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for FAR Parts 25, 29, 37,
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Title 14—AERONAUTICS AND SPACE

Chapter I—Federal Aviation Adminis- tration, Department of Transportation

[Docket No. 10015; Amdt. Nos. 25-29; 29-3;
37-31; 91-95; 121-79; and 135-29]

EMERGENCY LOCATOR TRANSMITTERS

These amendments to Parts 25, 29, 37, 91, 121, and 135 of the Federal Aviation Regulations implement section 31 of Public Law 91-596, achieve uniformity in the terminology used therein, and update requirements and standards for the manufacture, installation, airworthiness, and operation of emergency locator transmitters required on airplanes operated in air commerce. In addition, the current requirements of Part 121 (also applicable to air travel club operations conducted under Part 123) concerning emergency signalling devices required for extended over-water operations and operations over uninhabited terrain, are updated. Finally, a requirement for an emergency locator transmitter for extended over-water operations has been added to Part 135.

These amendments are based on a notice of proposed rule making, Notice 71-7, published in the *FEDERAL REGISTER* on March 13, 1971 (36 F.R. 4878). Nearly 200 commentators responded to the notice, and based on the views they expressed and further examination by the FAA, several changes have been made to the notice. The analysis of the comments has been broken down into three broad categories: Those comments which are general in nature or which speak to the general objective of the notice; those comments submitted in direct response to the FAA request for comments addressed

to the 75 milliwatt power standard; and those comments making specific recommendations or stating specific objections. The changes made by the FAA independent of any public comment will be discussed within this framework.

General comments. Approximately 50 commentators objected to any requirement for emergency locator transmitters for the following reasons: Past experience with such locator devices indicates that they seldom prove helpful in locating a lost airplane and thus their benefit does not justify their cost and weight; installation and use of an emergency locator transmitter should be optional with the operator—those who are willing to take the risk of operating without a transmitter should be allowed to do so; required use of the transmitter would generate a tremendous search and rescue workload, which combined with false alarms, would cause air rescue personnel to lose their effectiveness and enthusiasm; emergency locator transmitters are not reliable; and finally, there is no need for an emergency locator transmitter if the pilot files a flight plan and follows it, because when an emergency occurs, he has ample time to notify the nearest FAA facility and report his position.

As pointed out in the notice, this regulatory action has been taken in response to a mandate from Congress (Public Law 91-596, amending section 801 of the Federal Aviation Act of 1958 (49 U.S.C. 1301 et seq.)), and as such, the FAA has no authority to grant exemptions from that section. With regard to the matter of reliability, the FAA has no reason to believe that emergency locator transmitters designed to meet the standards adopted herein would not be adequately reliable. With regard to flight plans, the FAA believes that rather than being a substitute for an emergency locator transmitter, the flight plan can be an effective adjunct to such equipment. To this end the

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agency is considering rule making action to require the use of flight plans for all operations with large U.S. registered civil airplanes and all turbine powered multi-engine U.S. registered civil airplanes when operated in the United States, and which are not subject to Part 121, 135, or 137.

Numerous comments were received recommending that the FAA exempt certain classes of airplanes, which were not exempted by Public Law 91-596 nor the proposals in Notice 71-7, from the emergency locator transmitter requirements. Specifically, it was recommended that the following be exempted: private airplanes; air taxi airplanes; amateur-built airplanes; antique airplanes; turboprop and multi-reciprocating-engine airplanes operated by a two-man crew; airplanes undergoing "export ferry"; airplanes that carry ATC transponders; and airplanes that do not operate over mountainous areas, sparsely populated areas, nor wide expanses of water.

As previously mentioned, the FAA does not have the power to expand the class of airplanes exempted by Public Law 91-596 from compliance with the emergency locator requirements of that law. This also applies to the comment of the ATA which contends that it was the intent of the statute to exempt all operations conducted by air carriers, not just operations conducted under Part 121, and thus recommends that charter operations, training flights, and ferry flights, when those operations are conducted in propeller-type airplanes, be exempt as well.

Several comments were received recommending that the FAA adopt a rule requiring that flight crewmembers of air carrier and military aircraft monitor the emergency frequencies during flight time, and that each emergency signal received be reported to the nearest FAA facility. Without such a requirement, these commentators contend, a requirement for an emergency locator transmitter is unjustified.

Although the air carriers have indicated a willingness to monitor emergency frequencies, and most military aircraft are equipped for this purpose, the FAA does not believe that requirements in this regard are necessary. Aircraft routinely used for search and rescue are equipped for homing in on emergency locator transmitter signals. In addition, emergency frequencies will be monitored in all FAA flight inspection aircraft and appropriate monitoring capability is planned for future installation in certain strategic Forest Service watchtowers. The FAA considers this monitoring capability to be adequate for the present. Additional rule making may be undertaken, however, if experience in service indicates the need for supplementary monitoring.

The proposal to bring the emergency locator transmitter under the Technical Standard Order (TSO) procedures of Part 37 was objected to by several commentators. These commentators recommended that emergency locator transmitters should be tested by independent test laboratories, the National Bureau of

Standards, or the FAA, rather than permit the manufacturer to, in effect, certify his own product. It was contended that under the TSO system, manufacturers will use incorrect measuring techniques and tamper with test results.

The FAA does not agree with this comment. The TSO system has been applied successfully in the past to hundreds of manufacturers of such airborne electronic equipment as radio navigation equipment, ATC transponders, radar altimeters, and various flight instruments. There is no reason to believe that it cannot be applied equally as well in this case. Although the FAA, under the TSO system, does not require testing by an independent laboratory, it does review the technical data submitted by the applicant (manufacturer), and also monitors quality control to ensure compliance with the standard.

Two commentators requested that the proposed emergency locator standards be revised, or replaced, in order to accommodate their own emergency signaling concepts. On the basis of the information submitted by these commentators, the FAA does not believe that there is sufficient justification to change the standards applicable to emergency locator transmitters, which were developed after exhaustive discussions among industry and government organizations.

Several commentators pointed out that FCC rules require that each airplane fitted with an emergency locator transmitter must also be equipped with a radio transmitter and receiver that operate on at least one other frequency. In addition, the airplane must have an FCC Station license and the operator must have an FCC operator's license. Consequently, these commentators contend, they will have to install, in addition to the emergency locator transmitter, expensive radio equipment that FAA does not require and that they do not need. Further, they would have to acquire both a station and an operator's license and pay the associated fees.

The FAA has been informed by the FCC that it plans to issue and amendment to its regulations, before the earliest effective date of Public Law 91-596 (December 30, 1971), that would permit the installation of an emergency locator transmitter in an airplane, without requiring the operator to obtain an FCC Station license or to acquire additional radio equipment, if the transmitter does not have voice transmission capability. This FCC rule making should solve most of the problems posed by these commentators. An operator's license would still be required, however.

