yes             |
| DTU 1403-( ), 1404-( ), 1405-( )   | No                  | No                    | No              | No              |
| DTU-100 1406-( ), 1407-( )         | Yes                 | Yes                   | Yes             | Yes             |
| SSDTU 1408-( ), 1409-( )           | Yes<br>(Notes 7)    | Yes<br>(Notes 7)      | Yes<br>(Note 7) | Yes<br>(Note 7) |
| Radio Tuning Unit 1055             | Yes<br>(Note 1)     | Yes<br>(Note 1)       | Yes<br>(Note 1) | Yes<br>(Note 1) |
| GPS-1000 1075-01                   | Yes                 | Yes                   | Yes             | Yes             |
| GPS-1200 1080-01                   | Yes                 | Yes                   | Yes             | Yes             |
| Radio Reference Sensor 1058-( )    | Yes                 | Yes                   | Yes             | Yes             |
| Air Data Converter Unit 1500-( )   | Yes                 | Yes                   | Yes             | Yes             |
| ARINC Radio Tuning Unit 1056-( )   | Yes<br>(Note 4)     | Yes<br>(Note 4)       | Yes<br>(Note 4) | Yes<br>(Note 4) |
| UL-600 1065-( )<br>UL-601 1066-( ) | Yes<br>(Note 6)     | Yes<br>(Note 6)       | Yes<br>(Note 6) | Yes<br>(Note 6) |
| UL-700 1067-( )<br>UL-701 1068-( ) | Yes                 | Yes                   | Yes             | Yes             |
| UL-800 10800-00<br>UL-801 10801-00 | Yes                 | Yes                   | Yes             | Yes             |
| TAWS 3010-( )                      | Yes                 | Yes                   | Yes             | Yes             |
| UniVision 3070-( )                 | Yes                 | Yes                   | Yes             | Yes             |
| UCD/ASU 3040-( )                   | Yes                 | Yes                   | Yes             | Yes             |
| Vision-1 3015-( )                  | Yes                 | Yes                   | Yes             | Yes             |

#### NOTES:

1. RTU (Radio Tuning Unit) must be SCN 6.0 or subsequent to support 8.33 KHz spacing.
2. If the 5-inch FPCDU is UniLink graphics capable (P/N 1018-X-X10), it must be SCN 10.2 or subsequent with standard display or SCN 10.3 and subsequent with high-resolution display (P/N 1018-X-X13).
3. The 4-inch FPCDU must be SCN 20.2 or subsequent.
4. ARTU must be SCN 2.0 or subsequent to support 8.33 kHz spacing.
5. Remote FPCDU.
6. UniLink UL-600 and UL-601 must be SCN 12.2 or subsequent.
7. WAAS/SBAS FMSs must have Mod 2 accomplished.

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### Power and Weight Specifications

