DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

[Docket No. 26886; Amendment No. 91-229]

RIN 2120-AE27

Air Traffic Control Radar Beacon System and Mode S Transponder Requirements in the National Airspace System

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is rescinding the Mode S transponder requirement for aircraft operating under part 91 of the Federal Aviation Regulations. The Mode S ground sensors, the bulwark of the Model S system, are not expected to be fully operational until late 1995. Therefore, requiring all aircraft to have Mode S transponders at this time is not essential for a safe and efficient National Airspace System. Until the installation of the Mode S ground sensors and studies of their effectiveness are completed, the FAA has determined that it is not in the public interest to require that any transponder newly installed in a general aviation aircraft after July 1, 1992, be a Mode S transponder.

EFFECTIVE DATE: July 30, 1992.

FOR FURTHER INFORMATION CONTACT: Mr. Aaron I. Boxer, Air Traffic Rules Branch, ATP-230, Airspace Rules and Aeronautical Information Division, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-8783.

SUPPLEMENTARY INFORMATION: The two kinds of aircraft equipment addressed by this rulemaking are the Mode A and the Mode S transponders.

The Mode A transponder consists of a radio transceiver that responds to radar pulses from radar ground sensors. It forms one component of the radar system used in air traffic control. The Mode A transponder can be set to transmit one of 4,096 distinct radar codes in response to a radar pulse sent by a radar ground sensor. The ground sensor receives the distinct transmission and an amplified return indicates the aircraft's position on the controller's radar scope.

The Mode S transponder is an advanced version of the Mode A transponder. In addition to providing the reliability of solid state circuitry, Mode S transponders can transmit a discrete set of radio pulses (codes) from each aircraft. In conjunction with Mode S ground sensors, a system of nearly interference-free radar transmission and reception will exist. The Mode S transponder is completely interoperative and compatible with existing ground sensors. The Mode A transponder is similarly compatible with Mode S ground sensors.

History

In 1982 the FAA announced a comprehensive plan to modernize and improve air traffic control and airway facilities. One part of the comprehensive plan included introducing the Mode S system. In an advanced notice of proposed rulemaking (48 FR 48364, October 18, 1983), the FAA stated that improved surveillance reliability and accuracy would be a central objective of the Mode S system. Mode S transponders were considered an integral link in the system, furnishing accurate, reliable and positive air traffic control information on aircraft identity, position, and altitude. At that time, the first 137 Mode S ground sensors were expected to be on-line by 1991. Therefore, the Mode S transponder requirement was promulgated with a final rule published February 3, 1987 (Amendment No. 91-198; 52 FR 3380). This final rule required that any transponder newly installed in a general aviation aircraft before January 1, 1992, could be a Mode A or Mode S transponder, provided the transponder was manufactured prior to January 1, 1990. Under Amendment 91-198, only Mode S transponders could be newly installed in general aviation aircraft after January 1, 1992.

Due to difficulties in manufacturing Mode S transponders, the FAA amended the installation and manufacturing cutoff dates to July 1, 1992, and January 1, 1991, respectively (Amendment 91-210; 54 FR 25681, June 16, 1989). On January 4, 1991, the FAA removed the manufacturing cutoff date associated with the Mode S transponder requirement in response to inventory shortfalls reported by transponder manufacturers (Amendment 91-221; 56 FR 467). The testing and installation schedule of Mode S ground sensors was also experiencing delays.

Amendment 91-221, which was codified in § 91.215(a) of the Federal Aviation Regulations (14 CFR), provided, in pertinent part, that any transponder installed in a U.S.-registered civil general aviation aircraft up to and including July 1, 1992, must meet the performance and environmental requirements of any class of the following technical standard orders (TSOs): TSO-C74b (Mode A) or TSO-C74c (Mode A with altitude reporting capability), as appropriate, or the appropriate class of TSO-C112 (Mode S). Amendment 91-221 required any transponder newly installed in an aircraft after July 1, 1992, to meet the standards of the appropriate class of TSO-C112 (Mode S).

The Mode S System

The Mode S system is designed to alleviate deficiencies in the current radar system. The deficiencies include synchronous garble, loss of target and altitude integrity, and the availability of discrete beacon codes approaching the limitations of the existing technology. Of the two components in the Mode S system (i.e., the ground sensor and the transponder), the ground sensor is more critical in alleviating these deficiencies.