Several commentators pointed out that the notice made no mention of a voice communication capability in the emergency locator transmitter, and contended that such capability should be made mandatory, or at least permitted. These commentators believe that this is a vital consideration, for it would enable a downed pilot to direct search and rescue aircraft to the scene and communicate his needs to them. The FAA does not

agree that a voice communication capability is an essential feature which warrants rule making action. However, the FAA has no objection to an optional feature such as the voice capability, provided all required standards adopted herein are met. Prospective users of emergency locator transmitters having this capability should consult FCC regulations concerning voice-modulated transmitters.

Several commentators expressed concern that emergency locator transmitters might be activated inadvertently and suggested various ways of preventing such inadvertent activation, or of detecting it quickly after it occurs. The FAA is reviewing these suggestions to determine whether further rule making should be undertaken.

There were numerous other comments of a general nature received which were outside the scope of the notice and thus are not discussed herein. However, it should be pointed out that as the state of the art develops with regard to emergency locator transmitters, the FAA will undertake additional rule making actions to implement necessary changes in technology and practice.

The 75 milliwatt power standard. Notice 71-7 requested comments addressed specifically to the 75 milliwatt peak effective radiated power standard developed by the Radio Technical Commission for Aeronautics (RTCA) for emergency locator transmitters. As stated in the notice, the 75 milliwatt standard was proposed because it would provide a transmission range of 50 nautical miles even where conditions at the site were unfavorable. Twenty comments were received in response to this point, and 14 recommended adoption of the standard, two recommended an increase in power, and four recommended a decrease. These comments are discussed below.

Those commentators recommending an increase in power contended that lost airplanes are often far off course thus necessitating a signal strong enough to be received by ground stations (to this point, one commentator recommended a power standard of 300 milliwatts, the other a power standard of 500 milliwatts). It was stated that an increase to 500 milliwatts, combined with a 1:3 on-off duty ratio for the transmitter would provide maximum range per unit battery weight.

Those commentators recommending a decrease in power contended, generally speaking, that a lower value for peak effective radiated power would reduce the cost and size of the transmitter. Thus, one commentator stated that reduction in power to 7.5 milliwatts would result in a 10-fold increase in transmission duration for a given battery weight or, alternatively, in a 10-fold reduction in battery weight for a given duration of transmission. Such a transmitter would provide a 16-mile transmission range which would be adequate for the purpose. For similar reasons, other commentators recommended a reduction to 25 milliwatts, or adoption of the lower radiated power level currently specified by Canadian regulations.

The FAA has carefully reviewed all comments submitted in regard to this matter, as well as FAA findings, and has concluded that the 75 milliwatt power standard represents a reasonable compromise and is realistic with regard to effectiveness, cost, and weight.

Comments of specific recommendation. Numerous specific recommendations and objections were made in response to Notice 71-7, and those within the scope of the notice are discussed below in the order the proposals on which they are based appeared in the notice, and, where possible, in connection with specific section numbers.

Sections 25.1415(d) and 29.1415(d). Three commentators recommended that more than one survival type emergency locator transmitter be required on aircraft certificated for ditching. One recommended that two transmitters be carried since ICAO Annex 6 requires two. Another recommended that there be one for each life raft because seldom are all life rafts deployed after a ditching. Based on the service record to date, the FAA does not believe that it is necessary to require that more than one life raft be equipped with a survival type emergency locator transmitter.

Section 37.200(b)(1). Several commentators noted that the proposed standard for personnel type emergency locator transmitters (DO-145) permits the use of self-contained antennas that must be manually deployed. The point was made that should the occupants be incapacitated, or merely forget to deploy the antenna, a sharp reduction in the strength of the signal would result. Moreover, this kind of personnel emergency locator transmitter, in its normal stowed position, is screened by the aircraft's skin such that its signal strength is further reduced, and the antenna radiation pattern is distorted. To remedy these situations, it was recommended that these transmitters meet the radiated power output, and omnidirectional radiation pattern requirements of DO-145, as mounted in the airplane. Another recommendation suggested the FAA prohibit the use of antennas that must be deployed.

Self-contained antennas that must be manually deployed have been an accepted feature of hand-held communication receivers and transmitters for many years. The FAA believes that only a small percentage of pilots would be unable, or forget, to deploy the antenna after a crash landing. However, even in that case, tests have indicated that emergency locator transmitters located inside the airplane, with antennas either not deployed or only partially deployed, are still capable of a measure of useful performance. Furthermore, portable emergency locator transmitters with protruding fixed antennas may be a hazard to persons in the crash situation.

Section 37.200—Paragraph 2.2.1 of DO-145, 146, and 147. It was recommended that the frequency requirements be revised to permit operation on either 121.5 or 243.0 MHz, because many emergency locator transmitters currently in

service operate on only one of these frequencies, and this is sufficient. The FAA believes that transmission on both frequencies is essential to successful operation of the emergency locator system, which is dependent upon full utilization of available civil and military monitoring capability.

Section 37.200—Paragraph 2.2.2 of DO-145, 146, and 147. With regard to the type of signal modulation required, it was recommended that an upward sweep be permitted as well as the proposed downward sweep because the latter is more costly and because both are readily identifiable and in fact, sound alike.

The proposal for a downward sweep tone was based upon an FAA determination that such a tone would provide a unique, recognizable, attention-getting signal that could be distinguished from background noise. We believe that to permit an upward sweep as well would only serve to lessen these advantages. The FAA is not persuaded that an upward sweep would cost less, nor that it sounds the same as a downward sweep.

Section 37.200—Paragraph 2.2.3 of DO-145, 146, and 147. It was recommended that the minimum modulation duty cycle be reduced from 33 percent to 10 percent the commentator contending that the higher standard serves no useful purpose, but merely increases cost; whereas the lower standard would not adversely affect the performance of the transmitter. Another commentator suggested that an average modulation duty cycle be prescribed with a standard between 25 percent and 75 percent without specifying an instantaneous modulation duty cycle; or, alternatively, an average modulation duty cycle between 33 percent and 67 percent with an instantaneous modulation duty cycle between 10 percent and 90 percent. It was contended that such standards would result in an increase in power of weak signals, and an increase in the effectiveness of search operations because it would be apparent when the signal strength is increased or decreased.

The proposed modulation duty cycle was developed by the RTCA and the FAA as a practical compromise among several possibilities, such as those mentioned by the commentators. From the information submitted by these commentators, the FAA is not persuaded that any of the standards suggested by them would provide any significant improvement.

Section 37.200—Paragraph 2.2.4 of DO-145, 146, and 147. Several commentators contended that cost could be reduced and battery life increased if the transmitter duty cycle requirement were revised to permit interruption of the carrier. One commentator suggested a transmitter duty cycle of between 100 percent and 33 percent, with an "off" period not to exceed 0.75 seconds. Another suggested that the "on" period be not less than two complete audio sweeps, and that the "off" period not exceed 2 seconds, or two times the "on" period, whichever is less. This commentator contended that this type of interrupted transmission has been proven to be more

effective than the conventional swept-tone signal and that the FAA has recognized this in TSO-C61a.

