

lations is to establish minimum requirements for the approval and operation of simplified directional facilities (SDF), distance measuring equipment (DME), and VHF marker beacons, and to make certain other minor revisions in that part. The amendments were proposed in Notice No. 70-6 issued on January 29, 1970, and published in the FEDERAL REGISTER on February 4, 1970 (35 F.R. 2528).

Comments were received from 52 sources, including individuals, trade associations, and Governmental bodies. Twenty-eight of these comments were received from a manufacturer of SDF equipment. Numerous comments from varied sources urged the adoption of the amendment but addressed the provisions of §§ 171.105(a)(7) and 171.105(b). The comments were identical and cited the following as unequal treatment of non-Federal and Federal navigation facilities:

1. The low priority of frequency assignment.
2. The low priority of frequency retention.
3. The additional cost burden of FAA commissioning.

With respect to both frequency assignment and frequency retention, it is believed that a reasonable basis exists for insuring that Federal facilities, in the National interest, are given high priority. However, this policy is the responsibility of the Federal Communications Commission, not the Federal Aviation Administration, and is not altered by this amendment.

With respect to inequities in funding policy, the Federal Aviation Administration believes that there may be a misunderstanding of FAA policy. As stated in Amendment 171-6, published in the FEDERAL REGISTER on June 24, 1970 (35 F.R. 10288), the FAA has relaxed the total prohibition on Federal funding of ground and flight inspections, and will now provide funds therefor when consistent with budgetary requirements and related necessary policies of the Administrator. This policy is repeated in this Amendment (§ 171.105(a)(7)). In any case, this amendment does not introduce any new FAA funding policy contrary to the interests of sponsors of non-Federal navigation aids.

In response to one comment, § 171.105(b) is clarified to make it clear that the facility in question will be licensed by the Federal Communications Commission. The license will give the operator authority to transmit on the assigned frequency until it expires, normally a period of 5 years, or until it is canceled. The Federal Communications Commission will cancel or revoke a license only for certain reasons. It does, however, consider Federal Aviation Administration recommendations for short term licenses, and has agreed to consider recommendations for nonrenewal of licenses for facilities which provide limited public service. This wording of § 171.105(b) is therefore changed accordingly.

As a result of internal recommendations, it has been decided to change the designation of the facility in Subpart F from Simplified Directional Approach

System (SDAS) to Simplified Directional Facility (SDF).

One comment questioned the criteria contained in § 171.103 (a)(5) and (b) as to inspection and evaluation of the facility, expressing the opinion that the criteria should apply only to the initial unit certified by a given manufacturer, and once accepted into the system that there should be no requirement for repeating the process for each identical facility.

It is the position of the Federal Aviation Administration that the 800-hour mean time between failure (MTBF) standard and in-service evaluation should apply to all SDF facilities to be installed subsequent to approval of SDF by the Systems Research and Development Service. It does not appear reasonable to assume that an evaluation of one facility at one particular location will necessarily satisfy the evaluation requirements of another facility at a different location. However, § 171.103 (a)(5) provides that previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with the provisions of that subparagraph.

This commentator also urged that the nominal course sector width (§ 171.109 (a)(9)) be maintained at 6° if possible. In response to this, the Federal Aviation Administration points out that a width of 12° would not be approved (and a width of 6° would be used) unless there is assurance that it will provide satisfactory service. The commentator further correctly noted that § 171.111 (g) and (h) as written, were inconsistent with the provisions of § 171.109(a)(8). This inconsistency has been resolved.

In addressing Subpart H, the commentator observed that an instrument approach procedure cannot be established on a VHF Marker Beacon which is a secondary facility to be used only in conjunction with another type of radio facility which provides course information. The Federal Aviation Administration agrees with this comment and appropriate changes have been made.

Three commentators expressed concern that approval of SDF would result in a "lowering of standards" and a struggle to acquire and retain scarce frequencies. The operational adequacy of the SDF will be determined by appropriate ground and flight inspection criteria. Approval of an IFR procedure for a particular location which will utilize an SDF will have to be determined on a location by location basis. This is the same procedure currently used for approval of an IFR procedure for any type of navigation aid. After careful review of the total combination of operating and approval criteria in this amendment, the Federal Aviation Administration is confident that no lowering of operational safety levels will result from this amendment.

One comment endorsed this amendment, but had particular reservations about §§ 171.113 (c) and (d), and 171.115(h)(i), concerning the possible requirement for dual equipment and the

[Docket No. 10116; Amdt. 171-7]

PART 171—NON-FEDERAL NAVIGATION FACILITIES

Simplified Directional Facility, Distance Measuring Equipment, and VHF Marker Beacons

The purpose of this amendment to Part 171 of the Federal Aviation Regu-

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shutting down of equipment upon detection of malfunction from the air, respectively.

The statement in § 171.113 pertaining to the possibility of requiring dual equipment is to advise the public that such a requirement may be necessary to support IFR procedures at given locations. This is consistent with current Federal Aviation Administration policy. The provisions of § 171.115(h) (i) are designed to ensure adequate safety in those instances where a facility may have a malfunction that is detected in the air before it is observed on the ground. No change in either provision appears justified.

In response to a comment concerning the factors to be included in Federal Aviation Administration determinations of reliability, the Federal Aviation Administration believes that reliability requirements for newly developed equipment installed subsequent to being approved for use in the National Airspace System by the Systems Research and Development Service may be satisfied by any party having acceptable documentation of the facility. Loss of electrical power constitutes an equipment failure and, therefore, must be retained as part of the MTBF requirement. The Federal Aviation Administration region concerned will determine compliance with respect to requirements for numbers of inspections and periodicity of performance checks. The suitability of specific air/ground communications equipment will have to be determined on a case-by-case basis. Licensing requirements of course are determined by the Federal Communications Commission, not the Federal Aviation Administration.

In response to one comment concerning reporting requirements, it is the Federal Aviation Administration's position that reporting requirements under Part 171 have already been sufficiently relaxed and no further relaxation is anticipated.

In response to a comment concerning communications requirements in Subpart H, the Federal Aviation Administration believes that the factors affecting these requirements cannot be predicted in advance, and that such requirements should therefore be considered on a case-by-case basis, and should not, as requested, be identified and defined in advance of receipt of data from the sponsor.

In a detailed submission, one comment supported the subparts on DME and VHF Marker Beacons, but strongly opposed inclusion of standards for SDF. The commentator stated that the SDF is a degraded ILS system and that in view of the great effort, nationally and internationally, that has gone into developing standards for the ILS system, it is unacceptable to now degrade that long-term standardization effort by adopting standards for a degraded ILS localizer without the accepted process of national selection or agreement. The comment also expressed concern with respect to the impact upon scarce ILS channel assignments since each SDF facility will require a localizer frequency. The commentator raised a question of reliability based upon one unfavorable report con-

cerning one particular installation and upon the fact that no SDF system has yet been installed which meets the standards and requirements outlined in the amendment; and stated that performance information is lacking and should be known prior to consideration of the rule.

