

# **federal register**

99-16  

---

**Wednesday**  
**March 7, 1990**

---

**Part V**

## **Department of Transportation**

---

**Federal Aviation Administration**

---

**14 CFR Part 99**

**Transponder Requirements in an Air  
Defense Identification Zone (ADIZ); Final  
Rule**

## DEPARTMENT OF TRANSPORTATION

## 14 CFR Part 99

[Docket No. 24903; Amdt. No. 99-16]

**Transponder Requirements in an Air Defense Identification Zone (ADIZ)****AGENCY:** Federal Aviation Administration (FAA), DOT.**ACTION:** Final rule.

**SUMMARY:** This action establishes requirements for all civil aircraft to be equipped with a transponder (basic transponder or Mode S transponder) with automatic altitude reporting equipment (referred to in this document as "a transponder with Mode C") when conducting operations into or out of the United States into, within, or across the contiguous U.S. ADIZ. The FAA is taking this action to reduce the risk of a midair collision and to reduce the use of aircraft engaged in the illegal transportation of drugs.

**EFFECTIVE DATES:** April 6, 1990.

**ADDRESSES:** Copies of this document may be obtained by submitting a request to the Federal Aviation Administration, Office of Public Affairs, APA-200, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-3479. Communications must identify the amendment number of the document.

**FOR FURTHER INFORMATION CONTACT:** Mr. William C. Davis, Air Traffic Rules Branch, ATO-230, Airspace—Rules and Aeronautical Information Division, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-8783.

**SUPPLEMENTARY INFORMATION:****Background and Related Rulemaking Actions**

On March 18, 1982, the FAA issued Amendment No. 99-12, Security Control of Air Traffic; Modification of Flight Plan Filing Requirements for Operations in Coastal ADIZ (47 FR 12324). This rule amended part 99 of the Federal Aviation Regulations (FAR) to require aircraft operating at a true airspeed of less than 180 knots in certain areas to meet the flight plan filing and other requirements of that part. Additionally, the rule established a requirement that an aircraft's transponder capability be included in the flight plan. The effort was in response to a threat to safety in air commerce by aircraft operating illegally with respect to transportation of drugs through airspace adjacent to the State of Florida.

By way of letter dated July 11, 1985, the Deputy to the Assistant Secretary of the Treasury, on behalf of the U.S. Customs Service (USCS), requested the FAA take additional regulatory actions as deemed necessary by the FAA to enhance the identification of all aircraft entering the United States. Subsequent discussions with the USCS revealed that since the issuance of Amendment No. 99-12, and as a result of concentrated law enforcement efforts in the targeted area (Florida Peninsula), a significant amount of illegal drug smuggling activity involving small aircraft has been forced into other areas of the United States. Consequently, the FAA was prompted to seek further regulatory changes to the flight plan filing and position reporting requirements of part 99 of the FAR.

On October 29, 1985, the FAA issued Amendment No. 91-190, Transponder-On Operations (50 FR 45599). This rule requires any person operating an aircraft equipped with an operable transponder to have that transponder turned on while operating in controlled airspace. Additionally, if the aircraft is equipped with automatic altitude reporting equipment, that equipment must also be turned on. The transponder-on rule was mandated to provide an increased level of safety without placing an undue burden on the public.

On May 13, 1988, the FAA issued Amendment No. 99-13, Security Control of Air Traffic; Modification of U.S. ADIZ (53 FR 18216). This rule amended part 99 of the FAR by changing the lateral boundaries of ADIZ's around the contiguous United States, Alaska, and Guam. In addition, this effort made editorial changes and deleted references to Distant Early Warning Identification Zones, Domestic ADIZ's, and Coastal ADIZ's.

On June 17, 1988, the FAA issued Amendment No. 91-203, Transponder with Automatic Altitude Reporting Capability Requirement (53 FR 23356). The rule requires most aircraft operating in busy terminal areas and all aircraft operating at or above 10,000 feet mean sea level (MSL) to be equipped with a transponder and automatic altitude reporting equipment. The rule will be implemented in two phases. Phase I, effective July 1, 1989, required all aircraft: (1) Operating within 30 miles of any terminal control area (TCA) primary airport, and (2) operating at and above 10,000 feet MSL to be equipped with a Mode C transponder. Phase II is effective December 30, 1990, and will require pilots that plan operations: (1) Within and above an airport radar service area (ARSA) up to 10,000 feet MSL, and (2) within a 10-mile radius of

two specially designated airports from the surface up to 10,000 feet MSL, excluding the airspace below 1,200 feet above ground level (AGL) outside of the airport traffic area for that airport, to be equipped with a Mode C transponder.

On October 5, 1988, the FAA issued Amendment No. 99-14, Flight Plan and Transponder Requirements in an ADIZ (53 FR 39842). This rule amended part 99 of the FAR by establishing a flight plan and position report requirements for all civil aircraft conducting operations into or out of the United States into, within, or across the contiguous U.S. ADIZ. Further, this rule requires all civil aircraft, equipped with an operable radar beacon transponder, to have the transponder turned on and replying on the appropriate code or on a code assigned by air traffic control (ATC) when conducting operations into or out of the United States into, within, or across an ADIZ.

