Federal Aviation Administration

MMEL Policy Letter (PL) 54, Revision 11, GC

Date:	XX/XX/XXXX
To:	All Aircraft Evaluation Division Branch Managers All Flight Standards Division Managers
From:	Manager, Aircraft Evaluation Division (AFS-100)
Reply to Attn of:	Manager, Branch Office (AFS-160)

MMEL GLOBAL CHANGE (GC)

This GC is an approved addendum to all existing Master Minimum Equipment List (MMEL) documents. Operators may seek use of the specific relief contained in this policy letter (PL) by revising their minimum equipment list (MEL). In doing so, each applicable sample proviso stating the relief in this PL must be copied verbatim in the operator's MEL. No operator may use the relief in this Global Change Policy Letter (GCPL) in their MEL without concurrence of the aircraft Flight Operations Evaluation Board (FOEB) Chair if the associated MMEL was published after XX/XX/XXXX. Approval of a revised MEL is gained utilizing established procedures, through the Operator's assigned Principal Operations Inspector (POI).

SUBJECT:	**Terrain Awareness and Warning System (TAWS)**
MMEL CODE:	34 (Navigation)
REFERENCE:	PL-54, Revision 10, dated October 31, 2005. PL-54, Revision 9, dated May 26, 2005. PL-54, Revision 8, dated March 10, 2005. PL-54, Revision 7, dated October 15, 2001. PL-54, Revision 6, dated January 19, 2001. PL-54, Revision 5, dated September 29, 1999. PL-54, Revision 4, dated January 12, 1998. PL-54, Revision 3, dated August 15, 1997. PL-54, Revision 2, dated April 1, 1993. PL-54, Revision 1, dated July 27, 1992. PL-54, Revision Original, dated April 10, 1991.

PURPOSE:
This PL provides policy for ground proximity warning system (GPWS) and Terrain Awareness and Warning System (TAWS) MMEL requirements.

REVISION HISTORY:
Revision 11: Removes relief and policy guidance for windshear systems as it is addressed by PL-67, Windshear Warning and Flight Guidance System (RWS), Windshear Detection and Avoidance System

(PWS). Removes the term “GPWS.” Places relief for Runway Overrun Awareness and Alerting System (ROAAS) under a generalized item name of “Surface Awareness System.”

Revision 10: Added limited relief for the GPWS Windshear Mode inoperative for Class A TAWS equipment, revised subitem numbers for the Terrain functions/displays, and revised the titles used for Class C TAWS equipment.

Revision 9: Clarified that the TAWS relief allowed is for the Class of TAWS equipment required, not the Class of TAWS equipment installed. References to Technical Standard Order (TSO)-C151, Terrain Awareness and Warning Systems (TAWS), were deleted.

Revision 8: Was based on changes to the Federal aviation regulations (FARs) for TAWS that became effective March 29, 2005. Relief was reorganized under the different classes of TAWS equipment required by Title 14 of the Code of Federal Regulations (14 CFR). Added “Reactive” and “Predictive” to windshear systems for clarification and added relief for optional Runway Awareness and Advisory System (RAAS) feature. Moved revision highlights that were under “Policy” to the “Discussion” and added historical highlights for Revisions 2, 3, and 4.

Revision 7: Provided guidance for aircraft that are not required by 14 CFR to have the GPWS/TAWS. For aircraft equipped with the GPWS/TAWS not required by 14 CFR, the repair interval category C will be assigned for the system(s).

Revision 6: Revised windshear mode provisions as defined in PL-67.

Revision 5: Introduced TAWS language as acknowledged by the FAA and replaced enhanced ground proximity warning system (EGPWS) references with TAWS. Information added for the GPWS and TAWS provides system background and relates system input and output requirements to MMEL provisions.

Revision 4: The previous policy for an inoperable GPWS provided relief for the loss of certain modes of the GPWS. However, it did not address relief for the entire GPWS inoperative. This revision clarified the intended relief when all GPWS modes are inoperative. Policy remained a category A, two-day repair period for the GPWS Modes 1-4 and the test mode. Glideslope Deviation (Mode 5) remained a category B item. Altitude advisory/callouts and windshear mode remained category C items. EGPWS was designated category C.

Revision 3: Retained a category A, two-day repair period for the entire GPWS, the GPWS Modes 1-4, and the test mode. Glideslope Deviation (Mode 5) remained a category B item. Altitude advisory/callouts and windshear mode remained category C items. EGPWS designated time limit was category C.

Revision 2: The revised GPWS policy required a category A repair interval for the GPWS Modes 1- 4 and the test mode, with a specified two-flight-day period. Glideslope Deviation (Mode 5) was a category B item. The remaining modes (altitude advisory/callouts and windshear mode) were category C items.