The Federal Aviation Administration does not believe that any of these concerns expressed by the commentator can be justified on their merits. The operational adequacy of the SDF will be determined by appropriate ground and flight inspection criteria that are fully adequate to ensure the safety of the operational use of the equipment. Approval of an IFR procedure on a location which will utilize an SDF is a matter to be determined on a location-by-location basis. This is the procedure currently used for approval of an IFR procedure for any type of navigational aid. Accordingly, if the SDF performs in accordance with the systems characteristics provided by SRDS and meets stability requirements, the Federal Aviation Administration is confident that no lowering of standards would result.

In regard to assigned frequencies, the Federal Aviation Administration does not anticipate any jeopardy of frequency assignment or retention because of the entry of SDF into the field. In addition to an SRDS evaluation of SDF performance, information will be determined by ground and flight inspection, and MTBF requirements will be satisfied on a site-by-site basis. With respect to a general comment on MTBF as a factor, the Federal Aviation Administration, in view of the many varying types of operational requirements, does not believe the levying of an availability requirement is the most feasible or economical way to obtain the results this factor provides for. An MTBF for all facilities encompassed in Part 171 will be provided as it becomes available.

One comment generally endorsed the amendment, but expressed concern over the ability of at least one type of SDF system to meet the stated requirements, particularly with regard to the tolerances for vertical polarization. It is expected that some manufacturers of SDF equipment may have to modify or improve their equipment to meet the vertical polarization tolerances specified in the amendment. The tolerance limit set out is adequate for approach aids, and experience has shown that with proper care, radiated signals can be maintained within the specified limits.

One manufacturer of an SDF system submitted 28 comments to the NPRM, requesting a variety of changes in Subpart F. Comments as to cost of flight and ground inspections, and priority of assignment and retention of frequencies, have already been answered. The Federal Aviation Administration concurred with changes suggested in 13 of the comments. These deal with:

- The composite field pattern from the SDF antenna system;
- The angle of convergence of the final approach course and the extended runway centerline;

- Changing "course width" to "course sector width" for consistency;
- The identification signal of the SDF;
- Course structure;
- Power output;
- VSWR;
- Requirements for course alignment;
- Clearance;
- Modulation monitor limits;
- Standby power for the SDF.

These suggested changes have been incorporated into the final rule.

The Federal Aviation Administration did not agree with the changes suggested in the remainder of this commentator's suggestions. The more significant of these are treated in the following discussion.

With respect to the approval of new facility types, the commentator objected to the procedures involved. In this regard, the Federal Aviation Administration believes that any new facility type should be approved by SRDS prior to receiving any consideration for having the facility concerned approved for IFR use. Upon SRDS approval of a new facility, any potential sponsor of an SRDS approved facility may request approval of an IFR approach procedure using such a facility. The Federal Aviation Administration region concerned will then respond to a potential sponsor's request for an IFR procedure by initiating action to evaluate the facility for a required period (normally 30 days) for the location concerned. This Federal Aviation Administration regional evaluation will be required for all subsequent locations utilizing identical facilities. The commentator assumed in one comment that the MTBF requirement need only be met once. This is not correct. An 800-hour MTBF will be required for all such facilities requesting an IFR procedure. This is not a one-time approval requirement and the commentator's suggested certification procedure would not, in the Federal Aviation Administration's opinion, achieve the same result. Furthermore, the period of in-service evaluation will be determined by the Federal Aviation Administration region in which the facility is installed, as proposed in the notice.

With respect to comments concerning relaxation of the vertical polarization requirement, the Federal Aviation Administration believes that a vertical polarization limit of one-twentieth of the course sector width is necessary to insure that the undesired polarization component does not exceed the course structure limitations. Vertical polarization can reasonably be controlled and maintained within the limits specified, and in view of its substantial effect upon the pilot's ability to fly the desired course, the specified value is justified.

One comment requested a form of relaxed tolerance checks in certain parameters, including ground standards and tolerances. It is believed that the tolerance check criteria in this Amendment are necessary for safety. This comment cannot, therefore, be accepted.

Interested persons have been afforded an opportunity to participate in the

making of these amendments. Due consideration has been given to all matter presented. In other respects, for the reasons stated in the preamble to the notice, the rule is adopted as provided herein.

In consideration of the foregoing, Part 171 of the Federal Aviation Regulations, is amended, effective September 9, 1970, as follows:

§§ 171.1, 171.21, 171.41 [Amended]

1. By amending §§ 171.1, 171.21, and 171.41, by inserting the words "approval and" between the words "for the" and the words "operation of."

2. By amending § 171.3(a) by adding a new subparagraph (5) to read as follows:

§ 171.3 Requests for IFR procedure.

(a) * * *

(5) A showing that the facility has an acceptable level of operational reliability and an acceptable standard of performance. Previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with this subparagraph.

3. By deleting § 171.3(c).

4. By amending the first sentence of § 171.7(a) to read as follows:

§ 171.7 Performance requirements.

(a) The VOR must perform in accordance with the "International Standards and Recommended Practices, Aeronautical Telecommunications" Part I, paragraph 3.3 (Annex 10 to the Convention on International Civil Aviation) except that part of paragraph 3.3.7 requiring removal of only the bearing information. * * *

5. By amending § 171.9(a) to read as follows:

§ 171.9 Installation requirements.

(a) The facility must be installed according to accepted good engineering practices, applicable electric and safety codes, and the installation must meet at least the Federal Communication Commission's licensing requirements.

6. By amending § 171.23(a) by adding a new subparagraph (5) to read as follows:

§ 171.23 Requests for IFR procedure.

(a) * * *

(5) A showing that the facility has an acceptable level of operational reliability and an acceptable standard of performance. Previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with this subparagraph.

7. By deleting § 171.23(c).

8. By amending § 171.27(a) to read as follows:

§ 171.27 Performance requirements.

(a) The facility must meet the performance requirements set forth in the "International Standards and Recommended Practices, Aeronautical Tele-

communications, Part I, paragraph 3.4" (Annex 10 to the Convention on International Civil Aviation), except that identification by on-off keying of a second carrier frequency, separated from the main carrier by 1020 Hz plus or minus 50 Hz, is also acceptable.

9. By amending § 171.43(a) by adding a new subparagraph (5) to read as follows:

§ 171.43 Requests for IFR procedure.

(a) * * *

(5) A showing that the facility has an acceptable level of operational reliability and an acceptable standard of performance. Previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with this subparagraph.

10. By deleting § 171.43(c).

11. By adding a new § 171.75, within Subpart E, to read as follows:

§ 171.75 Submission of requests.

(a) Requests for approval of facilities not having design and operational characteristics identical to those of facilities currently approved under this part, including requests for deviations from this part for such facilities, must be submitted to the Director, Systems Research and Development Service.

(b) The following requests must be submitted to the Regional Director of the region in which the facility is located:

(1) Requests for approval of facilities that have design and operational characteristics identical to those of facilities currently approved under this part, including requests for deviations from this part for such facilities.