This standard was selected from several alternatives by the RTCA, with FAA participation. It was found that these "interrupted-carrier" transmissions lower the reliability of the emergency locator transmitter and complicate the task of the search receiver, thereby reducing the effectiveness of the transmitter. On the basis of the information submitted, the FAA is not persuaded that other transmitter duty cycles would improve transmitter performance.

Section 37.200—Paragraph 3.1 of DO-145. One commentator recommended that the low operating temperature be reduced from 0° C. to -20° C. since personnel type emergency locator transmitters are to be attached to the airplane (proposed § 91.52(b)(2)) as is the case with automatic-type transmitters which are required to meet the -20° C. standard.

The FAA agrees that personnel type emergency locator transmitters may be required to operate at temperatures below that prescribed in DO-145. Accident records indicate that a significant number of accidents have occurred in ambient temperatures between 0° C. and -20° C. To assure effective performance in foreseeable conditions, the "Low Operating Temperature" requirement has been changed to -20° C., and a concomitant change to the low temperature required for the temperature variation test, as prescribed in DO-145, from -20° C. to -40° C. has been made.

Section 37.200—Paragraph 3.1 of DO-145, 146, and 147. Another recommendation concerning temperature standards suggested that the maximum high operating temperature specified in this paragraph be increased from +55° C. to +71° C., because, it was contended, solar heating can raise the temperature 35° C. above the ambient. The FAA considers the +55° C. figure to be realistic and reasonable based on the probability of exposure to high temperature in service.

Section 37.200—Paragraph 3.4(a) of DO-145, 146, and 147. One commentator recommended that the FAA replace the proposed maximum g. level with the military standard, Curve IIIA of Mil-E-5400, Fig. 2, because the proposed maximum g. level was unnecessarily high, and because the military standard is adequate in military airplanes, which have vibration stresses significantly higher than civil airplanes.

The proposed maximum g. values were developed to insure reliable operation after prolonged exposure to severe vibration and shock environments. The FAA has no reason to believe that the vibration environment in civil aircraft is necessarily less severe than that in military aircraft, thereby justifying a lesser standard. The FAA's views in this regard apply to other comments discussing the g. standard for other types of transmitters.

Section 37.200—Paragraph 1.9(a) of DO-147. It was recommended that the

prohibition against sharp edges or projections on automatic-fixed type emergency locator transmitters be deleted because such transmitters must be installed in the tail section of the airplane where it is not accessible to the cockpit. Regardless of the location where the emergency locator transmitter is attached, the FAA believes that a prohibition against sharp edges and projections is necessary for all transmitters. Although fixed and deployable automatic type transmitters must be attached as far aft as practicable, there is no assurance that they would not be located where they could injure occupants or damage inflatable survival equipment.

Section 37.200—Paragraph 3.5 of DO-147. One commentator recommended that the temperature range specified in this paragraph be changed from a range of -40°C . to $+55^{\circ}\text{C}$. to a range of -20°C . to $+55^{\circ}\text{C}$. to make it consistent with paragraph 3.1 which prescribes this latter range as the operating temperature range for the subject transmitters. The FAA does not agree with this comment, because the test requirements of paragraph 3.1 are different than those of paragraph 3.5 with a corresponding difference in temperature requirements.

Section 37.200—Appendix A, Part II, Section T-2, Step 5a of DO-145, 146, and 147. A commentator recommended that the transmitter peak effective radiated power test prescribed in this step be revised to permit the use of a quarter-wave-length element surrounded by three quarter-wave-length radials spaced 120° around its base. It was contended that this arrangement would match the 50-ohm output impedance of most signal generators, whereas the arrangement prescribed in Step 5a would have a mismatching impedance of 25-30 ohms.

The FAA sees no compelling reason to adjust its test procedure to facilitate an impedance match with signal generators. Any mismatch that exists must be accounted for under referenced provision in DO-145, 146, and 147.

Section 37.200(c)(1). Several commentators recommended that the additional performance standards for automatic activation prescribed in this proposal be deleted entirely. A discussion of the various reasons for this position, and the corresponding FAA response follows. Those comments already discussed which are applicable to this proposal are not dealt with further.

It was contended that the automatic activation feature on most existing emergency locator transmitters is either too "tender" or too "stiff". In the case of the former, false alarms result; in the case of the latter, the transmitter may not be activated in a crash. In addition, experience in Alaska, it is argued, has shown that g-switches are activated by moderately hard landings, with the resulting operation of the transmitter going unnoticed by the pilot, thus running down the battery and rendering the transmitter useless.

The proposed automatic activation standard was developed after a thorough

examination of past service experience with devices of this kind. The FAA believes that emergency locator transmitters designed to that standard will not be activated during a hard landing, nor will they fail to activate during a crash landing. However, to help prevent inadvertent or accidental activation, a requirement for a switch guard has been added in new paragraphs (c)(4) and (5). The guard is required for all personnel, automatic portable and survival type emergency locator transmitters, which use a manual activation switch. In addition, the guard is required for all automatic deployable type emergency locator transmitters using a remote activation switch.

Canadian aviation authorities have recommended that the emergency locator transmitter not be turned on for 24 hours after a crash because it would take that long before it could be determined that an airplane was lost or where it might be. The FAA does not agree. In many areas, the emergency signal could be detected by aircraft flying normal routes and a search could be initiated. A 24-hour delay in some cases could prove fatal.

Some commentators contended that an automatic portable emergency locator transmitter, as described in DO-147, could adequately perform the functions of an automatically activated personnel type emergency locator transmitter, and thus there is no need for the latter. In this regard, it should be noted that the standards, as proposed in Notice 71-7, for automatic portable type emergency locator transmitters are, in several respects, more severe than those proposed for the personnel type. The FAA sees no justification for applying these higher standards to all users, as suggested.

In addition to those comments which recommended that the standards of § 37.200(c)(1) be deleted entirely, several comments on specified proposals in § 37.200(c)(1) were received. A discussion of them follows.

Several commentators pointed out the typographical error in paragraph (c)(1)(i) prescribing a force of $5.0 \pm 2.0\text{ g}$. The correct force standard should read 5.0^{+2}_{-0} g , and this is adopted herein. The FAA has found, after considerable experience with crash-activated devices, that an inertia limit below 5 g. leads to "nuisance tripping" during hard landings or when the taxiway is rough.

Two commentators recommended that the time duration standard of 11 milliseconds prescribed in paragraph (c)(1)(i) be changed to 11^{+5}_{-0} milliseconds to provide a practical manufacturing tolerance. The FAA agrees with this comment, and accordingly paragraphs (c)(1)(i) and (iii) have been changed to prescribe an 11^{+5}_{-0} millisecond standard. In addition, it has been necessary to make a similar change, by way of exception in § 37.200(b)(2)-(4), to the standard as prescribed in DO-145, 146, and 147.