On October 5, 1988, the FAA issued Notice No. 88-17, Transponder Requirements in an ADIZ (53 FR 39846). This notice proposed a requirement for all civil aircraft to be equipped with a transponder and automatic altitude reporting equipment when conducting operations into or out of the United States into, within, or across an ADIZ.

On November 18, 1988, the Anti-Drug Abuse Act of 1988 (Public Law 100-690) was enacted. This law, in part, requires the Secretary of Transportation to study the feasibility, costs, and benefits associated with drug interdiction of requiring each pilot operating an aircraft which enters the continental United States to have—(1) an operating transponder installed in the aircraft; (2) a flight plan filed with the FAA; (3) transmission of a transponder code which can be used to identify the aircraft in the most efficient manner; and (4) a transponder signal which provides information that will ensure that the aircraft is following its filed flight plan.

**Analysis of Comments**

In response to the proposals detailed in Notice No. 88-17, the FAA received a total of five comments. The following is a categorization and discussion of those comments received.

*Comment Period Too Short*

An aviation organization suggested that the comment period was too short and did not allow for secondary publication to its membership. This organization believes that a 120-day comment period is the minimum necessary to provide for its standard publication lead times. Other

commenters also objected to the 32-day comment period assigned to Notice No. 88-17.

On December 5, 1985, the FAA issued an advance notice of proposed rulemaking (ANPRM), Notice No. 86-1, Transponder Requirements; Operations In or Out of U.S. Through a Coastal ADIZ (51 FR 4756). This ANPRM proposed to require a transponder for operations associated with an ADIZ. A 90-day comment period was assigned to this ANPRM. Because only five comments were received during the comment period of the ANPRM, which essentially proposed similar requirements, the FAA believed that under these circumstances, a shorter comment period for Notice No. 88-17 was sufficient.

#### *Advantages of a Transponder with Mode C Equipment*

One commenter suggested that the proposal was an unworkable solution to the problem of illegal drugs being smuggled into the United States.

According to the USCS, a large portion of the illegal drugs entering the United States is being smuggled by persons using aircraft that enter the United States through an ADIZ. The means for detection of these aircraft include radar, pursuit aircraft, and advanced police techniques. While the FAA does not have jurisdiction for enforcement of anti-smuggling and related statutes, it is concerned with the growth of hazards to U.S. air commerce arising in connection with the increasing use of aircraft involved in such illegal activities. The FAA believes that the flight practices of persons conducting illegal drug activities in aircraft create safety hazards for other aircraft used in legitimate operations in the same airspace as well as to persons and property on the surface. For instance, in order to escape detection, pilots of aircraft transporting illegal drugs into the United States may be expected to engage in extremely dangerous flight techniques. Such techniques include flying very low to avoid radar detection, landing and taking off from unprepared landing areas, and operating in weather conditions beyond the capability of the aircraft or pilot. Thus, while other agencies are responsible for controlling the activities involved in the transportation and importation of illegal drugs and while the mere carriage of those items under normal conditions is not dangerous, the conduct of pilots engaged in smuggling activity poses a direct threat to air commerce.

For national defense purposes, aircraft operating from outside the United States to destinations in the

United States are subject to an identification process which involves, in part, the detection of these aircraft on radar. Once detected on radar, an aircraft's position is correlated with known flight plan information and any position reports that have been made. An aircraft with an operating transponder can be identified more quickly and more positively than an aircraft without a transponder. Having aircraft equipped with transponders when operating in an ADIZ would expedite the identification process, thereby allowing the appropriate governmental entities to concentrate on those aircraft suspected of being involved in illegal drug transportation and conducting hazardous flight maneuvers while attempting to avoid detection and identification.

Additionally, aircraft altitude information can be displayed directly on a radar screen. Using this data, personnel conducting detection operations would be better able to conduct intercepts of suspect aircraft. Further, pilots of pursuit aircraft could use this information independently to narrow the field of a visual search. Even though the FAA believes that the use of transponders alone may enhance safety in the airspace of the ADIZ, the ability to determine the aircraft altitude through the use of Mode C will further increase the safety and effectiveness of the drug interdiction program, as well as reduce the number of false intercept missions now being flown by Customs. For these reasons, the FAA has modified the proposal as contained in Notice No. 86-1 to require automatic altitude reporting equipment in conjunction with the proposed transponder requirement.

#### *Altitude Detecting Radar Systems*

Two commenters suggested that the recently awarded contract to Westinghouse to replace 40 en route radars with new radar systems would effectively eliminate the need for aircraft under such radar surveillance to be equipped with a Mode C transponder. This commenter assumed that the altitude detecting function of such radar systems would accomplish the intentions of the proposals in Notice No. 88-17.