(2) Requests for deviations from this part for facilities currently approved under this part.

(3) Requests for modification of facilities currently approved under this part.

9. By adding new Subparts F, G, and H to read as follows:

Subpart F—Simplified Directional Facility (SDF)

§ 171.101 Scope.

This subpart sets forth minimum requirements for the approval and operation of non-Federal Simplified Directional Facilities (SDF) that are to be involved in the approval of instrument flight rules and air traffic control procedures related to those facilities.

§ 171.103 Requests for IFR procedure.

(a) Each person who requests an IFR procedure based on an SDF that he owns must submit the following information with that request:

(1) A description of the facility and evidence that the equipment meets the performance requirements of § 171.109 and the standards and tolerances of § 171.111, and is installed in accordance with § 171.113.

(2) A proposed procedure for operating the facility.

(3) A proposed maintenance organization and a maintenance manual that meets the requirements of § 171.115.

(4) A statement of intent to meet the requirements of this subpart.

(5) A showing that the facility has an acceptable level of operational reliability as prescribed in § 171.111(k), and an acceptable standard of performance. Previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with this subparagraph.

(b) After the Federal Aviation Administration inspects and evaluates the facility, it advises the owner of the results and of any required changes in the facility or the maintenance manual or maintenance organization. The owner must then correct the deficiencies, if any, and operate the facility for an in-service evaluation by the Federal Aviation Administration.

§ 171.105 Minimum requirements for approval.

(a) The following are the minimum requirements that must be met before the Federal Aviation Administration will approve an IFR procedure for a non-Federal Simplified Directional Facility:

(1) A suitable frequency channel must be available.

(2) The facility's performance, as determined by air and ground inspection, must meet the requirements of §§ 171.109 and 171.111.

(3) The installation of the equipment must meet the requirements of § 171.113.

(4) The owner must agree to operate and maintain the facility in accordance with § 171.115.

(5) The owner must agree to furnish periodic reports as set forth in § 171.117, and agree to allow the FAA to inspect the facility and its operation whenever necessary.

(6) The owner must assure the FAA that he will not withdraw the facility from service without the permission of the FAA.

(7) The owner must bear all costs of meeting the requirements of this section and of any flight or ground inspections made before the facility is commissioned, except that the FAA may bear certain of these costs subject to budgetary limitations and policy established by the Administrator.

(b) If the applicant for approval meets the requirements of paragraph (a) of this section, the FAA commissions the facility as a prerequisite to its approval for use in an IFR procedure. The approval is withdrawn at any time the facility does not continue to meet those requirements. In addition, the facility is licensed by the Federal Communications Commission. The Federal Aviation Administration recommends cancellation or nonrenewal of the Federal Communications Commission license whenever the frequency channel is needed for higher priority common system service.

§ 171.107 Definition.

As used in this subpart:

"SDF" (simplified directional facility) means a directional aid facility providing only lateral guidance (front or back course) for approach from a final approach fix.

"DDM (difference in depth of modulation)" means the percentage modulation depth of the larger signal minus the percentage modulation depth of the smaller signal, divided by 100.

"Angular displacement sensitivity" means the ratio of measured DDM to the corresponding angular displacement from the appropriate reference line.

"Back course sector" means the course sector on the opposite end of the runway from the front course sector.

"Course line" means the locus of points along the final approach course at which the DDM is zero.

"Course sector" means a sector in a horizontal plane containing the course line and limited by the loci of points nearest to the course line at which the DDM is 0.155.

"Displacement sensitivity" means the ratio of measured DDM to the corresponding lateral displacement from the appropriate reference line.

"Front course sector" means the course sector centered on the course line in the direction from the runway in which a normal final approach is made.

"Half course sector" means the sector in a horizontal plane containing the course line and limited by the loci of points nearest to the course line, at which the DDM is 0.0775.

"Point A" means a point on the front course in the approach direction a distance of 4 nautical miles from the threshold.

"Point A1" means a point on the front course in the approach direction a distance of 1 statute mile from the threshold.

"Point A2" means a point on the front course at the threshold.

"Reference datum" means a point at a specified height located vertically above the intersection of the course and the threshold.

"Missed approach point" means the point on the final approach course, not farther from the final approach fix than Point "A2", at which the approach must be abandoned, if the approach and subsequent landing cannot be safely completed by visual reference, whether or not the aircraft has descended to the minimum descent altitude.

§ 171.109 Performance requirements.

(a) The Simplified Directional facility must perform in accordance with the following standards and practices:

(1) The radiation from the SDF antenna system must produce a composite field pattern which is amplitude modulated by a 90 Hz and a 150 Hz tone. The radiation field pattern must produce a course sector with the 90 Hz tone predominating on one side of the course and with the 150 Hz tone predominating on the opposite side.

(2) When an observer faces the SDF from the approach end of runway, the

depth of modulation of the radiofrequency carrier due to the 150 Hz tone must predominate on his right hand and that due to the 90 Hz tone must predominate on his left hand.

(3) All horizontal angles employed in specifying the SDF field patterns must originate from the center of the antenna system which provides the signals used in the front course sector.

(4) The SDF must operate on odd tenths MHz within the frequency band 108.1 MHz to 111.9 MHz. The frequency tolerance must not exceed plus or minus 0.005 percent.

(5) The radiated emission from the SDF must be horizontally polarized. The vertically polarized component of the radiation on the course line must not exceed that which corresponds to an error one-twentieth of the course sector width when an aircraft is positioned on the course line and is in a roll attitude of 20° from the horizontal.

(6) The SDF must provide signals sufficient to allow satisfactory operation of a typical aircraft installation within the sector which extends from the center of the SDF antenna system to distances of 18 nautical miles within a plus or minus 10° sector and 10 nautical miles within the remainder of the coverage when alternative navigational facilities provide satisfactory coverage within the intermediate approach area. SDF signals must be receivable at the distances specified at and above a height of 1,000 feet above the elevation of the threshold, or the lowest altitude authorized for transition, whichever is higher. Such signals must be receivable, to the distances specified, up to a surface extending outward from the SDF antenna and inclined at 7° above the horizontal.

(7) The modulation tones must be phase-locked so that within the half course sector, the demodulated 90 Hz and 150 Hz wave forms pass through zero in the same direction within 20° of phase relative to the 150 Hz component, every half cycle of the combined 90 Hz and 150 Hz wave form. However, the phase need not be measured within the half course sector.

(8) The angle of convergence of the final approach course and the extended runway centerline must not exceed 30°. The final approach course must be aligned to intersect the extended runway centerline between points A1 and the runway threshold. When an operational advantage can be achieved, a final approach course that does not intersect the runway or that intersects it at a distance greater than point A1 from the threshold, may be established, if that course lies within 500 feet laterally of the extended runway centerline at a point 3,000 feet outward from the runway threshold. The mean course line must be maintained within ±10 percent of the course sector width.

