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Establishment and Discontinuance
Criteria for LORAN-C; Nonprecision
Approach Procedures; Rule

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 170**

[Docket No. 26758; Amendment 170-1]

RIN 2120-AD68

Establishment and Discontinuance Criteria for LORAN-C; Nonprecision Approach Procedures**AGENCY:** Federal Aviation Administration (FAA), DOT.**ACTION:** Final rule.

SUMMARY: This final rule prescribes benefit-cost based criteria for the establishment and discontinuance of LORAN-C nonprecision approach procedures at airports. Under the criteria, the FAA will consider traffic density, passengers served, and aircraft operation efficiencies along with the cost of establishing and maintaining an approach. The criteria provide a guide to FAA management to assure the cost-effective placement of LORAN-C approaches. This regulation implements the requirements of Public Law (Pub. L.) 100-223, which requires the publication of criteria for navigational aids and airport traffic control towers.

EFFECTIVE DATE(S): September 10, 1993.

FOR FURTHER INFORMATION CONTACT: Mr. Frank Emerson, Office of Aviation Policy and Plans (APO-220), Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-3298.

SUPPLEMENTARY INFORMATION:**Background**

The FAA has the responsibility to establish or discontinue LORAN-C nonprecision approach procedures when activity levels merit such action.

The FAA, and its predecessor agency, have been developing, approving, and publishing criteria for approach procedures since 1951. Currently, establishment and discontinuance criteria for certain navigational facilities and control towers are published in an internal FAA document: Airway Planning Standard Number One—Terminal Air Navigation Facilities and Air Traffic Control Services (FAA Order No. 7031.2C, issued November 15, 1984). The existing document does not include the criteria for establishing LORAN-C nonprecision approaches to runways. The Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, section 308 (49 U.S.C. 1348), mandates that certain

criteria be promulgated through Federal regulations.

A LORAN-C nonprecision approach procedure is established under FAA Handbook 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS), as amended, which provides guidance for preparation, approval, and promulgation of terminal instrument approach procedures. LORAN-C operates through the low-frequency transmission of timed signals with controlled coded pulses that furnish nonprecision guidance to pilots with appropriately equipped aircraft. The LORAN-C signal is transmitted by groups of three to six stations, called chains; each chain includes a designated master station and several secondary stations.

In a separate rulemaking, the FAA published a new part 170 to the Federal Aviation Regulations (14 CFR part 170) to list the criteria on which it will base its decision to establish or discontinue certain navigation facilities and procedures. On January 3, 1991, the FAA published The Establishment and Discontinuance Criteria for Airport Traffic Control Tower Facilities (56 FR 336). It is anticipated that, in the future, part 170 will include criteria for other kinds of navigation facilities and services. The LORAN-C criteria will be set forth in subpart C of the new part.

The Criteria

New benefit-cost criteria for LORAN-C nonprecision approaches are established by this regulation. The criteria are explained in detail in FAA report number FAA-APO-90-5, Establishment Criteria for LORAN-C Approach Procedures. The criteria for LORAN-C approaches require that, to be eligible for establishment, a candidate runway must meet all FAA standards for nonprecision approaches and must have life-cycle benefits that exceed life-cycle costs. Discontinuance criteria state that a LORAN-C approach is subject to discontinuance when the present value of its remaining life-cycle benefits falls below the level of the cost of its continued maintenance.