DISCUSSION:
Controlled flight into terrain (CFIT) has historically been a major contributor to aircraft hull loss. The introduction of the GPWS, a reactive system providing visual and aural warnings when the aircraft enters an unsafe flight path, has reduced CFIT events. The conditions the GPWS recognizes and provides reactive warnings for are:

- Excessive rate of descent,
- Aircraft approaching rising terrain,
- Takeoff altitude loss,
- Unsafe terrain clearance,
- Deviation below glideslope,
- Descent below decision height, and
- Windshear.

TAWS was introduced in 1997 to further reduce CFIT events and is anticipated to be adopted as required equipment. It provides Terrain Clearance Floor and Terrain Awareness Alerting and Display functions. GPWS and TAWS are housed in the same unit under current manufacturer design; however, they function independently of each other. TAWS functions provide pilots a display of the terrain to which they are approaching relative to their altitude by utilizing a worldwide runway and terrain database, as well as aircraft position (from flight management systems (FMS) or Global Positioning System (GPS)). The Electronic Flight Information Systems (EFIS) or weather radar displays are used to show terrain to which the aircraft is approaching. Different intensities (light, medium, and heavy) are used on the display depending on distance in relative altitude to the aircraft. In addition, if alerts are provided to the crew and no evasive action is indicated, displays change from green dotted to solid bright yellow to solid bright red.

The term "GPWS" is removed as this term has been all but removed from FAA guidance and regulation. Title 14 CFR §§ 121.360 and 135.153 addressing GPWS have been archived. TSO-C151 also incorporates the standards of past GPWSs set forth in TSO-C92, Airborne Ground Proximity Warning Equipment. The individual Modes 1-5, while defined in AC 25-23, Airworthiness Criteria for the Installation Approval of a Terrain Awareness and Warning System (TAWS) for Part 25 Airplanes, and TSO-C151, are not uniformly referenced amongst TAWS equipment manufacturers. This revision adds the function name while retaining the "Mode" designation. The intent is to provide a better understanding of the individual modes to operators and airframe manufacturers as other TAWS equipment manufacturers release new products.

Relief for Forward-Looking Terrain Avoidance (FLTA) and Premature Descent Alert (PDA) for aircraft requiring Class B TAWS adopts the proviso for aircraft requiring Class A TAWS as the regulatory requirements for these functions are the same.

Relief for Class A TAWS incorporates a limitation prohibiting Required Navigation Performance Authorization Required Approaches (RNP AR APCH) as Class A TAWS is required per AC 90-101A CHG 1, Approval Guidance for RNP Procedures with AR, Appendix 4. To maintain a forward-looking PL, an additional condition was added to the parent system relief for TAWS, which stipulates TAWS must not be required by any operation, such as RNP AR.

Relief for ROAAS is placed under a generalized item name of "Surface Awareness System." The term "ROAAS" is specific to one TAWS equipment manufacturer. Other TAWS equipment manufacturers have released similar systems under different titles. This revision includes several of these titles, but POIs should consider other titles as more equipment options enter the market. A repair category "D" proviso is added for the Surface Awareness System as this is an optional system which does not make the aircraft eligible for any specific operation (e.g., Category II operations). It is strictly added for situational awareness. Operators who incorporate the Surface Awareness System into their operating procedures may continue to use category "C" relief. Surface Awareness System is added to the PL as some equipment is standalone from the TAWS.

POLICY:
The standardized MMEL format for TAWS is provided below. The title for TAWS should be customized to reflect the manufacturer's title for the particular equipment (e.g., Collins's title is "Enhanced GPWS").

FOEB chairmen and POIs should consider subordinate components (e.g., switches, lights, etc.) to be listed as part of the MMEL (or operator's MEL relief under the authority of the system deferral).

POIs should consider other systems which provide input to TAWS, such as radio altimeters, the Global Navigation Satellite System (GNSS), FMSs, and barometric altitude and vertical speed sources (e.g., air data computers, gear and flap position systems, glideslope receivers, etc.). Depending on design and particular installation, certain features or modes of the TAWS may be inoperative if these related systems fail. POIs may consult with FOEB Chairs with any questions regarding these systems or requested relief and provisos.

AIRCRAFT: (Insert aircraft make and model)	**TABLE KEY** 1. REPAIR CATEGORY 2. NO. INSTALLED 3. NO. REQUIRED FOR DISPATCH 4. REMARKS OR EXCEPTIONS