(9) The nominal displacement sensitivity within the half course sector must be 50 microamperes/degree. The nominal course sector width must be 6°. When an operational advantage can be achieved, a nominal displacement sensi-

tivity of 25 microamperes/degree may be established, with a nominal course sector width of 12° with proportional displacement sensitivity. The lateral displacement sensitivity must be adjusted and maintained within the limits of plus or minus 17 percent of the nominal value.

(10) The off-course (clearance) signal must increase at a substantially linear rate with respect to the angular displacement from the course line up to an angle on either side of the course line where 175 microamperes of deflection is obtained. From that angle to ±10°, the off-course deflection must not be less than 175 microamperes. From ±10° to ±35° the off-course deflection must not be less than 150 microamperes. With the course adjusted to cause any of several monitor alarm conditions, the aforementioned values of 175 microamperes in the sector 10° each side of course and 150 microamperes in the sector ±10° to ±35° may be reduced to 160 microamperes and 135 microamperes, respectively. These conditions must be met at a distance of 18 nautical miles from the SDF antenna within the sector 10° each side of course line and 10 nautical miles from the SDF antenna within the sector ±10° to ±35° each side of course line.

(11) The SDF may provide a ground-to-air radiotelephone communication channel to be operated simultaneously with the navigation and identification signals, if that operation does not interfere with the basic function. If a channel is provided, it must conform with the following Standards:

(i) The channel must be on the same radiofrequency carrier or carriers as used for the SDF function, and the radiation must be horizontally polarized. Where two carriers are modulated with speech, the relative phases of the modulations on the two carriers must avoid the occurrence of nulls within the coverage of the SDF.

(ii) On centerline, the peak modulation depth of the carrier or carriers due to the radiotelephone communications must not exceed 50 percent but must be adjusted so that the ratio of peak modulation depth due to the radiotelephone communications to that due to the identification signal is approximately 9:1.

(iii) The audiofrequency characteristics of the radiotelephone channel must be flat to within 3 db relative to the level at 1,000 Hz over the range from 300 Hz to 3,000 Hz.

(12) (i) The SDF must provide for the simultaneous transmission of an identification signal, specific to the runway and approach direction, on the same radiofrequency carrier or carriers as used for the SDF function. The transmission of the identification signal must not interfere in any way with the basic SDF function.

(ii) The identification signal must be produced by Class A2 modulation of the radiofrequency carrier or carriers using a modulation tone of 1020 Hz within ±50 Hz. The depth of modulation must be between the limits of 5 and 15 percent except that, where a radiotelephone communication channel is provided, the

depth of modulation must be adjusted so that the ratio of peak modulation depth due to radiotelephone communications to that due to the identification signal modulation is approximately 9:1. The emissions carrying the identification signal must be horizontally polarized.

(iii) The identification signal must employ the International Morse Code and consist of three letters.

(iv) The identification signal must be transmitted at a speed corresponding to approximately seven words per minute, and must be repeated at approximately equal intervals, not less than six times per minute. When SDF transmission is not available for operational use, including periods of removal of navigational components or during maintenance or test transmissions, the identification signal must be suppressed.

(b) It must be shown during ground inspection of the design features of the equipment that there will not be conditions that will allow unsafe operations because of component failure or deterioration.

(c) The monitor must be checked periodically during the in-service test evaluation period for calibration and stability. These tests, and ground checks of SDF radiation characteristics, must be conducted in accordance with the maintenance manual required by section 171.115(c) and must meet the standards and tolerances contained in paragraph 171.111(j).

(d) The monitor system must provide a warning to the designated control point(s) when any of the conditions of 171.111(j) occur, within the time periods specified in that paragraph.

(e) Flight inspection to determine the adequacy of the facility's operational performance and compliance with applicable performance requirements must be conducted in accordance with the "U.S. Standard Flight Inspection Manual." Tolerances contained in the U.S. Standard Flight Inspection Manual, section 217, must be complied with except as stated in paragraph (f) of this section.

(f) Flight inspection tolerances specified in section 217 of the "U.S. Standard Flight Inspection Manual" must be complied with except as follows:

(1) *Course sector width.* The nominal course sector width must be 6°. When an operational advantage can be achieved, a nominal course sector width of 12° may be established. Course sector width must be adjusted and maintained within the limits of ±17 percent of the nominal value.

(2) *Course alignment.* The mean course line must be adjusted and maintained within the limits of ±10 percent of the nominal course sector width.

(3) *Course structure.* Course deviations due to roughness, scalloping, or bends must be within the following limitations:

(i) *Front course.* (a) Course structure from 18 miles from runway threshold to Point A must not exceed ±40 microamperes;

(b) Point A to Point A-1—linear decrease from not more than ±40 micro-

amperes at Point A to not more than ±20 microamperes at Point A-1;

(c) Point A-1 to Missed Approach Point—not more than ±20 microamperes;

(d) Monitor tolerances: width ±17 percent of nominal; alignment—±10 percent of nominal course sector width.

(ii) *Back course.* (a) Course structure 18 miles from runway threshold to 4 miles from runway threshold must not exceed ±40 microamperes. Four miles to 1 mile from R/W must not exceed ±40 microamperes decreasing to not more than ±20 microamperes, at a linear rate.

(b) Monitor tolerances: width—±17 percent of nominal; alignment—±10 percent of nominal course sector width.

§ 171.111 Ground standards and tolerances.

Compliance with this section must be shown as a condition to approval and must be maintained during operation of the SDF.

(a) *Frequency.* (1) The SDF must operate on an assigned frequency within the band 108.1 MHz to 111.9 MHz, inclusive. The frequency tolerance must not exceed ±0.005 percent.

(2) The modulating tones must be 90 Hz and 150 Hz within ±2.5 percent.

(3) The identification signal must be 1020 Hz within ±50 Hz.

(4) The total harmonic content of the 90 Hz tone must not exceed 10 percent.

(5) The total harmonic content of the 150 Hz tone must not exceed 10 percent.

(b) *Power output.* The normal carrier power output must be of a value which will provide coverage requirements of § 171.109(a)(6) when reduced by 3dB to the monitor RF power reduction alarm point specified in § 171.111(j)(3).

(c) *VSWR.* (1) The VSWR of carrier and sideband feedlines must be a nominal value of 1/1 and must not exceed 1.2/1.

(2) The sponsor will also provide additional manufacturer's ground standards and tolerances for all VSWR parameters peculiar to the equipment which can effect performance of the facility in meeting the requirements specified in §§ 171.109 and 171.111.

(d) *Insulation resistance.* The insulation resistance of all coaxial feedlines must be greater than 20 megohms.

(e) *Depth of modulation.* (1) the depth of modulation of the radio frequency carrier due to each of the 90 Hz and 150 Hz tones must be 20 percent ±2 percent along the course line.

(2) The depth of modulation of the radiofrequency carrier due to the 1020 Hz identification signal must be within 5 percent to 15 percent.

(f) *Course sector width.* The standard course sector width must be 6° or 12°. The course sector must be maintained within ±17 percent of the standard.

