

**SUMMARY:** This amendment makes a minor revision to the minimum standards and procedures used for the approval, installation, operation, and maintenance of Microwave Landing System facilities that are not operated and maintained by the FAA. This amendment is necessary to bring those standards in accord with the minimum standards used for the operation and maintenance of FAA facilities.

**EFFECTIVE DATE:** May 18, 1984.

**FOR FURTHER INFORMATION CONTACT:** Mr. Sotires P. Mantis, Program Engineering and Maintenance Service (APM-120), Maintenance Engineering Division, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591; Telephone (202) 426-3628.

**SUPPLEMENTARY INFORMATION:** On December 17, 1981, Amendment 171-11 to Part of the Federal Aviation Regulations (FAR's) established the minimum standards and procedures for the approval, installation, operation, and maintenance of a Microwave Landing System (MLS) facility that is not operated and maintained by the FAA. On October 18, 1982, the FAA published revisions to Amendment 171-11 (47 FR 46259; October 18, 1982) in which it provided changes to those standards.

The MLS is a system designed to take the place of the Instrument Landing System (ILS) used throughout the world and is projected to meet both civil and military requirements. MLS has been selected for standardization by the International Civil Aviation Organization (ICAO) and chosen to satisfy the need for a new system to fulfill future precision approach and landing guidance requirements. Since these facilities may be operated and maintained by persons other than the FAA, the requisite uniform standards and procedures to operate these facilities in the National Airspace System (NAS) must be provided in regulatory form to govern those activities.

With respect to Table 8, in Subpart J of FAR Part 171, the 1982 correction to Amendment 171-11 did not make a change to the range of values for the approach azimuth coverage limits that was needed to bring the format of the Basic Data transmissions into exact conformity with the international standards for MLS. That change is being made by this amendment, and each non-FAA facility, will not code the "Approach Azimuth Proportional Coverage Limits" (AAPCL) exactly as

prescribed by agreed-upon international standards; consequently, all airborne MLS receivers will decode the AAPCL accurately.

Because this requirement has already been substantially complied with and the changes it imposes are minor in nature, notice and public procedure regarding this action are unnecessary.

#### Cost of Compliance

The cost of compliance with this amendment will be minimal. Non-FAA MLS ground equipment already deployed will require reprogramming of the digital device, usually a Programmable Read-Only Memory (PROM), on which the code is stored. In some cases, the revised data field is entered into the equipment memory by means of a portable terminal. The cost of compliance is limited to an inexpensive reprogramming of the digital device, and there is only one non-FAA facility known to be deployed with the old code. All but approximately six airborne receivers are FAA experimental equipment on which the necessary modifications have already been made. For those few privately owned receivers, the modification is inexpensive and exactly analogous to ground equipment modification previously described. In addition, because manufacturers of MLS equipment are aware of this standard and have already made this simple coding change with no added cost, there is no cost to these equipment manufacturers.

#### List of Subjects in 14 CFR Part 171

Navigation, Facilities.

#### Amendment

#### PART 171—[AMENDED]

Accordingly, Part 171 of the Federal Aviation Regulations (14 CFR Part 171) is amended, effective May 18, 1984, as follows:

#### Subpart J—Microwave Landing System (MLS)

##### Table 8. Basic Data

1. By revising the range of values for Word 1 in Table 8 of Subpart J by removing the phrase "0° to -60°" and inserting, in its place, the phrase "-10° to -60°", and by removing the phrase "0° to +60°" and inserting, in its place, the phrase "+10° to +60°". As amended, Table 8 of § 171.311 reads as follows:

#### DEPARTMENT OF TRANSPORTATION Federal Aviation Administration

#### 14 CFR Part 171

[Docket No. 20669; Amendment 171-12]

#### Microwave Landing System Requirements for Non-Federal Navigational Facilities

**AGENCY:** Federal Aviation  
Administration (FAA), DOT.

**ACTION:** Final rule.

APM

TABLE 8--Basic Data (Continued)