| POWER AND WEIGHT SPECIFICATIONS |  |                          |                           |              |              |       |                    |
|---------------------------------|--|--------------------------|---------------------------|--------------|--------------|-------|--------------------|
| PRODUCT                         | PART NUMBER                            | WEIGHT (LBS)<br>(Note 1) | CURRENT @ VDC<br>(Note 2) |              |              | NOTES | INSTALL KIT        |
|                                 |  |                          | 19.0V<br>Min              | 27.5V<br>Nom | 32.0V<br>Max |       |                    |
| UNS-1Ew                         | 3017-( )                               | 8.1                      | 2.90                      | 2.41         | 2.38         |       | K12024             |
| UNS-1Espw                       | 3019-( )                               | 7.2                      | 2.34                      | 2.29         | 2.19         |       | K12025 or K12025-1 |
| UNS-1Fw                         | 3192-( )                               | 6.7                      | 3.21                      | 2.70         | 2.64         |       | K12075             |
| UNS-1Lw                         | 3116-( )                               | 6.7                      | 3.21                      | 2.70         | 2.64         |       | K12075             |
| LP/LPV Monitor                  | 3116-52-1110                           | 6.7                      | 3.21                      | 2.70         | 2.64         |       | K12075             |
| 5-inch FPCDU                    | 1018-( )                               | 3.8                      | 0.9                       | 0.6          | 0.6          | 3     | K12026-4           |
| 4-inch FPCDU                    | 1117-XX                                | 2.6                      | 0.9                       | 0.6          | 0.6          | 4     | K12026-4           |
| 4-inch FPCDU                    | 1117-X-XX3<br>1117-X-XX4<br>with Mod 9 | 2.9                      | 1.15                      | 1.5          | 1.55         | 4     | K12026-4           |
| 4-inch FPCDU                    | 1117-X-XX3<br>1117-X-XX4<br>w/o Mod 9  | 2.9                      | 0.9                       | 0.87         | 0.75         | 4     | K12026-4           |
| MCDU                            | 1025-( )                               | 6.4                      | 2.72                      | 1.9          | 1.87         |       | K12068             |
| DTU-100                         | 1406-( )                               | 2.5                      | 0.22                      | 0.35         | 0.14         |       | K12050             |
| DTU-100 (portable)              | 1407-( )                               | 5.25                     | 0.22                      | 0.35         | 0.14         |       | K12050-1           |
| SSDTU                           | 1408-( )                               | 2.4                      | 0.41                      | 0.3          | 0.28         |       | K12079-1           |
| SSDTU (portable)                | 1409-( )                               | N/A                      | 0.41                      | 0.3          | 0.28         |       | K12079-2           |

### NOTES:

1. Weights listed are the maximum weights representing a full board complement.
2. Current listed is maximum, representing a full board complement.
3. The 5-inch FPCDU startup current may be slightly higher. Panel lighting: 1.54A @ 5V or 0.46A @ 28V.
4. The 4-inch FPCDU startup current may be slightly higher. Panel lighting: 1.6A @ 5V or 0.5A @ 28V.



## **SERVICE LETTER**

### **Reference Documents**

References are made to other pertinent Service Information in this Service Letter. If you require any of this information it is readily available on the UniNet portion of our website.

**Service Letter No. 2779** – Functional Equivalency of 4-inch Flat Panel Control Display Unit P/N 1117-X-XX as a Replacement for 4-inch Flat Panel Control display Unit P/N 1117-XX

**Service Letter No. 2816** – Obsolescence of the DTU-100

**Service Letter No. 2818** – UASC FMS Compliance with RNP and RNAV Requirements

**Service Letter No. 2838** – AC 20-138B Compliance Evaluation Summary for WAAS/SBAS FMS

**Service Letter No. 2820** – Functional Equivalency of the 10709 Antenna

**Service Bulletin No. 3275** – Installation of SCN 1000.0/1100.0 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3286** – Installation of SCN 1000.1/1100.1 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3299** – Installation of SCN 1000.2/1100.2 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3352** – Installation of SCN 1000.3/1100.3 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3393** – Installation of SCN 1000.4/1100.4 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3455** – Installation of SCN 1000.5/1100.5 into the UNS-1Ew, -1Espw, -1Fw and -1Lw FMS

**Service Bulletin No. 3303** – Introduction of the Solid State Data Transfer Unit and Portable Solid State Data Transfer Unit

**Service Bulletin No. 3308** – Introduction of the WAAS (SBAS) GPS Antenna P/N 10708

**Service Bulletin No. 3309** – Introduction of the WAAS (SBAS) GPS/Sirius Antenna P/N 10709

**Service Bulletin No. 3353** – Introduction of the WAAS/SBAS GPS/XM Antenna P/N 10710

**Report No. 34-60-49** – UNS-1Ew FMS Installation Manual

**Report No. 34-60-50** – UNS-1Espw FMS Installation Manual

**Report No. 34-60-51** – UNS-1Fw FMS Installation Manual

**Report No. 34-60-52** – UNS-1Lw FMS Installation Manual

**Report No. 34-60-53** – FMS Interface Manual

**Report No. 34-61-01** – FMS Configuration Manual SCN 1000/1100

**Report No. 2423sv1000/1100** – SCN 1000/1100 FMS Operator's Manual

**Report No. 2423sv1000/1100.01** – SCN 1000/1100 FMS Reference Guide