Synchronous garble occurs when the ground sensor interrogating two aircraft near one another cannot distinguish between their respective signals. The system then does not display information, or displays erroneous information, on the air traffic controller radar scope. This condition is most likely to hamper air traffic services in areas of high density aircraft activity such as Terminal Control Areas and Airport Radar Service Areas. The latest studies do not indicate to what degree this problem will be eliminated by Mode S ground sensors alone as compared to Mode S ground sensors combined with Mode S transponders. The FAA will analyze results from a study of the first operational Mode S ground sensor to determine, in a system environment, the improvements attributable solely to the new sensor in surveillance integrity and controller workload.

Target and altitude integrity expresses the ability of the radar system to distinguish between transmissions received from two different aircraft. The radar system transmits interrogation signals, and all transponder-equipped aircraft receiving the signal reply with a distinct code and, if so equipped, report the aircraft's altitude. As described earlier, the ability of the current system to distinguish between two signals is affected by the proximity of the aircraft to each other. Terrain, signal strength of the aircraft transponder equipment, and environmental factors can also derogate the ability of the ground sensor to determine the position and altitude of an aircraft. A 1977 FAA sponsored study determined that the existing radar ground sensors provided an overall target and altitude integrity of 82 to 87 percent. The same study indicated that, due to a narrower, more focused interrogation signal, use of Mode S

ground sensors with Mode A transponder equipment could improve integrity to 96 percent.

A homogeneous Mode S system, consisting of both Mode S ground sensors and transponders, will vastly improve accuracy in the surveillance of aircraft position and reduce interference in identity reports transmitted to air traffic controllers. The range accuracy of existing sensors is 729 feet between targets. In other words, when two aircraft are on the same bearing from an existing sensor and are less than 729 feet apart, one of the targets might not be displayed on the controller's radar scope. When the Mode S system is fully implemented, the targets of those aircraft can be expected to be displayed separately on the controller's radar scope even when those aircraft are only 25 feet apart.

Similarly, azimuth accuracy will improve with the Mode S system. To illustrate, when two aircraft are equal distances from a sensor in the existing system, they must be at least .23 degrees of azimuth apart before both targets are displayed. With the Mode S system, those same aircraft need only be apart by .06 degrees of azimuth to be displayed. The 1976 study postulated that a homogeneous Mode S environment (Mode S ground sensors and transponders) would increase integrity to more than 99 percent. Recent FAA tests of the Mode S ground sensors have verified these figures. The study to be performed following installation of the first ground sensor will confirm the degree of integrity and accuracy of Mode S ground sensors in an on-line system environment of Mode A and Mode S transponders.

As the number of aircraft being handled in the National Airspace System increases, the number of codes needed will eventually exceed the current limit of 4,096 discrete codes. The controllers assign radar codes, used to track aircraft position and altitude, to aircraft receiving air traffic services. The Mode S transponder is not limited to 4,096 possible codes. A Mode S transponder allows air traffic control to assign, transmit, and receive a radar code for each individual aircraft. Since commercial aircraft, requiring approximately 75 percent of the discrete codes assigned, are already installing Mode S transponders, the strain on the current transponder technology limits will be mitigated when the individually assigned radar code feature of Mode S is utilized for those aircraft.

The FAA has contracted to buy 137 Mode S ground sensors, which are crucial elements of the Mode S system. Because the sensors are not expected to be fully operational until late 1995 or early 1996, the more costly Mode S transponder equipment is not yet necessary for general aviation aircraft. As the Mode S ground sensors become operational and the vast majority of the commercial fleet becomes equipped with Mode S transponders, the need for general aviation aircraft to use Mode S transponders may be further diminished. Future testing, as Mode S ground sensors come on-line, will confirm the extent of this need.