The economic benefit of a LORAN-C approach is improved efficiency associated with a lower approach minimum which permits the runway to remain open at times when weather conditions would otherwise have closed the airport, thereby reducing flight disruptions. A safety benefit for LORAN-C was not included in the benefit-cost analysis because the procedure only enables approaches to be made that weather conditions might otherwise preclude. LORAN-C provides a nonprecision approach signal that

guides a pilot to a specific heading that is in line with a runway. Upon descending to a specified altitude, it is then necessary for a pilot to complete the approach and landing visually or to execute a missed approach if the runway is not in sight. Because the final descent to the runway must be made visually, the level of safety is considered the same as landing during visual flight rules conditions, and therefore unaffected by the existence of a LORAN-C approach. Furthermore, the establishment of a LORAN-C approach is meant to enhance operational efficiencies; the FAA does not deem this rule to have safety-enhancement as a primary objective. The costs of initiating a LORAN-C approach relate to investment and maintenance. Investment costs include the initial costs associated with the development, publication, and flight testing of a LORAN-C approach. Maintenance costs consist of annual flight inspection and annual updating of procedures. For discontinuance of an approach, the Agency need only consider maintenance costs. There are no unique added costs to implement the discontinuance decision.

Explicit dollar values assigned to passenger time and aircraft operating costs provide a basis for comparing benefits to costs. LORAN-C economic benefits are based on future aviation activity projected in FAA's annual Terminal Area Forecast which contains airport-specific forecasts. Benefits and costs are based on a 15-year life cycle and are discounted to their present value using a 7 percent discount rate as directed by the Office of Management and Budget. The 15-year life cycle is the same as that used for most other FAA navigational facilities criteria.

How the Criteria Are Applied

FAA will use the benefit-cost criteria to determine the eligibility of runways for LORAN-C nonprecision approach procedures. A runway is considered to be eligible for establishment of a LORAN-C approach procedure when the ratio of the benefits to the costs of establishment equals or exceeds 1.0 and all other requirements of the criteria are met. A LORAN-C approach procedure may be discontinued if the benefits expected to be realized over the remainder of its life cycle fall below its recurring maintenance costs.

Meeting the economic criteria is usually a necessary condition to include a site in the FAA budget; however, it is not a guarantee that a site will be funded.

Criteria Results

Runways at 4,078 airports from the Terminal Area Forecast were examined to determine their current benefit-cost (B/C) ratios. Of this universe, at least 1,880, or 46 percent, have one or more runways with a B/C ratio of 1.0 or greater with the remainder falling below the criteria standard. The results show that about three quarters of the airports not qualifying have a B/C ratio below 0.3.

Need for the Regulation

This final rule is issued in compliance with the Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223 (49 U.S.C. 1348), which requires the promulgation of regulations to establish criteria for the installation of airport control towers and other navigational aids. Its fundamental purpose is to improve the efficiency of FAA resource allocation. Also, the final rule will assist in the establishment of airport and funding priorities.

Discussion of Comments

Six comments were received in response to the Notice of Proposed Rulemaking (NPRM) Notice No. 92-1 (57 FR 3830, January 31, 1992). Most commenters express support for the development of LORAN-C approaches, stating they will be of particular benefit to rural America and airports without an existing approach.

Use of Benefit-Cost Analysis for Establishing LORAN-C Approaches

Comments: Several commenters disagree with the application of benefit-cost criteria that prevent development of approaches into small, rural communities. One commenter recommends that all airports and heliports meeting the requirements of United States Standard for Terminal Instrument Procedures (TERPS) and part 77 criteria be equally considered. Additionally, if a benefit-cost analysis must be conducted, the commenter advises that a relationship be established that weighs the value of an instrument approach into an airport without an existing approach.

A second commenter claims that the NPRM fails to acknowledge the premise behind efforts devoted to the establishment of LORAN-C approaches. The commenter asserts that the application of strict establishment criteria arbitrarily reduces the number of eligible airports and, therefore, may negate the usefulness of LORAN-C for business and general aviation. Moreover, the commenter alleges that discussion of establishment for LORAN approaches has never been based on the

type of consideration listed in Airport Planning Standard Number One. In this regard, a third commenter questions the inclusion of "traffic density" and "number of passengers served" as considerations in these deliberations.