Several commentators recommended that a "g-versus-time" curve, with a defined minimum g. value be established in place of the limits proposed in § 37.200(c)(1)(i), contending that impact switch characteristics necessitate a greater number of force/time points for design. It was argued that this type of standard would define the desired severity of crash irrespective of airplane structure, location of the emergency locator transmitter, or kind of crash.

The "g-versus-time" alternative was considered by the FAA, but we concluded it would be too restrictive and unnecessary to provide a minimum level of safety. The g. value proposed by these commentators could lead to "nuisance tripping."

Another commentator recommended that § 37.200(c)(1) be revised to permit use of "deformation sensors", installed in the nose, wing, or other vulnerable part of the airplane. Such sensors, it was contended, have been used successfully in many military applications. The FAA agrees with this comment, pointing out that the note following paragraph 2.3.1 of DO-147 permits this alternative means of activation. Accordingly, the substance of that note has been added to § 37.200(c)(1).

Another alternative for activation, based on the combined use of a ram-air switch and an impact switch, was recommended. Under this arrangement, the emergency locator transmitter would transmit only when the impact switch is activated following flight of the aircraft, thus reducing, the commentator contended, the possibility of inadvertent activation. The FAA considers this approach unnecessarily complex. Moreover, it appears that it could prevent needed activation of the transmitter in some circumstances.

Section 37.200(c)(2). Numerous comments were addressed to the proposal requiring a manually activated test circuit, and the majority of them recommended deletion of this requirement. The points raised in these comments and the information submitted with them indicate that due to unnecessarily complex design and functional problems, and questionable benefits to the user, this requirement is not practical at this time. Accordingly, proposed § 37.200(c)(2) has been deleted.

Section 37.200(c)(3). Several commentators, largely manufacturers of emergency locator transmitters, responded to the marking proposals of this subparagraph, and the majority of them recommended they be deleted. Generally speaking, the bases for this position were the problems involved with obtaining battery manufacturer cooperation, and the fact that the required dates may mislead the user because they may not be a true indicator of available battery power. Upon examination of the points raised by these commentators, the FAA agrees that a requirement for the marking of date of manufacture is of questionable value, and believes further, that the marking requirements of § 37.200(f)(1) (battery replacement

date) and § 91.52(d) are adequate to insure operable power sources. Accordingly, the first sentence of § 37.200(c)(3), as proposed, has been deleted.

Several commentators addressed recommendations to the proposed requirements of § 37.200(c)(3) regarding battery electrical connections, contending that there is no reason why spring contacts (prohibited in the notice), if properly designed for this application, could not be used. Furthermore, it was stated that special connection requirements serve only to increase battery cost and thereby make it more difficult to keep spares available.

The FAA is persuaded that battery connections which rely on spring force alone are not necessarily subject to failure. Accordingly, the last sentence of § 37.200(c)(3), as proposed, has been deleted.

Section 37.200(d). One commentator recommended that this paragraph recognize other environmental testing techniques which meet or exceed the standards prescribed in DO-147 and referenced in this section. In this regard, it should be noted that § 37.9 permits a manufacturer to deviate, upon application and approval, from any performance standard prescribed by a TSO. Therefore, it is unnecessary to incorporate this commentator's recommendation in paragraph (d).

Section 37.200(f)(1). Several commentators recommended that the marking requirements proposed in this subparagraph be deleted, and the operator of the airplane merely be required to post battery replacement schedules in the airplane logbook. It was contended that some emergency locator transmitters are externally mounted thus resulting in exposure to the elements causing markings to fade. In addition, these commentators stated that because many transmitters are mounted internally in inaccessible places, checking would be difficult, and the tendency of many operators would be to neglect the battery replacement requirement.

The FAA anticipates no difficulty with this requirement. Most emergency locator transmitters will be internally mounted and visible. In the case of externally mounted transmitters, markings can be designed to remain legible even when exposed to the weather. Those transmitters that are not visible will be examined during normal airplane maintenance.

Two commentators recommended that nickel-cadmium rechargeable batteries and water-activated batteries be expected from the requirements of paragraph (f)(1) because, with regard to the former, they have an indefinite shelf life, and with regard to the latter, their condition is not time-related.

The FAA agrees that water-activated batteries have, for all practical purposes, an unlimited shelf life. Furthermore, it appears that this requirement should be qualified to take into account rechargeable batteries. Accordingly, § 37.200(f)(1) has been revised to except emergency locator transmitters with water-

activated batteries from the battery-replacement-date marking requirement. In addition, § 37.200(f)(1) now permits those emergency locator transmitters using rechargeable batteries to be marked with a "recharging" date rather than a "replacement" date. This revision has necessitated a change in proposed § 37.200(g)(2), which will be discussed in connection with that section.

Section 37.200(f)(2). One commentator recommended that this subparagraph be revised to indicate that it does not apply to components that are mechanically connected to the main emergency locator transmitter unit, because, the commentator contended, there is no reason to identify such components. The FAA does not agree. The language used in this subparagraph regarding the marking of separate components has been used in several TSO standards without difficulty, and the agency considers it adequate for the purpose of requiring manufacturers to permanently set forth certain basic information.

Section 37.200(g)(2). With regard to the battery useful life requirement of this subparagraph, one commentator recommended that the useful life be established by the battery manufacturer rather than the transmitter manufacturer, for the reason that the former is best qualified to provide data on the useful life of his product.

Section 37.200 is addressed to emergency locator transmitter manufacturers, and not to battery manufacturers and the FAA does not consider it practicable to divide TSO authorization between the two. Finally, the transmitter manufacturer can be expected to be adequately familiar with the useful life of the battery he is using.

As mentioned previously, it has been necessary to make certain minor revisions to accommodate rechargeable batteries. Accordingly, this proposed subparagraph has been revised to recognize rechargeable batteries by basing their useful life on the life of the charge.

Section 37.200(g)(5). One commentator contended that the language of this requirement concerning data relating to actual equipment performance could be interpreted to require testing to destruction, particularly with respect to shock, vibration, and high temperature. The FAA agrees that testing to destruction should not be required solely to obtain data for the equipment data sheet. Accordingly, proposed § 37.200(g)(5) has been revised to require data sheets specifying the equipment's typical actual performance. The intent of this provision, as well as § 37.200(h) which refers to it, is to require that the equipment data sheet contain actual performance data for equipment of that type, not for each individual unit. As such, the manufacturer is permitted to determine what the performance characteristics are for his particular type of equipment, without being required to test each unit, or to test them to destruction.

Section 37.200(h). One commentator recommended that the provision requiring the transmitter manufacturer to fur-

nish a copy of the installation instructions, and of the data sheet, with each unit revised to accept transmitters furnished in bulk to aircraft manufacturers or aircraft fleet operators. It was argued that this requirement is appropriate only for transmitters that are sold individually.