WORD	DATA CONTENT	MAX. TIME BETWEEN TRANSMISSIONS (SECONDS)	BITS USED	RANGE OF VALUES	LEAST SIGNIFICANT BIT	BIT NUMBER
	Approach Azimuth Sector Guidance Alert		3	1° to 8°	1°	I <sub>21</sub> - I <sub>23</sub>
	-60° to -20°		2	1° to 4°	1°	I <sub>24</sub> - I <sub>25</sub>
	-20° to -5°		2	1° to 4°	1°	I <sub>26</sub> - I <sub>27</sub>
	+20° to +5°		3	1° to 8°	1°	I <sub>28</sub> - I <sub>30</sub>
	+60° to +20°		2	SEE NOTE 1		I <sub>31</sub> - I <sub>32</sub>
4	PREAMBLE	10	12			I <sub>1</sub> - I <sub>12</sub>
	DME Distance		12	-8000M to +8000M See Note 7	4M	I <sub>13</sub> - I <sub>24</sub>
	DME Offset		6	-155M to +155M SEE NOTE 7	5M	I <sub>25</sub> - I <sub>30</sub>
	PARITY		2	SEE NOTE 1		I <sub>31</sub> - I <sub>32</sub>
5	PREAMBLE	10	12			I <sub>1</sub> - I <sub>12</sub>
	Approach Azimuth Antenna Offset		7	-126M to +126M SEE NOTE 7	2M	I <sub>13</sub> - I <sub>19</sub>
	DME or DME/P		1	DME = 0 DME/P = 1 SEE NOTE 8		I <sub>20</sub>
	DME Channel		9	SEE NOTE 8		I <sub>21</sub> - I <sub>29</sub>
	SPARE		1			I <sub>30</sub>
	PARITY		2	SEE NOTE 1		I <sub>31</sub> - I <sub>32</sub>

TABLE 8--Basic Data

WORD	DATA CONTENT	MAX. TIME BETWEEN TRANSMISSIONS (SECONDS)	BITS USED	RANGE OF VALUES	LEAST SIGNIFICANT BIT	BIT NUMBER
1	PREAMBLE	0.4	12			I <sub>1</sub> - I <sub>12</sub>
	Approach Azimuth to Threshold Distance		6	0M to 6300M	100M	I <sub>13</sub> - I <sub>18</sub>
	Approach Azimuth Proportional Coverage Limit		5	-10° to -60°	2°	I <sub>19</sub> - I <sub>23</sub>
	Approach Azimuth Proportional Coverage Limit		5	+10° to +60°	2°	I <sub>24</sub> - I <sub>28</sub>
	Clearance Signal Type		1	See Note 9		I <sub>29</sub>
	SPARE		1			I <sub>30</sub>
	PARITY		2	SEE NOTE 1		I <sub>31</sub> - I <sub>32</sub>
2	PREAMBLE	0.16	12			I <sub>1</sub> - I <sub>12</sub>
	Ground Equipment Performance Level		2	SEE NOTE 2		I <sub>13</sub> - I <sub>14</sub>
	Minimum Glide-path		6	2° to 8.2°	0.1°	I <sub>15</sub> - I <sub>20</sub>
	Back Azimuth Next Function		1	SEE NOTE 3		I <sub>21</sub>
	SPARE		7	SEE NOTE 6		I <sub>22</sub> - I <sub>28</sub>
	DME Status		2	SEE NOTE 2		I <sub>29</sub> - I <sub>30</sub>
	PARITY		2	SEE NOTE 1		I <sub>31</sub> - I <sub>32</sub>
3	PREAMBLE	10	12			I <sub>1</sub> - I <sub>12</sub>
	Approach Azimuth Beamwidth		3	0.5° to 4°	0.5°	I <sub>13</sub> - I <sub>15</sub>
	Approach Elevation Beamwidth		3	0.5° to 2.5°	0.5°	I <sub>16</sub> - I <sub>18</sub>
	Flare Elevation Beamwidth		2	0.5° to 1°	0.25°	I <sub>19</sub> - I <sub>20</sub>

TABLE 8—Basic Data (Continued)