(g) *Course alignment.* Course alignment must be as specified in § 171.109(a)(8).

(h) *Back course alignment and width.* If a back course is provided, standards

and tolerances for back course sector width and alignment must be the same as course sector width and course alignment specified in paragraphs (f) and (g) of this section.

(i) *Clearance.* Clearance must be as specified in § 171.109(a)(10).

(j) *Monitor standards and tolerances.*

(1) The monitor system must provide a warning to the designated control point(s) when any of the conditions described in this paragraph occur, within the time periods specified in subparagraph (6) of this paragraph.

(2) *Course shift alarm:* The monitor must alarm and cause radiation to cease, or identification and navigation signals must be removed, if the course alignment deviates from standard alignment by 10 percent or more of the standard course sector width.

(3) *RF power reduction alarm:* The monitor must alarm and cause radiation to cease, or identification and navigation signals must be removed, if the output power is reduced by 3 Db or more from normal.

(4) *Modulation level alarm:* The monitor must alarm and cause radiation to cease, or identification and navigation signals must be removed, if the 90 Hz and 150 Hz modulation levels decrease by 17 percent or more.

(5) *Course sector width alarm:* The monitor must alarm and cause radiation to cease, or identification and navigation signals must be removed, for a change in course sector width to a value differing by ±17 percent or more from the standard.

(6) *Monitor delay before shutdown:* Radiation must cease, or identification and navigation signals must be removed, within 10 seconds after a fault is detected by the monitor, and no attempt must be made to resume radiation for a period of at least 20 seconds. If an automatic recycle device is used, not more than three successive recycles may be permitted before a complete SDF shutdown occurs.

(k) *Mean time between failures.* The mean time between failures must not be less than 800 hours. This measure is applied only to equipment failures (monitor or transmitting equipment, including out of tolerance conditions) which result in facility shutdown. It does not relate to the responsiveness of the maintenance organization.

(l) *Course alignment stability.* Drift of the course alignment must not exceed one-half the monitor limit in a 1-week period.

§ 171.113 Installation requirements.

(a) The facility must be installed according to accepted good engineering practices, applicable electric and safety codes, and FCC requirements.

(b) The SDF facility must have the following basic components:

(1) VHF SDF equipment and associated monitor system;

(2) Remote control and indicator equipment (remote monitor) when required by the FAA;

(3) A final approach fix; and

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(4) Compass locator (COMLO) or marker if suitable fixes and initial approach routes are not available from existing facilities.

(c) The facility must have a reliable source of suitable primary power, either from a power distribution system or locally generated. Also, adequate power capacity must be provided for operation of test and working equipment at the SDF. A determination by the Federal Aviation Administration as to whether a facility will be required to have standby power for the SDF and monitor accessories to supplement the primary power will be made for each airport based upon operational minimums and density of air traffic.

(d) A determination by the Federal Aviation Administration as to whether a facility will be required to have dual transmitting equipment with automatic changeover for the SDF will be made for each airport based upon operational minimums and density of air traffic.

(e) There must be a means for determining, from the ground, the performance of the equipment (including antennae), initially and periodically.

(f) The facility must have the following ground/air or landline communication services:

(1) At facilities outside of and not immediately adjacent to air traffic control zones or areas, there must be ground/air communications from the airport served by the facility. The utilization of voice on the SDF should be determined by the facility operator on an individual basis.

(2) At facilities within or immediately adjacent to air traffic control zones or areas, there must be the ground/air communications required by subparagraph (1) of this paragraph and reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communications facility.

Compliance with subparagraphs (1) and (2) of this paragraph need not be shown at airports where an adjacent Federal Aviation Administration facility can communicate with aircraft on the ground at the airport and during the entire proposed instrument approach procedure. In addition, at low traffic density airports within or immediately adjacent to air traffic control zones or areas, and where extensive delays are not a factor, the requirements of subparagraphs (1) and (2) of this paragraph may be reduced to reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communication facility, if an adjacent Federal Aviation Administration facility can communicate with aircraft during the proposed instrument approach procedure down to the airport surface or at least to the minimum approach altitude.

(g) At those locations where two separate SDF facilities serve opposite ends of a single runway, an interlock must insure that only the facility serving the approach direction in use can radiate,

except where no operationally harmful interference results.

(h) At those locations where, in order to alleviate frequency congestion, the SDF facilities serving opposite ends of one runway employ identical frequencies, an interlock must insure that the facility not in operational use cannot radiate.

(i) Provisions for maintenance and operations by authorized persons only.

(j) Where an operational advantage exists, the installation may omit a back course.

§ 171.115 Maintenance and operations requirements.

(a) The owner of the facility shall establish an adequate maintenance system and provide qualified maintenance personnel to maintain the facility at the level attained at the time it was commissioned. Each person who maintains a facility shall meet at a minimum the Federal Communications Commission's licensing requirements and show that he has the special knowledge and skills needed to maintain the facility, including proficiency in maintenance procedures and the use of specialized test equipment.

(b) The SDF must be designed and maintained so that the probability of operation within the performance requirements specified is high enough to insure an adequate level of safety. In the event out-of-tolerance conditions develop, the facility shall be removed from operation, and the designated control point notified.

(c) The owner must prepare, and obtain approval of, and each person operating or maintaining the facility shall comply with, an operations and maintenance manual that sets forth procedures for operations, preventive maintenance, and emergency maintenance, including instructions on each of the following:

(1) Physical security of the facility. This includes provisions for designating critical areas relative to the facility and preventing or controlling movements within the facility that may adversely affect SDF operations.

(2) Maintenance and operations by authorized persons only.

(3) Federal Communications Commission requirements for operating personnel and maintenance personnel.

(4) Posting of licenses and signs.

(5) Relation between the facility and Federal Aviation Administration air traffic control facilities, with a description of the boundaries of controlled airspace over or near the facility, instructions for relaying air traffic control instructions and information (if applicable), and instructions for the operation of an air traffic advisory service if the facility is located outside of controlled airspace.

(6) Notice to the Administrator of any suspension of service.

(7) Detailed and specific maintenance procedures and servicing guides stating the frequency of servicing.

(8) Air-ground communications, if provided, expressly written or incorporating appropriate sections of Federal

Aviation Administration manuals by reference.

(9) Keeping of station logs and other technical reports, and the submission of reports required by § 171.117.

(10) Monitoring of the facility.

(11) Names, addresses, and telephone numbers of persons to be notified in an emergency.

(12) Inspection by U.S. personnel.

(13) Shutdowns for routine maintenance and issue of "Notices to Airmen" for routine or emergency shutdowns, except that private use facilities may omit "Notices to Airmen."

(14) Commissioning of the facility.

(15) An acceptable procedure for amending or revising the manual.

(16) An explanation of the kinds of activities (such as construction or grading) in the vicinity of the facility that may require shutdown or certification of the facility by Federal Aviation Administration flight check.

(17) Procedure for conducting a ground check of SDF course alignment, width and clearance.