The FAA disagrees. If bulk transmitter deliveries were excepted from this requirement there would be no assurance that the ultimate user would get a copy of the data sheet required in § 37.200(g)(5). The bulk purchaser could resell the transmitter in small lots or individually.

Section 91.52(a). One commentator recommended that the requirement for an emergency locator transmitter be extended to the more than 4,000 rotorcraft now in service. This comment is beyond the scope of Notice 71-7; however, it should be noted that the FAA is currently examining this area to determine if further rule making is warranted.

With regard to the compliance date requirements of paragraph (a)(2), two commentators stated that the 3-year timetable prescribed in Public Law 91-596 should be applied to operations conducted under Part 135, rather than the 1 year proposed in the notice. It was contended that this time was necessary in order to adequately provide for the design of transmitter installations, particularly the antenna installation.

The FAA agrees that the effective date should be the same for all operations covered by § 91.51(a)(2), and that provision has been revised accordingly.

Section 91.52(b). Several commentators recommended that the words "a personnel type or" be deleted from paragraph (b)(4) because such transmitters, it was contended, do not meet the intent of Public Law 91-596 since they require manual erection of the antenna and may fail to operate below 0° C. Furthermore, it was argued that in order to insure that transmissions are omnidirectional with maximum signal strength, the antenna must be in place and operable in the event of a crash.

The FAA does not agree that use of the personnel type emergency locator transmitter should be prohibited for operations other than those conducted under Parts 121, 123, or 135. Standards for many classes of general aviation equipment, although providing an adequate level of safety, are generally less stringent than those applicable to equipment required for air carriers and commercial operators.

One commentator recommended that only nonautomatic personnel type emergency locator transmitters be required, arguing that if the airplane were totally destroyed the transmitted would be also. The commentator described several crash configurations and stated that in those situations where the airplane was not destroyed, the normal airplane communication system or the nonautomatic personnel type transmitter would prove to be the most effective emergency devices. It was the feeling of this commentator

that the personnel type is more adaptable to more given situations.

The FAA does not agree that the personnel type emergency locator transmitter, whether automatic or nonautomatic, should be specified for all operations. If the airplane suffers even minor damage, the electrical system of the airplane might be rendered inoperative, and thus normal communications equipment would be of no value. Even if left intact, use of the electrical system could be dangerous due to the possibility of a fuel leak. In addition, many airplanes are not even equipped with normal communications equipment.

The FAA is aware that externally mounted transmitter antennas may be damaged in some crash situations, as pointed out by this commentator; however, the probability that they will remain intact, or at least functional, is good.

Another commentator recommended that the requirement that the transmitter be attached to the airplane, appearing in paragraphs (b) (1)-(4), be deleted. It was argued that in the case of fleet operators who operate only a fraction of their fleet at any given time, this requirement would be unnecessary and burdensome.

In this regard, it should be noted that § 91.52 prohibits the operation of airplanes without an emergency locator transmitter attached. Consequently, the transmitter is not required to be attached when the airplane is in the hangar or parked on the ramp. Therefore, the operator need not attach the transmitter to the airplane until it begins its taxi run preparatory to flight. This will permit the operator to use several transmitters for his entire fleet.

Finally, one commentator recommended use of the word "installed" rather than "attached" because that was the word used in Public Law 91-596 and because it is more definitive. The FAA selected the term "attached to" rather than "installed on" to insure that the emergency locator transmitter is subjected to crash-inertia forces and is thereby automatically activated. The term "installed on" could be erroneously interpreted to permit the operator to carry the transmitter on his person, or on the seat next to him, where it might not be subjected to the full inertia force in a crash.

Section 91.52(c). Three commentators recommended revision of this proposal to require that personnel type and automatic portable type emergency locator transmitters, also be mounted as far aft as practicable because reliability would be comprised if installed in a nonaft location. Furthermore, it was contended that aft mounting is required by the statute, and no justification exists for excepting any type of transmitter from the requirement.

The FAA considers ready accessibility to be an important safety consideration with regard to personnel type and automatic portable type emergency locator transmitters, and thus, a forward location is permitted for them.

One commentator recommended that the FAA require emergency locator transmitters to be installed "in a manner that complies with the applicable shock requirements of § 37.200(b)." The commentator contended that the proposed language "minimize the probability of damage" was vague, whereas the various RTCA documents referenced in § 37.200 (b) specify a suitable criterion for shock resistance.

This requirement is objective, covering many different kinds of attachment methods in various airplanes. On the other hand, § 37.200(b) applies only to the emergency locator transmitter itself and is not related to methods of attachment. This type of requirement is useful in this situation because it permits the exercise of engineering judgment in the field. The proposed language appears elsewhere in the Federal Aviation Regulations and has caused no problems in the past, nor do we anticipate any now.

Section 91.52(d). Several commentators recommended that the "50 percent of useful life" battery replacement criterion be deleted in favor of a requirement that the battery be replaced "at least during each annual inspection." Another commentator suggested that the battery be replaced "every year or at such shorter intervals as is determined by the battery manufacturer's guaranteed useful life." These commentators contended that exposure to prolonged high temperature (as when the airplane is parked in the sun) causes rapid deterioration of the battery, which may render the emergency locator transmitter inoperative before the 50-percent shelf life date is reached.

The FAA does not agree that the alternatives suggested would serve the purpose more effectively than the agency's "half-life" proposal which takes into account probable exposure to temperature extremes and typical decrease in battery capacity when the transmitter is not in use. However, it has been necessary to make a minor revision to conform with previously discussed changes to § 37.200(f) (2) and (g) (2) with regard to rechargeable batteries.

Section 91.52(e). One commentator recommended that the proposals in this paragraph to permit the ferrying of airplanes for the purpose of installing or repairing a transmitter, be deleted and replaced with a 30-day grace period. It was argued that under the proposal, operators in remote areas would have to ground their airplanes for long periods while awaiting repair of the emergency locator transmitter.

The FAA does not agree that the suggested 30-day grace period is necessary. As is the case with other required equipment, ferry privileges are available for those operators affected by these requirements. In addition, it is expected that relatively few aircraft will be affected by the December 30, 1971, compliance date, and for those that must be equipped by the December 30, 1973, compliance date, we expect service facilities for emergency locator transmitters to be widely available by that time.

Section 91.52(f). Several commentators recommended that proposed paragraph (f) of § 91.52 excepting training flights conducted within a 20-mile radius of base be deleted, stating that once airborne an airplane not equipped with a transmitter, pursuant to this exception, could go beyond the 20-mile limit. Furthermore, it was contended that often the area within such a radius could be such that location of a downed aircraft would be difficult without the emergency locator transmitter. Finally, these commentators expressed concern that the exception could be used as a loophole by those who wish to operate without the transmitter.

The FAA recognizes that this exception (which is expressly prescribed in new section 601(d) (2) of the Federal Aviation Act of 1958) may present some administrative difficulty, but will defer regulatory action thereon until service experience indicates what, if any, problems may arise.

