



U.S. Department
of Transportation
**Federal Aviation
Administration**

**Transport Airplane Directorate
Aircraft Certification Service**

1801 Lind Avenue S.W.
Renton, Washington 98055-4056

DEC 10 1988

In Reply
Refer To: 99-130S-0944

Ms Colleen Portch
Certification Services Administrator
AlliedSignal Aerospace
15001 NE. 36th Street
P.O. Box 97001
Redmond, WA 98073-9701

OPTIONAL FORM 99 (7-90) *When complete pl. fax to:*

FAX TRANSMITTAL # of pages *1*

To <i>Lyle Kendall</i>	From <i>Sheila Mariano</i>
Dept./Agency <i>Honeywell</i>	Phone #
Fax # <i>425-885-2994</i>	Fax #

NSN 7640-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Dear Ms. Portch:

Technical Standard Order (TSO) Approvals
 TSO C92c Authorization of Ground Proximity Warning Functions;
 TSO C117a Authorization of Windshear Warning Functions;
 TSO C151a Authorization of Terrain Awareness and Warning System Functions
 AlliedSignal Enhanced Ground Proximity Warning Computer (EGPWC) part numbers
 965-0976-003-210-210 (960-0329-013), 965-0976-020-210-210 (960-0336-002),
 965 0976 040 210-210 (960-0335-010), 965-1076-001-210 210 (960-2226-005),
 965-1076-020-210-210 (960-2225-003), and 965-1076-040-210-210 (960-2224-005)

Your certification that the following new AlliedSignal EGPWC part numbers (P/N):

EGPWC Type	Certification Baseline (115 VAC)	New 115 VAC EGPWC
MK V EGPWC	965-0976-003-208-208 (960-0329-012)	965-0976-003-210-210 (960-0329-013)
MK V EGPWC Internal GPS Receiver	965-0976-020-208-208 (960-0336-001)	965-0976-020-210-210 (960-0336-002)
MK VII EGPWC	965-1076-001-208-208 (960-2226-004)	965-1076-001-210-210 (960-2226-005)
MK VII EGPWC Internal GPS Receiver	965-1076-020-208-208 (960-2225-002)	965-1076-020-210-210 (960 2225-003)

EGPWC Type	Certification Baseline (28 VDC)	New 28 VDC EGPWC
MK V EGPWC	965-0976-040-208-208 (960-0335-009)	965-0976-040-210-210 (960 0335-010)
MK VII EGPWC	965-1076-040-208-208 (960 2224-004)	965-1076-040-210-210 (960 2224-005)

99-130S-0944

2

are in conformance with Federal Aviation Regulations (FAR) Part 21, Subpart O, as described in your letters of November 11, 1999, (ref. 99FAA-777) and December 7, 1999, (ref. 99FAA-820) are acceptable. Your Quality Control Manual, Revision H, dated May, 1998, is considered adequate and is on file in the Manufacturing Inspection District Office, Renton, Washington.

The approval for TSO C92c applies to the performance, qualification testing, and software testing of the basic Ground Proximity Warning Computer (GPWC) functions in the EGPWC. The added features meet the same qualification testing and software testing of the GPWC.

The approval for TSO C117a, only applies to the windshear warning alert and windshear caution alert portions of the equipment and does not include the Boeing windshear prealert and any escape guidance or auto-recovery options. These limitations will be evaluated under the Supplemental Type Certificate (STC) process and should be listed in the aircraft installation manual.

The approval for TSO C151a applies to the Terrain Awareness and Warning System Functions. The added features meet the same qualification testing and software testing of the TAWS; however, the actual performance standards for additional features including geometric and peaks mode are not under this TSO. They should be evaluated under the STC process and should be listed in the aircraft installation manual. A detailed functional description of the EGPWC is in the Product Specification, Document Number 965-0976-603. Details of interface and customer options are in the Interface Control Document (ICD), Document Numbers 993-0976-401 (for MK V EGPWS) and 993-1076-401 (for MK VII EGPWS).

The following documents, as referenced in the above letters, have been reviewed and added to our files to support this application:

Item	Document Title	Document Number & Revision
1.	DO161A System Validation Test Results For The Enhanced Ground Proximity Warning Computer 965-0976-0XX-210-210	070-4553-015, Rev New (2)
2.	DO161A System Validation Test Results For The Enhanced Ground Proximity Warning Computer 965-1076-0XX-210-210	070-4553-016, Rev New (3)
3.	Windshear Test Results for Enhanced Ground Proximity Warning Computer (EGPWC)	076-0882-206, Rev New (1)
4.	TSO-C151 Test Procedure for the Enhanced Ground Proximity Warning Computer (EGPWC)	060-4323-000, Rev New (1)
5.	TSO-C151 Test Results for the Enhanced Ground Proximity Warning Computer (EGPWC)	070-4611-000, Rev New (1)
6.	System Requirements Document (SRD) for the Enhanced Ground Proximity Warning Computer (EGPWC)	993-0976-302, Rev J* (1)

99-130S-0944

3

Continued...