The FAA has also received recommendations for further study of the Mode S transponder requirement. On January 22, 1991, the Aviation Rulemaking Advisory Committee (ARAC) was established (56 FR 2190). The ARAC consists of 59 aviation related organizations brought together to advise the FAA on various regulatory issues. The FAA asked the Air Traffic Subcommittee, an element of the ARAC, to examine the current Mode S requirements for aircraft operating under part 91. The Air Traffic Subcommittee recommended that the FAA: (1) Change the requirements of § 91.215 of the FAR to require installation of Mode S transponders on newly manufactured, type certificated aircraft after July 1, 1996; (2) exempt balloons, gliders, and other aircraft with electrical limitations from the rule; (3) conduct a study of the first Mode S ground sensor installed to determine the extent of benefits derived from the ground sensor alone; (4) publish a progress report within six months after the commissioning of the ground sensor, giving an expected completion date of the study; and (5) examine the costs and benefits of requiring Mode S transponder equipage in specific airspace areas needing such treatment.

The FAA agrees with the ARAC's suggestion that the requirement to install Mode S transponders in general aviation aircraft after July 1, 1992, exceeds the minimum requirements of the present and immediate future for a safe and efficient National Airspace System. While areas of high density aircraft activity might benefit from the improved target and altitude integrity of the Mode S system, many portions of airspace over the country might not require a homogeneous Mode S environment for several years. The recommended study, which the FAA is about to undertake, will show whether the problems that would be solved by a homogeneous Mode S environment are significant enough to warrant mandatory general aviation equipage for operation in all airspace.

Discussion of Comments

Notice 92–6, proposing to rescind the Mode S requirement, was published in the **Federal Register** on May 29, 1992 (57 FR 23038). The NPRM comment period expired June 29, 1992. A total of 15 comments were received. There are 13 comments in favor of the proposal, consisting of five individuals, Piper Aircraft Corporation, the Air Traffic Control Association, Gulfstream Aerospace Corporation, Allied-Signal Aerospace Company, Air Logistics, the National Business Aircraft Association, the General Aviation Manufacturers Association, and the Experimental Aircraft Association.

The Air Line Pilots Association (ALPA) and the Air Transport Association (ATA) submitted the only comments in opposition. ALPA suggest, "The Mode S transponder requirement for aircraft operating under part 91 of the FARS should be retained and a delayed implementation date established." ATA makes the same suggestion. The FAA has not established that the safe and efficient management of the nation's airspace requires equipage of Mode S transponders on general aviation aircraft. The specific needs and benefits of Mode S equipage on commercial aircraft operations include not only increased surveillance, but also interface with collision avoidance systems on board these aircraft. If there is a benefit to the system to be gained by requiring Mode S transponder equipage on general aviation aircraft, it will be realized in dense air traffic areas, where radar surveillance is imperative to safe operations. The FAA has committed to study the need for universal equipage in areas of high aircraft activity and may take additional regulatory action regarding Mode S transponder equipage requirements for general aviation aircraft in response to that study.

ATA asserts that the notice proposing to rescind the Mode S requirement did not adequately recognize the benefits of Mode S equipage prior to completion of the corresponding ground sensors. It also questions the FAA's calculation of the anticipated economic benefits of this rescission. The ATA comments that benefits could be gained as each ground site becomes operational. The FAA does not disagree with that generalization, but has determined that requiring all general aviation operators to install Mode S transponders is not warranted when, for the next several years, few will enter airspace within a ground sensor's coverage. The ATA also contends that the notice is "largely

silent" on the relationship between Mode S transponders and the Traffic Alert and Collision Avoidance Systems (TCAS) that air carriers have been required to install. As the ATA points out, Mode S transponders would improve the interaction with TCAS by reducing garble, interference, and the frequency of interrogation transmissions. Appreciable benefits would only be gained, however, in areas of relatively dense air traffic, such as in Terminal Control Areas (TCA's) and Airport Radar Service Areas (ARSA's). Mode C transponders are already required for all aircraft, including general aviation, operating within 30 miles of a TCA primary airport, and most general aviation aircraft have been equipping with Mode C transponders as a result. The degree to which safety would be further enhanced by a Mode S requirement for general aviation has not yet been established as sufficient, in this respect alone, to justify the requirement.

ATA questions the FAA's economic evaluation. It views the cost estimate for Mode A transponders as too low and Mode S as too high, but it provides no alternative figures that it deems accurate. The FAA obtained the cost data used for the economic evaluation from transponder manufacturers and industry representatives and has no reason to question their validity.