FAA Response: With limited resources available to establish LORAN-C (as well as other) airport approach procedures, the most likely impact of applying establishment criteria, at least over the next several years, may be to influence the order in which LORAN-C approaches are established, rather than on the number of such approaches established. Over the longer term, strict application of the criteria could limit the establishment of LORAN-C approaches at airports that have low levels of traffic.

The establishment of LORAN-C approaches is evaluated for airports both with and without established approaches. The application of the criteria involves assigning greater benefits to the establishment of approaches that are expected to result in greater increases in activity. Thus, other factors being held constant, an airport that already has an established approach would be expected to have lower incremental benefits from establishing a LORAN-C approach than would an otherwise-identical airport without an established approach.

The FAA expects relatively little variation among sites in the cost of establishing LORAN-C approaches. Thus, the greatest net benefit (total benefits minus total costs) to the aviation community should be derived by first establishing approaches at those airports having the highest benefit-cost ratios, then proceeding to establish approaches at airports where these ratios are lower. The use of benefit-cost criteria that consider all benefits (including avoided flight delays and benefits to passengers, where applicable) provides a systematic basis for recommending priorities among airports that are candidates for the establishment of LORAN-C approaches.

In view of the current backlog of sites designated for LORAN-C approaches under a cooperative arrangement between FAA and the National Association of State Aviation Officials, the application of establishment criteria is unlikely to either cause or prevent a LORAN-C approach from being installed at an airport in the near term. In addition, as noted in § 170.23(c) of the rule, "the criteria do not cover all situations that may arise and are not used as a sole determinant in denying or granting the establishment of a nonprecision LORAN-C approach for which there is a demonstrated

operational or air traffic control requirement."

Application of Establishment Criteria for LORAN-C Approaches

Comments: Some commenters indicate that LORAN-C is a "navigational aid," but not in the sense that it is located on or in the vicinity of the airport/heliport being served, as would be the case for a nondirectional beacon (NDB) or very high frequency omnidirectional range station (VOR). Accordingly, they claim it is unclear from Public Law 100-223 whether "procedure development criteria" fall within this context so that LORAN-C should not be considered in the same category as airport-based facilities. Such classification, in their opinion, makes LORAN-C subject to a "planning standard" which may be a misapplication of Public Law 100-223.

FAA Response: Although LORAN-C installations typically serve wide areas rather than a particular airport, establishment of a LORAN-C approach at a particular airport is conceptually similar to establishment of any other approach. An incremental expenditure is made in order to reap an incremental benefit. For LORAN-C, incremental expenditures consist of the airport-specific costs of establishing and operating the approach. Incremental benefits consist of the airport-specific benefits—over and above those already provided by other aids or by the availability of LORAN-C for en route navigation—that the LORAN-C approach makes possible. The criteria are designed to ensure that the incremental airport-specific benefits exceed or equal incremental costs. Thus, the use of establishment criteria for LORAN-C approaches that are similar to those for other types of nonprecision approaches is appropriate.

Evaluation of LORAN-C

Comments: Three commenters raise issues pertaining to the evaluation of LORAN-C approaches. One commenter asks whether credit for en route guidance was included in the evaluation of LORAN-C approaches. A second commenter questions the validity of projections contained in the FAA's Terminal Area Forecasts (TAF) publication, alleging that restricting LORAN-C approach evaluations to airports included in FAA Terminal Area Forecasts artificially limits the number of airports considered. Another commenter states that the aviation community considers LORAN-C to be a "valuable navigational [aid]", and disagrees with it being labeled non-precision. The commenter further states

that LORAN-C users are kept in an ellipsoid sphere of airspace wherever coverage exists, and that LORAN-C's accuracy is not downgraded or improved based on distance; it stays the same throughout the entire flight from takeoff to landing.