One commentator recommended that all air carrier aircraft be required to carry an emergency locator transmitter, contending that despite radar surveillance, a number of downed air carrier aircraft were not quickly located.

Except in the case of air taxi and charter airplanes, the FAA does not believe that an emergency locator transmitter requirement can be justified at this time for all airplanes used in air transportation. These airplanes, operated under Part 121, are routinely flown under the operational control of the air carrier by means of flight following procedures, and the large majority of these flights are conducted in accordance with flight plans, along established routes, and into airports that are near high density population areas. In addition, most of these airplanes are equipped with ATC transponders which can be used to signal in an emergency.

Section 91.52(g). The proposals in this paragraph received numerous comments which, generally speaking, recommended that the FAA allow the continued use of emergency locator transmitters approved under existing TSO-C61a. The following "grandfather clause" recommendations were made: Permit the use of transmitters approved under TSO-C61a before the effective date of this amendment; permit the use of those so approved and purchased before the effective date of this amendment; and permit the use of transmitters approved by the State of California. In addition, one commentator suggested a cutoff date for the sale of transmitters that do not meet the proposed standards. In support of these recommendations, the commentators made the following arguments: Several thousand general aviation aircraft are currently equipped with transmitters approved under TSO-C61a, and the operators of these aircraft relied on the assumption that they were in compliance with an acceptable FAA standard. As such, these persons are entitled to a reasonable transition period in which to comply with the new standards. Furthermore, there is no basis for wholesale condemnation of currently used emergency

locator transmitters, even where they are deficient in some respects. In fact, some exceed the requirements in TSO-C61a and approach the proposed standards in all essential respects.

The FAA recognizes the need for an adequate transition period and agrees that appropriate relief is warranted. Accordingly, proposed § 91.52(g) has been revised to permit, until December 30, 1975, the use of an emergency locator transmitter that does not meet the requirements of § 91.52, provided that the transmitter: Has been installed and approved before the effective date of this amendment; has been manufactured under a TSO Authorization issued against TSO-C61a; transmits simultaneously on 121.5 and 243.0 MHz; and after the applicable effective date, prescribed in § 91.52(a), is attached to the airplane.

Sections 121.339(a)(4) and 121.353(b). Comments similar to those dealt with in the preceding discussion were received with regard to the proposed requirements of Part 121 concerning survival type emergency locator transmitters. These comments pointed out that U.S. air carriers have just recently completed installation of survival type emergency locator transmitters to meet ICAO standards, and thus have entire fleets with new equipment which complies with TSO-C61a, and to require them to now switch over to the new equipment would be unreasonably burdensome. Furthermore, it was contended that in many cases, currently installed equipment meets, for the most part, the proposed standards of Notice 71-7.

Again, the FAA agrees that relief is justified in this situation and safety will not be adversely affected by permitting certain "grandfather" rights. Accordingly, proposed §§ 121.339(a)(4) and 121.353(b) have been revised to permit, until December 30, 1975, the use of a survival type emergency locator transmitter that does not meet the applicable requirements of § 37.200, provided that transmitter: has been installed and approved before the effective date of this amendment; has been manufactured under a TSO Authorization issued against TSO-C61a; and transmits simultaneously on 121.5 and 243.0 MHz.

In addition, several commentators made suggestions similar to those discussed previously concerning battery replacement criteria. Accordingly, appropriate changes have been made to these requirements to accommodate rechargeable batteries.

Finally, comments discussing the number of survival type emergency locator transmitters required have been dealt with previously in the discussion of §§ 25.1415 and 29.1415. No further mention is necessary here.

Section 135.163. Again, several comments were addressed to the number of survival type emergency locator transmitters that should be required on an airplane. The discussion of these comments in connection with §§ 25.1415 and 29.1415 is sufficient for the purposes of this section as well.

With regard to battery replacement criteria, the necessary change to accommodate rechargeable batteries has been made in this section.

Finally, the "grandfather rights" discussed previously had been adopted for this section as well.

Interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Parts 25, 29, 37, 91, 121, and 135 of the Federal Aviation Regulations are amended, effective October 21, 1971, as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. By amending § 25.1415(d) to read as follows:

§ 25.1415 Ditching equipment.

(d) There must be a survival type emergency locator transmitter that meets the applicable requirements of § 37.200 of this chapter for use in one life raft.

PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT

2. By amending § 29.1415(d) to read as follows:

§ 29.1415 Ditching equipment.

(d) There must be a survival type emergency locator transmitter that meets the applicable requirements of § 37.200 of this chapter for use in one life raft.

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

3. By adding a new section to Part 37 to read as follows:

§ 37.200 Emergency locator transmitters—TSO-C91.

(a) *Applicability.* This technical standard order prescribes the minimum performance standards that airborne emergency locator transmitters must meet in order to be identified with the applicable TSO marking. Emergency locator transmitters which are to be so identified must meet the requirements prescribed in paragraphs (b) and (c) of this section.

(b) *Basic performance standards.* Basic performance standards are hereby established for the following types of emergency locator transmitters:

(1) *Type ELT(P) (personnel type).* Personnel type emergency locator transmitters must meet the standards prescribed in Radio Technical Commission for Aeronautics Document No. DO-145 titled "Minimum Performance Stand-

ards—Personnel Type Emergency Locator Transmitters, ELT(P), Operating on 121.5 and 243.0 Megahertz," dated November 5, 1970.

(2) *Type ELT(AF) (automatic fixed type).* Automatic fixed type emergency locator transmitters must meet the standards for Automatic Fixed (AF) Type equipment set forth in Radio Technical Commission for Aeronautics Document No. DO-147 titled "Minimum Performance Standards—Automatic Fixed, Automatic Portable, and Automatic Deployable Type Emergency Locator Transmitters ELT(AF)(AP)(AD), Operating on 121.5 and 243.0 Megahertz," dated November 5, 1970. Notwithstanding the requirements of paragraphs 2.3.1(a)(1) and 2.3.1(c) of DO-147, a tolerance of ± 5 milliseconds may be applied to the value "11 milliseconds" prescribed therein.

(3) *Type ELT(AP) (automatic portable type).* Automatic portable type emergency locator transmitters must meet the standards for Automatic Portable (AP) Type equipment prescribed in Radio Technical Commission for Aeronautics Document No. DO-147 titled "Minimum Performance Standards—Automatic Fixed, Automatic Portable, and Automatic Deployable Type Emergency Locator Transmitters, ELT(AF)(AP)(AD), Operating on 121.5 and 243.0 Megahertz," dated November 5, 1970. Notwithstanding the requirements of paragraphs 2.3.1(a)(1) and 2.3.1(c) of DO-147, a tolerance of ± 5 milliseconds may be applied to the value "11 milliseconds" prescribed therein.