Two commenters agree with the proposal but assert that it does not go far enough. The commenters believe that the FAA should also rescind the Mode S transponder installation requirement for aircraft operating under Part 135 of the FAR. They state that the Mode S transponder requirement places an undue financial burden on businesses operating under Part 135. Although the FAA recognizes this financial burden, it did not propose to withdraw the Mode S requirement for part 135 operators because of the need for the enhanced Mode S integrity in connection with air carrier operations in relatively dense traffic areas. The FAA anticipates however, examining this issue further.

Another commenter recommends enhancing the TSO classifications in the rule with parenthetical descriptions. The FAA accepts this recommendation and has modified the text of the rule accordingly.

The Rule

Until the FAA completes the study to reevaluate the specific need and benefit of Mode S transponder equipage on general aviation aircraft, it is rescinding the Mode S transponder requirement for aircraft operating under part 91 of the Federal Aviation Regulations.

Regulatory Evaluation Summary

This section summarizes the regulatory evaluation prepared by the FAA. The regulatory evaluation provides more detailed information on estimates of the potential economic consequences of this final rule. This summary and the evaluation quantify, to the extent practicable, the estimated costs of the rule to the private sector, consumers, and Federal, State, and local governments, and also the anticipated benefits.

Executive Order 12291, dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if potential benefits to society for each regulatory change outweigh potential costs. The order also requires the preparation of a Regulatory Impact Analysis of all "major" rules except those responding to emergency situations or other narrowly defined exigencies. A "major" rule is one that is likely to result in an annual effect on the economy of $100 million or more, a major increase in consumer costs, or a significant adverse effect on competition.

The FAA has determined that this final rule is not "major" as defined in the executive order. Therefore, a full regulatory impact analysis, which includes the identification and evaluation of cost-reducing alternatives to the rule, has not been prepared. Instead, the Agency has prepared a more concise document termed a "regulatory evaluation," which analyzes only this rule without identifying alternatives. In addition to a summary of the regulatory evaluation, this section also contains a regulatory flexibility determination required by the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) and an international trade impact assessment. For more detailed economic information than this summary contains, the reader should consult the regulatory evaluation contained in the docket.

Benefits

The rule will generate benefits in the form of cost relief to part 91 operators who would be required to install Mode S transponders in their aircraft after July 1, 1992. These benefits are estimated to range from $31 million to $63 million (discounted, 1991 dollars). The methodology used to derive this range of potential benefits is discussed below.

This evaluation employed two steps to derive the potential benefits of the rule. First, it was necessary to determine the number of general aviation aircraft operators who would be impacted and the extent they would be impacted. This information was obtained by contacting a number of industry representatives (i.e., transponder manufacturers, fixed based operators (FBOs), and trade associations). The General Aviation Manufacturers Association (GAMA) was contacted for information related to the number of transponders purchased annually by general aviation operators (namely, those operators with small, single-engine, piston aircraft). Based largely on information provided by GAMA, the FAA estimates that sales of transponders (such as ATCRBS) to general aviation operators averaged about 4,000 per year between 1983 and 1987.

From 1988 to 1991, transponder sales to general aviation aircraft operators averaged approximately 7,700 per year. Sales of these transponders peaked at approximately 8,900 units in 1989. For the purpose of this evaluation, sales of these transponders only up to 4,000 between 1988 and 1991 will be counted to exclude sales attributable solely to the requirement, effective July 1, 1989, to install altitude encoding transponders in aircraft operating within 30 miles of any TCA primary airport (Mode C rule). The number of transponders sold between 1983 and 1987 is considered to be more indicative of normal sales. Therefore, the estimate of slightly less than 4,000 has been used as a means of projecting the number of annual transponders sales between 1992 and 2006. This estimate represents the number of new transponders installed annually by general aviation aircraft operators.

Over the next 15 years, an estimated 58,000 transponders could be purchased primarily by small general aviation aircraft operators. However, not all of these transponders would be purchased by general aviation operators after July 1, 1992. The FAA contends that at least half of these general aviation operators would elect to have their existing transponders repaired for under $500 rather than pay five or six times this price for a newly installed Mode S transponder. The Mode S requirement only impacts general aviation operators planning to install any type of new transponder after July 1, 1992.