(18) The following information concerning the facility:

(i) Facility component locations with respect to airport layout, instrument runway, and similar areas;

(ii) The type, make, and model of the basic radio equipment that will provide the service;

(iii) The station power emission and frequencies of the SDF, markers and associated COMLOs, if any;

(iv) The hours of operation;

(v) Station identification call letters and method of station identification and the time spacing of the identification;

(vi) A description of the critical parts that may not be changed, adjusted, or repaired without a Federal Aviation Administration flight check to confirm published operations.

(d) The owner shall make a ground check of the facility each month in accordance with procedures approved by the Federal Aviation Administration at the time of commissioning, and shall report the results of the checks as provided in § 171.117.

(e) If the owner desires to modify the facility, he shall submit the proposal to the Federal Aviation Administration and may not allow any modifications to be made without specific approval.

(f) The owner's maintenance personnel shall participate in initial inspections made by the Federal Aviation Administration. In the case of subsequent inspections, the owner or his representatives shall participate.

(g) Whenever it is required by the Federal Aviation Administration, the owner shall incorporate improvements in SDF maintenance. In addition, he shall provide a stock of spare parts, of such a quantity, to make possible the prompt replacement of components that fail or deteriorate in service.

(h) The owner shall provide Federal Aviation Administration approved test instruments needed for maintenance of the facility.

(i) The owner shall close the facility by ceasing radiation and shall issue a "Notice to Airmen" that the facility is out of service (except that private use facilities may omit "Notices to Airmen"), upon receiving two successive pilot reports of its malfunctioning.

§ 171.117 Reports.

The owner of each facility to which this subpart applies shall make the following reports, at the time indicated, to the Federal Aviation Administration Regional Office for the area in which the facility is located:

(a) Record of meter readings and adjustments (Form FAA-198). To be filled out by the owner or his maintenance representative with the equipment adjustments and meter readings as of the time of commissioning, with one copy to be kept in the permanent records of the facility and two copies to the appropriate Regional Office of the Federal Aviation Administration. The owner shall revise the form after any major repair, modification, or retuning, to reflect an accurate record of facility operation and adjustment.

(b) Facility maintenance log (Form FAA-406c). This form is a permanent record of all equipment malfunctioning met in maintaining the facility, including information on the kind of work and adjustments made, equipment failures, causes (if determined), and corrective action taken. The owner shall keep the original of each report at the facility and send a copy to the appropriate Regional Office of the Federal Aviation Administration at the end of each month in which it is prepared.

(c) Radio equipment operation record (Form FAA-418), containing a complete record of meter readings, recorded on each scheduled visit to the facility. The owner shall keep the original of each month's record at the facility and send a copy of it to the appropriate Regional Office of the Federal Aviation Administration.

Subpart G—Distance Measuring Equipment (DME)

§ 171.151 Scope.

This subpart sets forth minimum requirements for the approval and operation of non-Federal DME facilities that are to be involved in the approval of instrument flight rules and air traffic control procedures related to those facilities.

§ 171.153 Requests for IFR procedure.

(a) Each person who requests an IFR procedure based on a DME facility that he owns must submit the following information with that request:

(1) A description of the facility and evidence that the equipment meets the performance requirements of § 171.157 and is installed in accordance with § 171.159.

(2) A proposed procedure for operating the facility.

(3) A proposed maintenance organization and maintenance manual that meets the requirement of § 171.161.

(4) A statement of intention to meet the requirements of this subpart.

(5) A showing that the facility has an acceptable level of operational reliability and an acceptable standard of performance. Previous equivalent operational experience with a facility with identical design and operational characteristics will be considered in showing compliance with this subparagraph.

(b) After the Federal Aviation Administration inspects and evaluates the facility, it advises the owner of the results and of any required changes in the facility or the maintenance manual or maintenance organization. The owner must then correct the deficiencies, if any, and operate the facility for an in-service evaluation by the Federal Aviation Administration.

§ 171.155 Minimum requirements for approval.

(a) The following are the minimum requirements that must be met before the Federal Aviation Administration will approve an IFR procedure for a non-Federal DME:

(1) A suitable frequency channel must be available.

(2) The facility's performance, as determined by air and ground inspection, must meet the requirements of § 171.157.

(3) The installation of the equipment must meet the requirements of § 171.159.

(4) The owner must agree to operate and maintain the facility in accordance with § 171.161.

(5) The owner must agree to furnish periodic reports, as set forth in § 171.163, and must agree to allow the Federal Aviation Administration to inspect the facility and its operation whenever necessary.

(6) The owner must assure the Federal Aviation Administration that he will not withdraw the facility from service without the permission of the Federal Aviation Administration.

(7) The owner must bear all costs of meeting the requirements of this section and of any flight or ground inspections made before the facility is commissioned, except that the Federal Aviation Administration may bear certain of these costs subject to budgetary limitations and policy established by the Administrator.

(b) If the applicant for approval meets the requirements of paragraph (a) of this section, the Federal Aviation Administration commissions the facility as a prerequisite to its approval for use in an IFR procedure. The approval is withdrawn at any time the facility does not continue to meet those requirements.

§ 171.157 Performance requirements.

(a) The DME must meet the performance requirements set forth in the "International Standards and Recommended Practices, Aeronautical Telecommunications, Part I, Paragraph 3.5.1" (Annex 10 to the Convention of International Civil Aviation).

(b) It must be shown during ground inspection of the design features of the equipment that there will not be conditions that will allow unsafe operations because of component failure or deterioration.

(c) The monitor must be checked periodically, during the in-service test evaluation period, for calibration and stability. These tests and ground tests of the functional and performance characteristics of the DME transponder must be conducted in accordance with the maintenance manual required by § 171.161(b).

(d) Flight inspection to determine the adequacy of the facility's operational performance and compliance with applicable "Standards and Recommended Practices" must be accomplished in accordance with the "U.S. Standard Flight Inspection Manual."

§ 171.159 Installation requirements.

(a) The facility must be installed according to accepted good engineering practices, applicable electric and safety codes, and Federal Communications Commission requirements.

(b) The facility must have a reliable source of suitable primary power, either from a power distribution system or locally generated, with a supplemental standby system, if needed.

(c) Dual transmitting equipment with automatic changeover is preferred and may be required to support certain IFR procedures.

(d) There must be a means for determining from the ground, the performance of the equipment, initially and periodically.

(e) A facility intended for use as an instrument approach aid for an airport must have or be supplemented by the following ground air or landline communications services:

(1) At facilities outside of and not immediately adjacent to air traffic control areas, there must be ground-air communications from the airport served by the facility. Separate communications channels are acceptable.

(2) At facilities within or immediately adjacent to air traffic control areas, there must be the ground-air communications required by subparagraph (1) of this paragraph and reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communication facility. Separate communications channels are acceptable.