34. Navigation

Sequence No.	Item	1	2	3	4	Change Bar
	Class A TAWS Required					|
34-XX	Terrain Awareness and Warning System (TAWS), Including Test Mode	A	1	0	(O) May be inoperative provided: a) Alternate procedures are established and used, b) System is not required by enroute or approach procedures, and c) Repairs are made within two flight-days.	|
-01	Forward-Looking Terrain Avoidance (FLTA) Function and Premature Descent Alert Function	B	2	0	(O) May be inoperative provided alternate procedures are established and used.	|
-02	Excessive Rate of Descent (Mode 1) and Altitude Loss After Takeoff or Missed Approach (Mode 3)	A	2	0	(O) May be inoperative provided: a) Alternate procedures are established and used, and b) Repairs are made within two flight-days.	|
-03	Voice Callouts (Mode 6)					|
	"Five-Hundred"	B	1	0	(O) May be inoperative provided alternate procedures are established and used.	|
	Other	C	-	0	(O) May be inoperative provided alternate procedures are established and used.	|
-04	Excessive Closure Rate to Terrain (Mode 2) and Flight Into Terrain Not In Landing Configuration (Mode 4)	A	2	0	(O) May be inoperative provided: a) Alternate procedures are established and used, and b) Repairs are made within two flight-days.	|
-05	Excessive Downward Glideslope/Glidepath Deviation (Mode 5)					|
		B	-	0		|
		C	-	1	May be inoperative provided affected glideslope or glidepath is not used.	|
					(Continued)	|

AIRCRAFT: (Insert aircraft make and model)	**TABLE KEY** 1. REPAIR CATEGORY 2. NO. INSTALLED 3. NO. REQUIRED FOR DISPATCH 4. REMARKS OR EXCEPTIONS

34. Navigation

Sequence No.	Item	1	2	3	4	Change Bar
34-XX	Terrain Awareness and Warning System (TAWS), Including Test Mode (Cont'd)					|
-06	Terrain Display					|
		B	-	0		|
		C	-	1		|
-07	Switch					|
	Flap Override, Terrain Inhibit, or Terrain Display Inhibit	B	-	0		|
		C	-	3	May be inoperative provided one switch of each listed function is operative.	|
	Other Excluding TAWS Test	C	-	0		|
-08	Annunciator/Indication					|
	Terrain Inhibited	B	-	0		|
		C	-	1		|
	Other	C	-	0		|

AIRCRAFT: (Insert aircraft make and model)	**TABLE KEY** 1. REPAIR CATEGORY 2. NO. INSTALLED 3. NO. REQUIRED FOR DISPATCH 4. REMARKS OR EXCEPTIONS

34. Navigation

Sequence No.	Item	1	2	3	4	Change Bar
	Class B TAWS Required					|
34-XX	Terrain Awareness and Warning System (TAWS), Including Test Mode	A	1	0	(O) May be inoperative provided: a) Alternate procedures are established and used, b) System is not required by enroute or approach procedures, and c) Repairs are made within two flight-days.	|
-01	Forward-Looking Terrain Avoidance (FLTA) Function and Premature Descent Alert Function	B	2	0	(O) May be inoperative provided alternate procedures are established and used.	|
-02	Excessive Rate of Descent (Mode 1) and Altitude Loss After Takeoff or Missed Approach (Mode 3)	A	2	0	(O) May be inoperative provided: a) Alternate procedures are established and used, and b) Repairs are made within two flight-days.	|
-03	Voice Callouts (Mode 6)					|
	"Five-Hundred"	B	1	0	(O) May be inoperative provided alternate procedures are established and used.	|
	Other	C	-	0	(O) May be inoperative provided alternate procedures are established and used.	|
-04	Excessive Closure Rate to Terrain (Mode 2) and Flight Into Terrain Not In Landing Configuration (Mode 4)	C	2	0	(O) May be inoperative provided alternate procedures are established and used.	|
-05	Excessive Downward Glideslope/Glidepath Deviation (Mode 5)	C	-	0		|
-06	Terrain Display	C	-	0		|
-07	Switch Excluding TAWS Test	C	-	0		|
-08	Annunciator/Indication	C	-	0		|

AIRCRAFT: (Insert aircraft make and model)	**TABLE KEY** 1. REPAIR CATEGORY 2. NO. INSTALLED 3. NO. REQUIRED FOR DISPATCH 4. REMARKS OR EXCEPTIONS

34. Navigation

Sequence No.	Item	1	2	3	4	Change Bar
	Class A or B TAWS Not Required					|
34-XX	Terrain Awareness and Warning System (TAWS)	C	1	0	(O) May be inoperative provided alternate procedures are established and used. NOTE: Any mode that operates normally may be used.	|
34-XX	Runway Overrun Awareness and Avoidance Systems (ROAAS) (Runway Overrun Protection System or Equivalent)	C	-	0	(O) May be inoperative provided alternate procedures are established and used.	|
		D	-	0	May be inoperative provided procedures do not require its use.	|
34-XX	Surface Awareness Function (ROAAS, SmartRunway/ SmartLanding, SurfaceWatch, or Equivalent)	C	-	0	(O) May be inoperative provided alternate procedures are established and used.	|
		D	-	0	May be inoperative provided procedures do not require its use.	|

Each FOEB Chair should review the specific aircraft configuration(s) and apply this policy to affected MMELs through the normal FOEB process.

John Posey
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