WORD	DATA CONTENT	MAX. TIME BETWEEN TRANSMISSIONS (SECONDS)	BITS USED	RANGE OF VALUES	LEAST SIGNIFICANT BIT	BIT NUMBER
6	PREAMBLE	10	12			$I_1 - I_{12}$
	MLS Ground Subsystem Identification (SEE NOTE 4)			LETTERS A to Z		$I_{13} - I_{18}$
	Character 2		6			$I_{19} - I_{24}$
	Character 3		6			$I_{25} - I_{30}$
	Character 4		6			$I_{31} - I_{32}$
	PARITY		2	SEE NOTE 1		
7	PREAMBLE	1	12			$I_1 - I_{12}$
	Ground Equipment Performance Level		2	SEE NOTE 2		$I_{13} - I_{14}$
	Back Azimuth Antenna Distance		5	0M to 3100M	100M	$I_{15} - I_{19}$
	Back Azimuth Proportional Coverage Limit		4	-10° to -40°	2°	$I_{20} - I_{23}$
	Back Azimuth Proportional Coverage Limit		4	+10° to +40°	2°	$I_{24} - I_{27}$
	Back Azimuth Beamwidth		2	1° to 4°	1°	$I_{28} - I_{29}$
	SPARE		1			$I_{30}$
	PARITY		2	SEE NOTE 1		$I_{31} - I_{32}$
	PREAMBLE	10	12			$I_1 - I_{12}$
	Elevation Antenna Height		6	-1M to +5.2M SEE NOTE 7	0.2M	$I_{13} - I_{18}$
Elevation Antenna Offset		5	-150M to +150M SEE NOTE 7	10M	$I_{19} - I_{23}$	
MLS Datum Point to threshold distance		7	0M to 630M	5M	$I_{24} - I_{30}$	
PARITY		2	SEE NOTE 1		$I_{31} - I_{32}$	

TABLE 8—Basic Data (Continued)

NOTES

NOTE 1 Parity checks that there is an even number of ones in Bits  $I_{13}$  to  $I_{30}$  and obeys the equations:

$$I_{13} + I_{14} + \dots + I_{29} + I_{30} + I_{31} = \text{EVEN}$$

$$I_{14} + I_{16} + I_{18} + \dots + I_{28} + I_{30} + I_{32} = \text{EVEN}$$

NOTE 2 Coding not yet defined. Transmit all zeros.

NOTE 3 Code for  $I_{21}$  is:

0 = No Back Azimuth Transmission

1 = Back Azimuth Transmission to follow

NOTE 4 Data word 6 is transmitted for both approach azimuth and back azimuth coverages alternately and at the 10-second maximum time between transmissions for each coverage sector, if back azimuth guidance is provided.

NOTE 5 Data word 7 is transmitted from the back azimuth equipment.

NOTE 6 These bits are reserved for future applications requiring high transmission rates. Transmit all zeros.

NOTE 7 The convention for the coding of negative numbers is as follows:

-MSB is the sign bit: 0 = +

1 = -

-Other bits represent the absolute value.

The convention for the antenna location is as follows: as viewed from the MLS approach reference datum looking toward the MLS datum point, a positive number shall represent a location to the right of the runway centre line (lateral offset) or above the runway (vertical offset) or toward the stop end of the runway (Longitudinal distance).

NOTE 8 Coding not yet defined. 9 bits provide the capability to encode frequency and mode separately. Transmit all zeros.

NOTE 9 Code for  $I_{29}$  is:

0 = Pulse Clearance Signal

1 = Scanning Clearance Signal

(Sec. 305, 307, 313(a), 601, 606, Federal Aviation Act of 1958, as amended (49 U.S.C. 1343, 1348, 1354(a), 1421, 1426); 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).)

**Note.**—This amendment merely makes a minor revision to the minimum standards and procedures used for the approval, installation, operation, and maintenance of non-FAA Microwave Landing System facilities. There is only one non-FAA facility and six airborne receivers operating with the old standard and they will only need inexpensive reprogramming; further, manufacturers are aware of this standard and are already in compliance. Consequently, there is only a minor cost impact as a result of this amendment. Accordingly, it has been determined that this final rule is not major under Executive Order 12291 or significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). For these reasons and because there are no cost savings associated with this revision, I certify that, under the criteria of the Regulatory Flexibility Act, this rule will not have a significant economic impact on a substantial number of small entities. In addition, the FAA has determined that the expected impact of this final rule is so minimal that it does not require an evaluation.

Issued in Washington, D.C., on March 14, 1984.

Michael J. Fenello,  
*Acting Administrator.*

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