Compliance with subparagraphs (1) and (2) of this paragraph need not be shown at airports where an adjacent Federal Aviation Administration facility can communicate with aircraft on the ground at the airport and during the entire proposed instrument approach procedure. In addition, at low traffic density airports within or immediately adjacent to air traffic control zones or areas, and where extensive delays are not a factor, the requirements of subparagraphs (1) and (2) of this paragraph may be reduced to reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communications facility, if an adjacent Federal Aviation Administration facility can communicate with aircraft during the proposed instrument approach procedure, at least down to the minimum en route altitude for the controlled area.

§ 171.161 Maintenance and operations requirements.

(a) The owner of the facility shall establish an adequate maintenance system and provide qualified maintenance personnel to maintain the facility at the level attained at the time it was commissioned. Each person who maintains a facility shall meet at a minimum the Federal Communications Commission's licensing requirements and show that he has the special knowledge and skills needed to maintain the facility, including proficiency in maintenance procedures and the use of specialized test equipment.

(b) The owner must prepare and obtain Federal Aviation Administration approval of, and each person operating or maintaining the facility shall comply with, an operations and maintenance manual that sets forth procedures for operations, preventive maintenance, and emergency maintenance, including instructions on each of the following:

(1) Physical security of the facility.

(2) Maintenance and operations by authorized persons only.

(3) Federal Communications Commission's requirements and maintenance personnel.

(4) Posting of licenses and signs.

(5) Relations between the facility and Federal Aviation Administration air traffic control facilities, with a description of the boundaries of controlled airspace over or near the facility, instructions for relaying air traffic control instructions and information (if applicable), and instructions for the operation of an air traffic advisory service if the DME is located outside of controlled airspace.

(6) Notice to the Administrator of any suspension of service.

(7) Detailed and specific maintenance procedures and servicing guides stating the frequency of servicing.

(8) Air-ground communications, if provided, expressly written or incorporating appropriate sections of Federal Aviation Administration manuals by reference.

(9) Keeping of station logs and other technical reports, and the submission of reports required by § 171.163.

(10) Monitoring of the facility.

(11) Inspections by U.S. personnel.

(12) Names, addresses, and telephone numbers of persons to be notified in an emergency.

(13) Shutdowns for routine maintenance and issue of "Notices to Airmen" for routine or emergency shutdowns, except that private use facilities may omit the "Notices to Airmen."

(14) An explanation of the kinds of activity (such as construction or grading) in the vicinity of the facility that may require shutdown or reapproval of the facility by Federal Aviation Administration flight check.

(15) Commissioning of the facility.

(16) An acceptable procedure for amending or revising the manual.

(17) The following information concerning the facility:

(i) Location by latitude and longitude to the nearest second, and its position with respect to airport layouts.

(ii) The type, make, and model of the basic radio equipment that will provide the service.

(iii) The station power emission and frequency.

(iv) The hours of operation.

(v) Station identification call letters and methods of station identification, whether by Morse Code or recorded voice announcement, and the time spacing of the identification.

(vi) A description of the critical parts that may not be changed, adjusted, or repaired without an FAA flight check to confirm published operations.

(c) The owner shall make a monthly ground operational check in accordance with procedures approved by the FAA at the time of commissioning, and shall report the results of the checks as provided in § 171.163.

(d) If the owner desires to modify the facility, he shall submit the proposal to the FAA and may not allow any modifications to be made without specific approval.

(e) The owner's maintenance personnel shall participate in initial inspections made by the FAA. In the case of subsequent inspections, the owner or his representative shall participate.

(f) Whenever it is required by the FAA, the owner shall incorporate improvements in DME maintenance.

(g) The owner shall provide a stock of spare parts of such a quantity to make possible the prompt replacement of components that fail or deteriorate in service.

(h) The owner shall provide FAA-approved test instruments needed for maintenance of the facility.

(i) The owner shall shut down the facility (i.e. cease radiation and issue a NOTAM that the facility is out-of-service) upon receiving two successive pilot reports of its malfunctioning.

§ 171.163 Reports.

The owner of each facility to which this subpart applies shall make the following reports on forms furnished by the FAA, at the time indicated, to the FAA Regional office for the area in which the facility is located:

(a) Record of meter readings and adjustments (Form FAA-198). To be filled out by the owner with the equipment adjustments and meter readings as of the time of commissioning, with one copy to be kept in the permanent records of the facility and two copies to the appropriate Regional office of the FAA. The owner shall revise the form after any major repair, modification, or retuning, to reflect an accurate record of facility operation and adjustment.

(b) Facility maintenance log (Form FAA-406c). This form is a permanent record of all equipment malfunctioning met in maintaining the facility, including information on the kind of work and adjustments made, equipment failures, causes (if determined), and corrective action taken. The owner shall keep the original of each report at the facility

and send a copy to the appropriate Regional Office of the Federal Aviation Administration at the end of the month in which it is prepared.

(c) Radio equipment operation record (Form FAA-418), containing a complete record of meter readings, recorded on each scheduled visit to the facility. The owner shall keep the original of each month's record at the facility and send a copy of it to the appropriate Regional Office of the Federal Aviation Administration.

Subpart H—VHF Marker Beacons

§ 171.201 Scope.

(a) This subpart sets forth minimum requirements for the approval and operation of non-Federal VHF marker beacon facilities that are to be involved in the approval of instrument flight rules and air traffic control procedures related to those facilities.

§ 171.203 Requests for IFR procedure.

(a) Each person who requests an IFR procedure which will incorporate the use of a VHF marker beacon facility that he owns must submit the following information with that request:

(1) A description of the facility and evidence that the equipment meets the performance requirements of § 171.207 and is installed in accordance with § 171.209.

(2) A proposed procedure for operating the facility.

(3) A proposed maintenance organization and a maintenance manual that meets the requirements of § 171.211.

(4) A statement of intent to meet the requirement of this subpart.

(5) A showing that the facility has an acceptable level of operational reliability, and an acceptable standard of performance. Previous equivalent operational experience may be shown to comply with this subparagraph.

(b) After the Federal Aviation Administration inspects and evaluates the facility, it advises the owner of the results and of any required changes in the facility or the maintenance manual or maintenance organization. The owner shall then correct the deficiencies, if any, and operate the facility for an in-service evaluation by the Federal Aviation Administration.

§ 171.205 Minimum requirements for approval.

(a) The following are the minimum requirements that must be met before the Federal Aviation Administration will approve an IFR procedure which incorporates the use of a non-Federal VHF marker beacon facility under this subpart:

(1) The facility's performances, as determined by air and ground inspection, must meet the requirements of § 171.207.

(2) The installation of the equipment must meet the requirements of § 171.209.

(3) The owner must agree to operate and maintain the facility in accordance with § 171.211.

(4) The owner must agree to furnish periodic reports, as set forth in § 171.213,

and agree to allow the Federal Aviation Administration to inspect the facility and its operation whenever necessary.

(5) The owner must assure the Federal Aviation Administration that he will not withdraw the facility from service without the permission of the Federal Aviation Administration.

(6) The owner must bear all costs of meeting the requirements of this section and of any flight or ground inspections made before the facility is commissioned, except that the Federal Aviation Administration may bear certain of these costs subject to budgetary limitations and policy established by the Administrator.