FAA Response: Like VORs and many radar installations, LORAN-C installations provide benefits to aircraft operators both en route and on approach to an airport. However, the final rule and evaluation criteria are based solely on estimated incremental benefits and costs associated with establishing approaches, rather than with en route benefits. Airports in the FAA's TAF were used in the sample evaluation that was performed prior to publishing the NPRM as a matter of convenience. Nothing in the final rule limits future evaluations solely to airports presently in the TAF. In addition, TAF forecasts are routinely reviewed and updated. Finally, LORAN-C is referred to as "non-precision" because, like an NDB or VOR, it does not provide information on altitude for use in glide slope guidance, as is the case for a precision approach based on an Instrument Landing System or Microwave Landing System.

LORAN-C Safety Benefit

Comments: Several commenters mention the NPRM's statement that a safety benefit for LORAN-C was not included in the benefit-cost study. Two commenters believe a safety benefit should be included in any benefit-cost study. In addition, one commenter claims that using an approach enhances overall safety even in visual flying rules (VFR) conditions.

FAA Response: A safety benefit for LORAN-C was not included in the benefit-cost analysis. The existence of a LORAN-C approach permits aircraft to make approaches under instrument meteorological conditions with a level of safety equivalent to that under visual conditions. The LORAN-C approach provides a nonprecision approach signal that guides a pilot to a specific heading that is in line with a runway. Upon descending to a specified altitude, it is then necessary for a pilot to complete the approach and landing visually or to execute a missed approach if the runway is not in sight. Because the descent to the runway must be made visually, the level of safety is considered the same as landing during visual flight rules conditions. Similarly, the level of safety of a LORAN-C approach is considered the same as that of a visual approach in visual meteorological conditions. LORAN-C merely enables an instrument approach to be made that

otherwise could not be made at all, rather than make such an approach safer. The intent of this rule is to set guidelines for establishing LORAN-C approaches for operational efficiency. The FAA does not disagree that the existence of an instrument approach may in some cases or situations contribute an element of added safety. The FAA does not deem that contribution to rise to a sufficient level, however, to be included as a quantifiable benefit for the purposes of this rule.

Effects of Lower Costs for Developing and Maintaining Approaches

Comments: Several commenters claim the FAA appears to have not considered the reduced costs for developing approaches using automated technology rather than the current laborious hand method. These commenters suggest that, with ground-based monitors in place to continuously check signal guidance accuracy, the frequency for flight checks could be reduced, resulting in cost savings. Moreover, the current flight inspection criteria for annual inspections may not be necessary; therefore, the possibility of eliminating annual flight check evaluations could be considered. As a result, because of the low cost, many more airports should be eligible.

FAA response: The criteria is based on a comparison of benefits with costs. Should new technologies lower costs, these newer, lower costs will be used in the benefit-cost evaluations. The result of lower costs, other factors being held constant, will be increased numbers of runways for which the establishment of a LORAN-C approach will have benefits that equal or exceed costs.

Combine LORAN-C and Global Positioning System (GPS)

Comment: Some commenters indicate that the FAA should investigate the possibility that a GPS non-precision approach could overlay a LORAN-C approach, or at least make use of some of the work done in preparing a LORAN-C approach, and that consideration, therefore, should be given to the potential combination of GPS and LORAN-C approaches. Commenters indicate that both GPS and LORAN-C approaches will benefit from an automated approach procedure development capability and from obstacle clearance evaluation. In addition, they argue that once a LORAN-C approach is developed, it also can be used as a GPS approach once the system is operational. In this regard, credit should be taken for cost savings because future costs for

establishing GPS approaches will be lowered once LORAN-C approaches are in place.

FAA Response: The possibility of overlaying GPS approaches on LORAN-C approaches is acknowledged and may be considered in future rulemakings on GPS approaches. To the extent that LORAN-C approaches may be used for GPS approaches, thereby resulting in cost savings, the net benefits of approaches that eventually may be designated as LORAN-C/GPS approaches may be raised. However, in the absence of a developed standard for GPS approaches, designating and accounting for benefits of GPS approaches would be premature. When and if appropriate, GPS approach establishment criteria will be pursued.