(4) *Type ELT(AD) Automatic deployable type.* Automatic deployable type emergency locator transmitters must meet the standards for Automatic Deployable (AD) Type equipment prescribed in Radio Technical Commission for Aeronautics Document No. DO-147 titled "Minimum Performance Standards—Automatic Fixed, Automatic Portable and Automatic Deployable Type Emergency Locator Transmitters, ELT(AF)(AP)(AD), Operating on 121.5 and 243.0 Megahertz," dated November 5, 1970. Notwithstanding the requirements of paragraphs 2.3.1(a)(1) and 2.3.1(c) of DO-147, a tolerance of ± 5 milliseconds may be applied to the value "11 milliseconds" prescribed therein.

(5) *Type ELT(S) (survival type).* Survival type emergency locator transmitters must meet the standards prescribed in Radio Technical Commission for Aeronautics Document No. DO-146 titled "Minimum Performance Standards—Survival Type Emergency Locator Transmitters, ELT(S), Operating on 121.5 and 243.0 Megahertz," dated November 5, 1970.

(c) *Additional performance standards.* In addition to meeting the basic performance standards (as applicable) prescribed in paragraph (b) of this section—

(1) Each personnel-type emergency locator transmitter must, when installed in accordance with the manufacturer's instructions—

(i) Be automatically activated when subject to a force of 5.0 ± 2 g. and greater

for a duration of 11 ± 5 milliseconds and greater in the direction of the longitudinal axis of the aircraft;

(ii) Not be activated under conditions less severe than those prescribed in subdivision (i) of this subparagraph; and

(iii) After activation, remain activated when subsequently subjected to shock forces in any direction of up to 50 g. and having durations up to 11 ± 5 milliseconds.

Alternate means of transmitter activation may be used, including, but not limited to, skin deformation sensors, provided that such alternate means are shown to be substantially equivalent to sensors responsive to the crash forces otherwise prescribed in the subparagraph.

(2) Notwithstanding the requirements of paragraph 3.1 of DO-145, the "low operating temperature" for each personnel type emergency locator transmitter shall be -20° C. In addition, notwithstanding the requirements of paragraph 3.5 of DO-145, the maximum low temperature for the temperature variation test shall be -40° C.

(3) The electrical connections to the battery, in each personnel, automatic, and survival type emergency locator transmitter must be corrosion resistant and positive in action.

(4) Each personnel, automatic portable, and survival type emergency locator transmitter must be equipped with a guard for the manual activation switch.

(5) Each automatic fixed, automatic portable, and automatic deployable type emergency locator transmitter that is installed with a remote switch for activation, must be equipped with a guard for the remote switch. In addition, the placard required in paragraph (f) (1) (iii) of this section must be installed adjacent to the remote switch, as well as on the transmitter.

(d) *Environmental standards.* Unless otherwise stated in RTCA documents referenced in paragraphs (b) and (c) of this section, environmental testing must be done in accordance with RTCA Document No. DO-138 titled "Environmental Conditions and Test Procedures for Airborne Electronic/Electrical Equipment and Instruments," dated June 27, 1968.

(e) *Availability of documents.* RTCA Documents Nos. DO-138, DO-145, DO-146, and DO-147 are incorporated herein in accordance with 5 U.S.C. 552(a) (1) and § 37.23 and are available as indicated in § 37.23. Additionally, these RTCA documents may be examined at any FAA Regional Office of the Chief, Engineering and Manufacturing Branch (or, in the case of the Western Region, the Chief, Aircraft Engineering Division). The

above documents may be obtained from the RTCA Secretariat, Suite 655, 1717 H Street NW., Washington, DC 20006.

(f) *Marking.* (1) In addition to the markings prescribed in § 37.7(d), the equipment must be permanently and legibly marked with—

(i) Its type designation as prescribed in paragraph (b) of this section;

(ii) The date on, or before, which the battery must be replaced or recharged, as applicable, to comply with the useful life limitation prescribed in paragraph (g) (2) of this section; and

(iii) The following placard: "For aviation emergency use only. Unlicensed operation unlawful. Operation in violation of FCC rules subject to fine or license revocation."

(2) In addition to the markings prescribed in § 37.7(d) and subparagraph (1) of this paragraph, each personnel type emergency locator transmitter, and each automatic portable type emergency locator transmitter must be permanently and legibly marked with the following placard: "When using in temperatures below freezing, keep transmitter inside your jacket with antenna outside for longest operating life."

(3) Each separate component of the equipment (antenna, transmitter, or other) must be permanently and legibly marked with at least the manufacturer's name and the TSO number.

(g) *Data requirements.* In accordance with § 37.5, the manufacturer must furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division (or, in the case of the Western Region, to the Chief, Aircraft Engineering Division), Federal Aviation Administration in the region in which the manufacturer is located, one copy of the following technical data, except that additional copies must be furnished upon request by the FAA:

(1) Manufacturer's operating instructions and equipment limitations, containing a statement identifying the type designation of the equipment as prescribed in paragraph (b) of this section.

(2) Installation instructions, including applicable schematic diagrams, wiring diagrams, procedures, and specifications. The specifications must set forth all limitations, restrictions, or other conditions, pertinent to the installation. The limitations must include, for batteries other than those that are essentially unaffected during probable storage intervals, a limitation on the use of the battery beyond 50 percent of its useful life (or in the case of a rechargeable battery, beyond 50 percent of its useful life of charge) as established by the transmitter manufacturer. For the purpose of this subparagraph, the useful life of the battery (established by the transmitter manufacturer) is the length of time, after its date of manufacture, that the battery may be stored on the shelf under normal environmental conditions without losing its ability to meet the power supply requirements prescribed in the applicable performance standards of paragraph (b) of this section.

(3) List of components (by part number) that make up the equipment system complying with the applicable standards prescribed in this section.

(4) Manufacturer's test report.

(5) Equipment data sheets specifying, within the prescribed range of environmental conditions, the actual performance of equipment of that type with respect to each performance factor prescribed in the applicable standard.

(h) *Data furnished with each manufactured unit.* A copy of the operating instructions and equipment limitations prescribed in paragraph (g) (1) of this section, the installation instructions prescribed in paragraph (g) (2) of this section, and the equipment data sheets prescribed in paragraph (g) (5) of this section, must be furnished with each emergency locator transmitter manufactured under this TSO.

PART 91—GENERAL OPERATING AND FLIGHT RULES

4. By adding a new section to Part 91 to read as follows:

§ 91.52 Emergency locator transmitters.

(a) Except as provided in paragraphs (e), (f), and (g) of this section:

(1) After December 30, 1971, no person may operate a U.S. registered civil airplane manufactured or imported after that date unless it meets the applicable requirements of paragraphs (b), (c), and (d) of this section.

(2) After December 30, 1973, no person may operate a U.S. registered civil airplane unless it meets the applicable requirements of paragraphs (b), (c), and (d) of this section.