Because of the lack of precision associated with this assessment, the FAA estimates that 29,000 of 58,000 Mode S transponder purchases would be affected by the installation requirement over the next 15 years.

The low end of this range represents a scenario that assumes demand for Mode S transponders would drop by at least 50 percent after July 1, 1992. This assessment is based largely on

information received from GAMA and conversations with general aviation pilots, who were asked, "In view of the fact that Mode S ground sensor sites will not be in place before late 1995 or early 1996, coupled with the fact that the Mode S rule for general aviation operators takes effect on July 1, 1992, what would be the impact on the annual sales of transponders?" All respondents indicated that the demand for Mode S transponders would drop by 50 to 75 percent for those reasons stated earlier. The high end of this range represents a scenario that assumes demand for transponders would not change from the historical annual sales average of 4,000 units.

The next step in deriving an estimate of potential benefits involved contacting a number of Mode S transponder manufacturers and FBOs. These industry representatives were contacted for the purpose of obtaining cost estimates of acquiring and installing Mode S transponders (without data link capability). According to these industry representatives, the average price (including installation) of a panel mounted Mode S transponder (without data link capability) for a small general aviation aircraft is $3,500 compared to $1,300 to $1,800 for a Mode A or Mode C transponder (in 1991 dollars). The average difference between a Mode S and a Mode A or C transponder is estimated to be $2,000. The representatives also indicated that the cost for biennial maintenance for a Mode S transponder is estimated to be the same as that for a Mode A transponder (ATCRBS), about $60.

Since general aviation aircraft operators are expected to purchase an estimated 4,000 ATCRBS transponders (with and without Mode C capability) annually, over the next 15 years, at an estimated average price of $1,500, the incremental cost of compliance with the Mode S requirement would be $2,000 ($3,500 less $1,500). This evaluation assumes that general aviation aircraft operators would purchase these ATCRBS transponders in the absence of any Mode S requirement. Therefore, rescinding the Mode S requirement for part 91 operators would save them an estimated $2,000 each time they replace their existing ATCRBS transponder with a new one.

From July 1, 1992, to December 30, 2006, the rule is expected to generate potential cost relief benefits ranging from estimates of $58 million (29,000 × $2,000) to $116 million (58,000 × $2,000). Discounted over this 15-year period (using an interest rate of 10 percent), benefits could range from an estimated $31 million to $63 million.

Costs

The rule is not expected to impose any costs (monetary or safety) on either Mode S transponder manufacturers or society. This assessment is based on the rationale contained in the following sections.

Cost Impact on Mode S Transponder Manufacturers

The rule rescinds the Mode S rule requirements for part 91 operators only, and it does not impose any future requirements or costs on manufacturers of panel mounted Mode S transponders. However, some of these manufacturers have incurred costs for developing panel mounted Mode S transponders in response to the Mode S requirement. Such costs, which range from $2 million to $4 million (undiscounted), are sunk. Once an investment is made and cannot be altered, it is referred to as sunk costs. In rulemaking, the economic evaluation considers only future costs as opposed to sunk costs (or passed costs). Even though some manufacturers of panel mounted Mode S transponders cannot recover their development costs, the FAA has determined that the net benefit of the rule is in the interest of the public.

Cost Impact on Society

The rule will not impose societal costs in the form of an unacceptable decrease in aviation safety. An integral part of the Mode S requirement was the ground sensor. These sensors, when combined with aircraft equipped with Mode S transponders, better enable Air Traffic Control to track aircraft positions and provide more interference-free identity reports of targets. This situation would enhance aviation safety by reducing the likelihood of mid-air collisions as the result of having more accurate target information. Since the first phase of 137 ground sensors will not be operational until either late 1995 or early 1996, the full potential benefits of Mode S transponders will not be realized before then. Mode S transponders do, however, complement the TCAS in a manner similar to Mode A transponders. However, without the ground sensors in place, Mode S transponders provide no more benefits than advanced solid state Mode A transponders. Thus, the rule does not effect an unacceptable reduction in aviation safety. In fact, in some instances, the rule enhances aviation safety by allowing the equipage of Mode C transponders rather than the equipage of Mode S transponder with only a Mode A transponder (lacking altitude encoding) capability.