The inclusion of potential GPS benefits would likely result in higher benefit-cost ratios for candidate approach sites examined, rather than in significant shifts in the relative benefit-cost ratios for candidate approach sites examined. It should be noted that exclusion from consideration of potential GPS benefits of LORAN-C approaches is not expected to have any near-term effect on the priority in which approaches are developed for various airports.

Capital Costs

Comments: One commenter questions whether it is appropriate to use life cycle costs evaluated over a 15-year period. Similarly, a second commenter asserts that the actual cost of equipment maintenance at the airport/heliport is zero since there is no navigational equipment located there.

FAA Response: The use of 15-year life cycle costs parallels the methodology used for analyzing most other FAA investments subject to establishment/discontinuance criteria, including alternative airport instrument approach aids. FAA utilizes the 15-year life cycle in recognition of both equipment useful life and the potential for technological obsolescence. The FAA recognizes that, where capital investment is involved, it is appropriate to use the expected useful lifetime of the investment as the relevant period for life-cycle cost analysis. In this instance, however, since LORAN-C approaches are relatively new, the FAA does not have sufficient experience-based data to estimate lifetimes for the investments in approaches, but has determined that 15 years represents a reasonable assumption in the absence of such data.

The FAA agrees with the commenter's statement that the actual cost of equipment maintenance at the airport/heliport is zero. Indeed, the Agency's

proposed methodology reflects this fact by including only those costs associated with establishing and inspecting the approaches, versus including costs pertaining to airport installed equipment.

Weather Information

Comment: One commenter questions the necessity and usefulness of requiring the availability of weather information and air-to-ground communications.

FAA Response: The weather information and air-to-ground communications requirements for a LORAN-C approach at an airport conform with longstanding requirements for instrument approaches. Weather forecasts are necessary when planning a trip under instrument flight rules (IFR) for determining whether a pilot is required to specify an alternate to the airport of intended landing. To be listed as an alternate, weather information about an airport must also be available. Barometric readings at an airport (or nearby airport) must be available in order for a pilot to set the altimeter to determine when the minimum descent altitude during a non-precision approach to an airport has been reached. This is particularly crucial in view of the fact that a LORAN-C approach minimum descent altitude can be as low as 250 feet.

Federalism Implications

Comment: One commenter believes that the NPRM's Federalism Implications statement is inappropriate because it ignores a long-standing partnership between the FAA and State aviation agencies and their representatives.

FAA Response: The FAA is well aware of past and current cooperation with the State aviation agencies and their representatives. This cooperation has been undertaken to accelerate work on the establishment of LORAN-C approaches. The final rule is not intended to interfere with the arrangement to proceed with work on the approaches for airports that have been nominated through the National Association of State Aviation Officials.

Paperwork Reduction Act

There are no reporting or recordkeeping requirements associated with this final rule.

Regulatory Evaluation Summary

Introduction

The issuance of this final rule is expected to have no direct cost impact on the public. There is only a minimal

administrative cost to the FAA of applying the criteria. The FAA uses an automated benefit-cost calculation procedure that provides results at minimal cost. This procedure is embodied in the Aviation Data Analysis (ADA) system maintained by the Office of Aviation Policy and Plans. ADA uses a 15-year forecast of aviation activity, as well as economic and other values, to estimate life-cycle B/C ratios. This final rule merely formalizes this application of criteria as part of normal agency procedures. The benefit of the rule is to inform the public of the benefit-cost criteria the FAA uses to allocate resources for establishment of LORAN-C nonprecision approach procedures, and further, to assure adequate consideration of the efficiency effects of potential LORAN-C approaches. Since this action is expected to have no cost impact to the public and have a positive, although unquantifiable, benefit, further regulatory evaluation is unnecessary.

International Trade Impact Analysis

This rule has no effect on the sale of foreign aviation products or services in the United States or on the sale of American products or services in foreign countries.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Government regulations. The RFA requires agencies to review rules that may have "a significant economic impact on a substantial number of small entities."