Item	Document Title	Document Number & Revision
7.	CFDS Interface Requirements Document (CISR.D) for the Enhanced Ground Proximity Warning Computer (EGPWC)	993-0104-706, Rev New (2)
8.	Product Specification for the Enhanced Ground Proximity Warning System (EGPWS)	965-0976-603, Rev E (1)
9.	Product Specification for Military Applications of the Enhanced Ground Proximity Warning System (EGPWS)	965-0976-620, Rev A (1)
10.	Interface Control Document (ICD) for the Mark V Enhanced Ground Proximity Warning System (MK V EGPWS)	993-0976-401, Rev F (2)
11.	Interface Control Document (ICD) for the Mark VII Enhanced Ground Proximity Warning System (MK VII EGPWS)	993-1076-401, Rev E (3)
12.	Configuration Index Document (CID) for EGPWS	993-0976-000, Rev AW (1)
13.	Plan for Release 16 of Enhanced Ground Proximity Warning Computer	060-4210-023, Rev A (1)
14.	Software Accomplishment Summary for the Enhanced Ground Proximity Warning Computer (EGPWC)	992-0103-822, Rev New (1)
15.	Hardware/Software Test Procedure for the Enhanced Ground Proximity Warning System (MK V and MK VII EGPWS)	076-0879-002, Rev E (1)
16.	SYSTEM, ENHANCED GROUND PROXIMITY WARNING, 115VAC <i>Separate Parts List</i>	960-0329, Rev BF (2) PL960-0329-001, Rev M PL960-0329-002, Rev F PL960-0329-003, Rev F PL960-0329-005, Rev E PL960-0329-006, Rev E PL960-0329-008, Rev F PL960-0329-009, Rev F PL960-0329-010, Rev D PL960-0329-011, Rev E PL960-0329-012, Rev G PL960-0329-013, Rev A PL960-0329-014, Rev A PL960-0329-016, Rev C
17.	ENHANCED GROUND PROX. WARNING COMPUTER <i>Separate Parts List</i>	965-0976-003, Rev AE (2) PL965-0976-003, Rev M

99-130S-0944

4

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Item	Document Title	Document Number & Revision
18.	SYSTEM, EGPW, 115VAC WITH GPS <i>Separate Parts List</i>	960-0336, Rev J (2) PL960-0336-001, Rev D PL960-0336-002, Rev A
19.	ENHANCED GROUND PROX. WARNING COMPUTER, 115VAC WITH GPS CARD <i>Separate Parts List</i>	965-0976-020, Rev E (2) PL965-0976-020, Rev C
20.	SYSTEM, ENHANCED GROUND PROXIMITY WARNING, 28 VDC <i>Separate Parts List</i>	960-0335, Rev AR (2) PL960-0335-001 Rev G PL960-0335-002 Rev D PL960 0335-003 Rev E PL960-0335-004 Rev E PL960-0335-006 Rev E PL960-0335-007 Rev F PL960- 0335 008 Rev D PL960-0335- 009 Rev E PL960-0335-010 Rev E
21.	ENHANCED GROUND PROX. WARNING COMPUTER <i>Separate Parts List</i>	965-0976-040, Rev AA (2) PL965-0976-040, Rev K
22.	SYSTEM, MKVII ENHANCED GROUND PROXIMITY WARNING, 115VAC <i>Separate Parts List</i>	960-2226, Rev AD (3) PL960-2226-001 Rev F PL960-2226-002 Rev D PL960-2226-003 Rev C PL960 2226 004 Rev D PL960-2226-005 Rev A
23.	MKVII ENHANCED GROUND PROX. WARNING COMPUTER <i>Separate Parts List</i>	965 1076 001, Rev U (3) PL965-1076-001, Rev L
24.	SYSTEM, MKVII ENHANCED GROUND PROXIMITY WARNING, 115VAC <i>Separate Parts List</i>	960-2225, Rev T (3) PL960-2225-001 Rev D PL960-2225-002 Rev C PL960-2225-003 Rev A
25.	MKVII ENHANCED GROUND PROX. WARNING COMPUTER <i>Separate Parts List</i>	965-1076-020, Rev N (3) PL965-1076-020, Rev F

99-130S-0944

5

Continued...