(b) To comply with paragraph (a) of this section, each U.S. registered civil airplane must be equipped as follows:

(1) For operations governed by the supplemental air carrier and commercial operator rules of Part 121 of this chapter, or the air travel club rules of Part 123 of this chapter, there must be attached to the airplane an automatic type emergency locator transmitter that is in operable condition and meets the applicable requirements of § 37.200 of this chapter;

(2) For charter flights governed by the domestic and flag air carrier rules of Part 121 of this chapter, there must be attached to the airplane an automatic type emergency locator transmitter that is in operable condition and meets the applicable requirements of § 37.200 of this chapter;

(3) For operations governed by Part 135 of this chapter, there must be attached to the airplane an automatic type emergency locator transmitter that is in operable condition and meets the applicable requirements of § 37.200 of this chapter; and

(4) For operations other than those specified in subparagraphs (1), (2), and (3) of this paragraph, there must be attached to the airplane a personal type or an automatic type emergency locator transmitter that is in operable condition

and meets the applicable requirements of § 37.200 of this chapter.

(c) Each emergency locator transmitter required by paragraphs (a) and (b) of this section must be attached to the airplane in such a manner that the probability of damage to the transmitter, in the event of crash impact, is minimized. Fixed and deployable automatic type transmitters must be attached to the airplane as far aft as practicable.

(d) Batteries used in the emergency locator transmitters required by paragraphs (a) and (b) of this section must be replaced (or recharged, if the battery is rechargeable)—

(1) When the transmitter has been in use for more than one cumulative hour; or

(2) When 50 percent of their useful life (or, for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under § 37.200(g)(2) of this chapter, has expired.

The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the transmitter. Subparagraph (2) of this paragraph does not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(e) Notwithstanding paragraphs (a) and (b) of this section, a person may—

(1) Ferry a newly acquired airplane from the place where possession of it was taken to a place where the emergency locator transmitter is to be installed; and

(2) Ferry an airplane with an inoperative emergency locator transmitter from a place where repairs or replacement cannot be made to a place where they can be made.

No persons other than required crewmembers may be carried aboard an airplane being ferried pursuant to this paragraph (e).

(f) Paragraphs (a) and (b) of this section do not apply to—

(1) Turbojet engine powered airplanes;

(2) Scheduled operations (other than charter flights) conducted by a domestic or flag air carrier certificated under Part 121 of this chapter;

(3) Training flights conducted within a 20-mile radius of the airport from which the flight began; or

(4) Agricultural aircraft operations conducted under Part 137 of this chapter.

(g) Until December 30, 1975, a U.S. registered civil airplane may be operated with an emergency locator transmitter that does not meet the requirements of paragraphs (b), (c), and (d) of this section, if—

(1) Its installation was approved before October 21, 1971;

(2) It was manufactured under a TSO Authorization issued against TSO-C61a of Part 37 of this chapter;

(3) It transmits simultaneously on 121.5 and 243.0 MHz; and

(4) After the effective dates prescribed in paragraph (a) of this section, as ap-

plicable, it is attached to the airplane and is in operable condition.

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

5. By amending § 121.339(a)(4) and (b) to read as follows:

§ 121.339 Equipment for extended over-water operations.

(a) * * *

(4) A survival type emergency locator transmitter that after October 21, 1972, meets the applicable requirements of § 37.200 of this chapter, except that, until December 30, 1975, the transmitter is not required to meet those requirements if its installation was approved before October 21, 1971, it was manufactured under a TSO Authorization issued against TSO-C61a of Part 37 of this chapter, and it transmits simultaneously on 121.5 and 243.0 MHz. The transmitter must be attached to one of the required life rafts. Batteries used in this transmitter must be replaced (or recharged, if the battery is rechargeable) when the transmitter has been in use for more than 1 cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under § 37.200(g)(2) of this chapter, has expired. The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this subparagraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(b) The required life rafts, life preservers, and survival type emergency locator transmitter must be easily accessible in the event of a ditching without appreciable time for preparatory procedures. This equipment must be installed in conspicuously marked, approved locations.

6. By amending § 121.353(b) to read as follows:

§ 121.353 Equipment for operations over uninhabited terrain areas: flag and supplemental air carriers and commercial operators.

* * *

(b) A survival type emergency locator transmitter that after October 21, 1972, meets the applicable requirements of § 37.200 of this chapter, except that, until December 30, 1975, the transmitter is not required to meet those requirements if its installation was approved before October 21, 1971, it was manufactured under a TSO Authorization issued against TSO-C61a of Part 37 of this chapter and it transmits simultaneously on 121.5 and 243.0 MHz. Batteries used in this transmitter must be replaced (or

recharged, if the battery is rechargeable) when the transmitter has been in use for more than 1 cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under § 37.200(g)(2) of this chapter, has expired. The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

PART 135—AIR TAXI OPERATORS AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT

7. By amending § 135.163 to read as follows:

§ 135.163 Emergency equipment: extended over-water operations.

(a) No person may operate an aircraft in extended over-water operations unless it carries enough life rafts (with proper buoyancy) to carry all occupants of the aircraft, and unless there is attached to each life raft, and clearly marked for identification, at least—

(1) One canopy (for sail, sunshade, or for rain catcher);

(2) One radar reflector (or similar device);

(3) One life raft repair kit;

(4) One bailing bucket;

(5) One signaling mirror;

(6) One police whistle;

(7) One raft knife;

(8) One CO₂ bottle for emergency inflation;

(9) One inflation pump;

(10) Two oars;

(11) One 75-foot retaining line;

(12) One magnetic compass;

(13) One dye marker;

(14) One flashlight;

(15) At least one pyrotechnic signaling device;

(16) A 2-day supply of emergency food rations supplying at least 1,000 calories a day for each person;

(17) One sea water desalting kit for each two persons the raft is rated to carry or 2 pints of water for each person;

(18) One fishing kit; and

(19) One book on survival appropriate for the area in which the aircraft is operated.

(b) After October 21, 1972, no person may operate an aircraft in extended over-water operations unless there is attached to one of the life rafts required by paragraph (a) of this section, a survival type emergency locator transmitter that meets the applicable requirements of § 37.200 of this chapter, except that, until December 30, 1975, the transmitter is not required to meet those requirements if its installation was approved before October 21, 1971, it was manufactured under a TSO Authorization issued against TSO-C61a of Part 37 of

this chapter, and it transmits simultaneously on 121.5 and 243.0 MHz. Batteries used in this transmitter must be replaced (or recharged, if the battery is rechargeable) when the transmitter has been in use for more than 1 cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under § 37.200(g) (2) of this chapter, has expired. The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(Secs. 313(a), 601, 604, Federal Aviation Act of 1958, 49 U.S.C. 1354(a), 1421, 1424; sec. 6(c), Department of Transportation Act, 49 U.S.C. 1655(c))

Issued in Washington, D.C., on September 14, 1971.

J. H. SHAFFER,
Administrator.