This final rule provides a guide for internal FAA management in the establishment and discontinuance of LORAN-C nonprecision approaches. It is not expected to have cost impact; therefore, FAA certifies that this final rule will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

Federalism Implications

The regulations herein are not expected to have substantial direct effects on the States, in the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this regulation does not have sufficient federalism implications to warrant the preparation of Federalism Assessment.

Conclusion

Since the regulation contained in this FAA document is expected to impose only a minimal administrative cost of the FAA, the estimated benefits are expected to exceed the estimated costs of their implementation. For the reasons discussed above, this regulation is not expected to have significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required. In addition, for the same reasons, the rule is not "major" under Executive Order 12291 and is not a "significant rule" under DOT Regulatory Policies and Procedures (44 11034; February 26, 1997).

List of Subjects in 14 CFR Part 170

Air traffic control, Navigation (air).

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 170 of the Federal Aviation Regulations (14 CFR part 170) as follows:

PART 170—ESTABLISHMENT AND DISCONTINUANCE CRITERIA FOR AIR TRAFFIC CONTROL SERVICES AND NAVIGATIONAL FACILITIES

1. The authority citation for part 170 is revised to read as follows:

Authority: 49 U.S.C. app. 1343, 1346, 1348, 1354(a), 1355, 1401, 1421, 1422 through 1430, 1472(c), 1502, and 1522; 49 U.S.C. 106(g).

2. Part 170 is amended by adding subpart C consisting of §§ 170.21, 170.23, and 170.25 to read as follows:

Sec.
170.21 Scope.
170.23 LORAN-C establishment criteria.
179.25 LORAN-C discontinuance criteria.

Subpart C—LORAN-C

§ 170.21 Scope.

This subpart sets forth establishment and discontinuance criteria for LORAN-C.

§ 170.23 LORAN-C establishment criteria.

(a) The criteria in paragraphs (a)(1) through (a)(6) of this section, along with general facility and navigational aid establishment requirements, must be met before a runway can be eligible for LORAN-C approach.

(1) A runway must have landing surfaces judged adequate by the FAA to accommodate aircraft expected to use the approach and meet all FAA-required airport design criteria for nonprecision runways.

(2) A runway must be found acceptable for instrument flight rules

operations as a result of an airport airspace analysis conducted in accordance with the current FAA regulations and provisions.

(3) The LORAN-C signal must be of sufficient quality and accuracy to pass an FAA flight inspection.

(4) It must be possible to remove, mark, or light all approach obstacles in accordance with FAA marking and lighting provisions.

(5) Appropriate weather information must be available.

(6) Air-to-ground communications must be available at the initial approach fix minimum altitude and at the missed approach altitude.

(b) A runway meets the establishment criteria for a LORAN-C approach when it satisfies paragraphs (a)(1) through

(a)(6) of this section and the estimated value of benefits associated with the LORAN-C approach equals or exceeds the estimated costs (benefit-cost ratio equals or exceeds one). As defined in § 170.3 of this part, the benefit-cost ratio is the ratio of the present value of the LORAN-C life-cycle benefits (PVB) to the present value of LORAN-C life-cycle costs (PVC):

$$PVB/PVC \geq 1.0$$

(c) The criteria do not cover all situations that may arise and are not used as a sole determinant in denying or granting the establishment of non-precision LORAN-C approach for which there is a demonstrated operational or air traffic control requirement.

§ 170.25 LORAN-C discontinuance criteria.

A LORAN-C nonprecision approach may be subject to discontinuance when the present value of the continued maintenance costs (PVCM) of the LORAN-C approach exceed the present value of its remaining life-cycle benefits (PVB):

$$PVB/PVCM < 1.0$$

Issued in Washington, DC on August 4, 1993.

Joseph M. Del Balzo,
Acting Administrator.

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