(b) If the applicant for approval meets the requirements of paragraph (a) of this section, the Federal Aviation Administration commissions the facility as a prerequisite to its approval for use in an IFR procedure. The approval is withdrawn at any time the facility does not continue to meet those requirements.

§ 171.207 Performance requirements.

(a) VHF Marker Beacons must meet the performance requirements set forth in the "International Standards and Recommended Practices, Aeronautical Telecommunications, Part I, paragraphs 3.1.6 and 3.6." (Annex 10 to the Convention on International Civil Aviation) except those portions that pertain to identification. Identification of a marker beacon (75 MHz) must be in accordance with "U.S. Standard Flight Inspection Manual," § 219.

(b) The facility must perform in accordance with recognized and accepted good electronic engineering practices for the desired service. The facility must be checked periodically during the in-service test evaluation period for calibration and stability. These tests and ground tests of the marker radiation characteristics must be conducted in accordance with the maintenance manual required by § 171.211(b).

(c) It must be shown during ground inspection of the design features of the equipment that there will not be conditions that will allow unsafe operations because of component failure or deterioration.

(d) Flight inspection to determine the adequacy of the facility's operational performance and compliance with applicable "Standards and Recommended Practices" are conducted in accordance with the "U.S. Standard Flight Inspection Manual." The original test is made by the Federal Aviation Administration and later tests must be made under arrangements, satisfactory to the Federal Aviation Administration, that are made by the owner.

§ 171.209 Installation requirements.

(a) The facility must be installed according to accepted good engineering practices, applicable electric and safety codes, and Federal Communications Commission requirements.

(b) The facility must have a reliable source of suitable primary power.

(c) Dual transmitting equipment may be required, if applicable, to support certain IFR procedures.

(d) At facilities within or immediately adjacent to air traffic control areas, and that are intended for use as instrument approach aids for an airport, there must be ground-air communications or reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communication facility. Compliance with this paragraph need not be shown at airports where an adjacent Federal Aviation Administration facility can communicate with aircraft on the ground at the airport and during the entire proposed instrument approach procedure. In addition, at low traffic density airports within or immediately adjacent to air traffic control zones or areas, and where extensive delays are not a factor, the requirements of this paragraph may be reduced to reliable communications (at least a landline telephone) from the airport to the nearest Federal Aviation Administration air traffic control or communications facility, if an adjacent Federal Aviation Administration facility can communicate with aircraft during the proposed instrument approach procedure, at least down to the minimum en route altitude for the controlled area.

§ 171.211 Maintenance and operations requirements.

(a) The owner of the facility shall establish an adequate maintenance system and provide qualified maintenance personnel to maintain the facility at the level attained at the time it was commissioned. Each person who maintains a facility shall meet at a minimum the Federal Communications Commission's licensing requirements and show that he has the special knowledge and skills needed to maintain the facility, including proficiency in maintenance procedures and the use of specialized test equipment.

(b) The owner must prepare, and obtain approval of, and each person who operates or maintains the facility shall comply with, an operations and maintenance manual that sets forth procedures for operations, preventive maintenance, and emergency maintenance, including instructions on each of the following:

- (1) Physical security of the facility.
- (2) Maintenance and operations by authorized persons only.
- (3) Federal Communications Commission's requirements for operating and maintenance personnel.
- (4) Posting of licenses and signs.
- (5) Relations between the facility and Federal Aviation Administration air traffic control facilities, with a description of the boundaries of controlled airspace over or near the facility, instructions for relaying air traffic control instructions and information (if applicable).
- (6) Notice to the Administrator of any suspension of service.
- (7) Detailed arrangements for maintenance, flight inspection, and servicing, stating the frequency of servicing.
- (8) Keeping of station logs and other technical reports, and the submission of reports required by § 171.213.

(9) Monitoring of the facility, at least once each half hour, to assure continuous operation.

(10) Inspections by U.S. personnel.

(11) Names, addresses, and telephone numbers of persons to be notified in an emergency.

(12) Shutdowns for routine maintenance and issue of "Notices to Airmen" for routine or emergency shutdowns (private use facilities may omit the "Notice to Airmen").

(13) Commissioning of the facility.

(14) An acceptable procedure for amending or revising the manual.

(15) The following information concerning the facility:

(i) Location by latitude and longitude to the nearest second, and its position with respect to airport layouts.

(ii) The type, make, and model of the basic radio equipment that will provide the service.

(iii) The station power emission and frequency.

(iv) The hours of operation.

(v) Station identification call letters and methods of station identification, whether by Morse Code or recorded voice announcement, and the time spacing of the identification.

(c) If the owner desires to modify the facility, he shall submit the proposal to the Federal Aviation Administration and meet applicable requirements of the Federal Communications Commission, and must not allow any modification to be made without specific approval by the Federal Aviation Administration.

(d) The owner's maintenance personnel shall participate in initial inspections made by the Federal Aviation Administration. In the case of subsequent inspections, the owner or his representative shall participate.

(e) The owner shall provide a stock of spare parts, of such a quantity to make possible the prompt replacement of components that fail or deteriorate in service.

(f) The owner shall shut down the facility by ceasing radiation, and shall issue a "Notice to Airmen" that the facility is out of service (except that private use facilities may omit "Notices to Airmen") upon receiving two successive pilot reports of its malfunctioning.

§ 171.213 Reports.

The owner of each facility to which this subpart applies shall make the following reports, at the times indicated, to the Federal Aviation Administration Regional Office for the area in which the facility is located:

(a) Record of meter readings and adjustments (Form FAA-198). To be filled out by the owner or his maintenance representative with the equipment adjustments and meter readings as of the time of commissioning, with one copy to be kept in the permanent records of the facility and two copies to the appropriate Regional Office of the Federal Aviation Administration. The owner must revise the form after any major repair, modification, or retuning, to reflect an accurate record of facility operation and adjustment.

(b) Facility maintenance log (Form FAA-406c). This form is a permanent

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record of all equipment malfunctioning met in maintaining the facility, including information on the kind of work and adjustments made, equipment failures, causes (if determined), and corrective action taken. The owner shall keep the original of each report at the facility and send a copy to the appropriate Regional Office of the Federal Aviation Administration at the end of the month in which it is prepared.

(c) Radio equipment operation record (Form FAA-418), containing a complete record of meter readings, recorded on each scheduled visit to the facility. The owner shall keep the original of each month's record at the facility and send a copy of it to the appropriate Regional Office of the Federal Aviation Administration.

(Secs. 305, 307, 313(a), 601, and 606 of the Federal Aviation Act of 1958; 49 U.S.C. 1346, 1348, 1354(a), 1421, 1426; sec. 6(c) of the Department of Transportation Act; 49 U.S.C. 1655(c))

Issued in Washington, D.C., on August 4, 1970.

J. H. SHAFFER,
Administrator.

[F.R. Doc. 70-10408; Filed, Aug. 10, 1970;
8:46 a.m.]