Once the radar ground sensors are in place, aviation safety is expected to be improved by approximately 10 percent over the current radar sensor system. This assessment is based on a 1977 FAA sponsored study which determined that the current radar ground sensors provide an overall target and altitude integrity of 82 to 87 percent. The study also indicated that with Mode S ground sensors and current aircraft transponder equipment (namely, either Mode A or Mode C transponders), integrity would improve to 96 percent. The study went on to postulate that with a homogeneous Mode S environment, consisting of Mode S ground sensors and transponders, integrity would exceed 99 percent. Thus, Mode S transponders would add another 3 percent of improvement to aviation safety.

The final rules for TCAS and Mode C transponders have already achieved much of the improvement in aviation safety expected from the Mode S transponder requirement in the form of lowering the likelihood of mid-air collisions between low and high performance aircraft. The need for part 91 operators to use Mode S transponders will be confirmed in a separate study when installation of the Mode S ground sensors begins.

Comparision of Costs and Benefits

Thus, in view of the estimated zero cost of compliance and the estimated cost relief benefits between $31 million and $63 million (discounted), the FAA has determined that the rule is cost-beneficial.

International Trade Impact Statement

The rule will neither have an effect on the sale of foreign aviation products or services in the United States, nor will it have an effect on the sale of United States products or services in foreign countries. This is because the rule neither imposes costs on aircraft operators nor aircraft manufacturers (U.S. or foreign).

Initial Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted to ensure that small entities are not unnecessarily and disproportionately burdened by Government regulations. The RFA requires agencies to review rules which may have "a significant economic impact on a substantial number of small entities." As discussed in the costs section of this evaluation, the rule will not impose costs. Therefore, the rule will not have any significant economic

impact on a substantial number of small entities.

Federalism Implications

This final rule will not have substantial direct effects on the States, on 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 rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Paperwork Reduction Act

This rule rescinds an agency regulation and does not change any reporting requirements. Therefore, no Paperwork Reduction Act review or approval is required.

Conclusion

For the reasons discussed in the preamble and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this regulation is not "major" under Executive Order 12291. In addition, the FAA certifies that this rule will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. This rule is considered "significant" under DOT Regulatory Policies and Procedures (44 FR 111034; February 26, 1979). A regulatory evaluation of the regulation, including a regulatory flexibility determination, and international trade impact analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under "**FOR FURTHER INFORMATION CONTACT.**"

The public interest demands that this rule become effective immediately upon issuance. This rule relieves the restriction and financial burden of having to install Mode S transponders in general aviation aircraft after July 1, 1992. The FAA thus finds good cause pursuant to 5 U.S.C. 553(d) for making this amendment effective in less than 30 days to avoid the disparate impact that would result from having a requirement come into effect only for the duration of the waiting period until its rescission can become effective.

List of Subjects in 14 CFR Part 91

Air traffic control, Aviation safety.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration is amending part 91 of the Federal Aviation Regulations (14 CFR part 91) as follows:

PART 91—GENERAL OPERATING AND FLIGHT RULES

1. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. App. 1301(7), 1303, 1344, 1348, 1352 through 1355, 1401, 1421 through 1431, 1471, 1472, 1502, 1510, 1522, and 2121 through 2125; articles 12, 29, 31, and 32(a) of the Convention on International Civil Aviation (61 Stat. 1180); 42 U.S.C. 4321 et seq; E.O. 11514, 35 FR 4247, 3 CFR, 1966–1970 Comp., p. 902; 49 U.S.C. 106(g).

2. Section 91.215 is amended by revising paragraph (a) to read as follows:

§ 91.215 ATC transponder and altitude reporting equipment and use.

(a) *All airspace: U.S.-registered civil aircraft.* For operations not conducted under part 121, 127 or 135 of this chapter, ATC transponder equipment installed must meet the performance and environmental requirements of any class of TSO–C74b (Mode A) or any class of TSO–C74c (Mode A with altitude reporting capability) as appropriate, or the appropriate class of TSO–C112 (Mode S).

* * * * *

Issued in Washington, DC, on July 30, 1992.

Thomas C. Richards,

Administrator.

[FR Doc. 92–18516 Filed 7–31–92; 12:49 pm]

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