Item	Document Title	Document Number & Revision
26.	SYSTEM, MKVII ENHANCED GROUND PROXIMITY WARNING, 28VDC <i>Separate Parts List</i>	960-2224, Rev AC (3) PL960-2224-001, Rev D PL960-2224-002, Rev D PL960-2224-003, Rev C PL960-2224-004, Rev D PL960-2224-005, Rev A
27.	MKVII ENHANCED GROUND PROX. WARNING COMPUTER, 28VDC <i>Separate Parts List</i>	965-1076-040, Rev R (3) PL965-1076-040, Rev H
28.	LABEL - EGPWS COMPUTER TOP ASSEMBLY	402-6068, Rev AA (1)
29.	Failure Modes Effects and Criticality Analysis for the 115VAC w/GPS Mark V EGPWC Based on FMECA Document 070-4507-001	070-4606-000, Rev New (2)
30.	Failure Modes, Effects, and Safety Analysis For Installations of The MK V and MK VII Enhanced Ground Proximity Warning Systems	060-4199-181, Rev New (1)
31.	Qualification by Similarity Report for the Enhanced Ground Proximity Warning Computers, ASI PN's 965-0976-003 HW Mod 8 /965-0976-020 HW Mod 1 and 965-0976-040 HW Mod 6	904-0078-401, Rev New (2)
32.	Qualification by Similarity Report for the Enhanced Ground Proximity Warning Computers, ASI PN's 965-0976-003-210-210 HW Mod 8, 965-0976-020-210-210 HW Mod 1 and 965-0976-040-210-210 Mod 6	904-0065-401 Rev New (2)
33.	Qualification Test Procedure for MK-V Enhanced Ground Proximity Warning Computer (EGPWC) with GPS ASI PN 965-0976-020-208-208 (960-0336-001)	960-0336-101, Rev A (2)
34.	Qualification by Similarity Report for the Enhanced Ground Proximity Warning Computers, ASI PN's 965-1076-001 HW Mod 6 /965-1076-020 HW Mod 3 and 965-1076-040 HW Mod 5	904-0079-401, Rev New (3)
35.	Qualification by Similarity Report for the Enhanced Ground Proximity Warning Computers, ASI PN's 965-1076-001-210-210 HW Mod 6, 965-1076-020-210-210 HW Mod 3 and 965-1076-040-210-210 HW Mod 5	904-0067-401 Rev New (3)

99-130S-0944

6

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Item	Document Title	Document Number & Revision
36.	MK V Enhanced Ground Proximity Warning System Component Maintenance Manual	012-0687-001, Rev 11 (2) ATA no. 34-45-36
37.	MK VII Enhanced Ground Proximity Warning System Component Maintenance Manual	012-0702-001, Rev 6 (3) ATA no. 34-45-39

Note:

- (1) Applicable to MKV and MKVII EGPWC
- (2) Applicable to MKV EGPWC only
- (3) Applicable to MKVII EGPWC only

* The SRD is not on file, but it is available at the AlliedSignal facility in Redmond for FAA review. A FAA Statement of Compliance for this document has been provided related to DO-178B.

We also acknowledge the FAA Forms 8110-3 that were submitted with your Letter 99/FAA-795, dated November 10, 1999, which approved the software accomplishment summary and other related data for this application.

Effective this date, you are authorized to use TSO procedures as prescribed by Subpart O of FAR Part 21 and to identify the MK V and MK VII Enhanced Ground Proximity Warning Computers, 965-0976-003-210 210 (960-0329-013), 965-0976-020-210-210 (960-0336-002), 965-0976-040-210-210 (960-0335-010), 965-1076-001-210-210 (960-2226-005), 965-1076-020-210-210 (960-2225-003), and 965-1076-040-210-210 (960-2224-005) with the applicable TSO markings as required by TSO-C92c, C117a, and TSO C151a.

Any design changes made to this TSO'ed EGPWS must be forwarded to this office as outlined in FAR 21.611(a), with minor change submittal intervals not to exceed six months. As a TSO manufacturer, you are required to report to the FAA any failure, malfunction, or defect related to your TSO authorization within 24 hours in accordance with the provisions of FAR 21.3. You must also notify the FAA when you no longer manufacture a TSO approved article as required by FAR 21.613(b).

This authorization pertains only to the manufacturing operations at the above address, and this office must be notified in advance of any proposed relocation.

99-130S-0944

7

If you have any questions, please contact Ms. Sheila Mariano at (425) 227-2675.

Sincerely,

A handwritten signature in black ink, appearing to read "Ali Bahrami", with a stylized flourish extending to the right.

Ali Bahrami
Manager, Seattle Aircraft
Certification Office