The new radar system addressed by the commenter is the ARSR-4 radar. This radar is designed for use by both the FAA and the Department of Defense (DoD). It is capable of determining and reporting target height to an accuracy of plus or minus 5,000 feet of true altitude, 90 percent of the time, as measured in any 5-nautical-mile range interval to a range of 175 nautical miles. However, air traffic controllers must provide aircraft

vertical separation by 1,000 feet (or 2,000 feet above 29,000 feet above mean sea level). Therefore, data derived from the height detection function of the ARSR-4 cannot be used to effect such separation. Notwithstanding its height accuracy limitation, the FAA will use the other functions of the ARSR-4 for en route ATC. More importantly, the ARSR-type systems are not suitable for use at terminal radar approach control facilities. Until advancements in technology produce systems that accurately detect true altitude of aircraft with the necessary reliability for ATC separation, the FAA will depend on the altitude information derived from Mode C transponders which report altitude in 100-foot increments accurate to within 125 feet of the altitude displayed on the altimeter. The DoD is expected to use all the ARSR-4 functions, including height detection, to maintain air sovereignty and for air defense purposes.

#### *Costs*

Several commenters suggested the cost of a Mode C transponder was too much for most general aviation aircraft operators.

A complete discussion of the costs and benefits is contained in the Final Regulatory Evaluation in the docket. However, a summary of that discussion is contained herein under the caption "Regulatory Evaluation Summary."

#### *ATC Authorizations*

The FAA specifically requested comments from operators of hot air balloons, fish spotter aircraft, petroleum industry helicopters, etc., and other persons interested in obtaining authorizations to deviate from the proposed transponder requirement and how information on such operations could be obtained by the FAA. No comments were received on this issue. However, in regard to hot air balloons and other aircraft such as sailplanes that are not equipped with an electrical system, the operators of such aircraft are excluded in this final rule from the Mode C transponder equipage requirement. Therefore, these operators will not have a need to seek approval to deviate from the requirement. However, in the case of petroleum-industry helicopter and other operators, the FAA has retained the general ATC authorization provisions contained in the proposal. Such an operator need only contact the ATC facility that exercises jurisdiction over the airspace and request an authorization. The FAA will grant such an authorization to the extent that aviation safety and drug

interdiction activities are not adversely affected.

#### Adoption of the Rule

For the reasons stated above, the final rule is substantially adopted as proposed in Notice No. 88-17. The following is a discussion of the regulatory changes contained in this final rule.

**ATC Transponder Requirement.** Effective September 7, 1990, all aircraft except as otherwise authorized by ATC are required to have a transponder when operating into or out of the United States into, within, or across an ADIZ. Aircraft which were not originally certificated with an engine-driven electrical system or which have not subsequently been certified with such a system installed, balloons, and gliders are excluded from this requirement.

**Transponder with Mode C Requirement.** Effective December 30, 1990, all aircraft except as otherwise authorized by ATC are required to have a transponder with automatic pressure altitude reporting equipment when operating into or out of the United States into, within, or across an ADIZ.

Aircraft which were not originally certificated with an engine-driven electrical system or which have not subsequently been certified with such a system installed, balloons, and gliders are excluded from this requirement.

#### Regulatory Evaluation Summary

This regulatory evaluation assesses the rule with respect to the potential benefits expected to accrue from implementation and the expected incremental costs of compliance. The FAA's estimation of the incremental cost of compliance with this rule assumes that only those aircraft which presently operate into the United States through an ADIZ which are not equipped with Mode C (or a basic transponder) will be affected.

The Aircraft Owners and Pilots Association (AOPA), on April 30, 1986, informed the FAA (Docket #24903), that the USCS, in 1984, estimated that 39,000 separate civil aircraft were processed about 160,000 times upon arrival in the United States. Of those, 28,678 were U.S.-registered aircraft. Informal contact with Customs Service personnel has verified that the number of processings has held steady at 161,000 in 1987.

The FAA estimated the proportion of the 28,678 U.S.-registered aircraft that might be affected by the amendment based on data contained in the FAA's December 1987 publication, "General Aviation Activity and Avionics Survey, Annual Summary Report 1986 Data." The FAA applied the percentages of

transponder and Mode C-equipped aircraft in the active general aviation fleet to the number of U.S.-registered aircraft processed in 1984. See Appendix A of the full Regulatory Evaluation in the Docket for the detailed steps used to calculate these percentages.

Based on these data, and estimated 74.9 percent of active U.S. general aviation aircraft are transponder equipped. This percentage, applied to the 28,678 U.S.-registered aircraft, indicates that 7,198 of those U.S.-registered aircraft may not be so equipped. These figures indicate that 21,480 of arriving U.S.-registered aircraft in 1984 were equipped with a transponder. Approximately 43.9 percent or 9,430 of the transponder-equipped aircraft did not have Mode C. Therefore, 9,430 aircraft must upgrade to Mode C and 7,198 aircraft must install a transponder with Mode C to conform with the rule. As discussed below, however, most of these aircraft will have to be equipped with Mode C as a result of another recent FAA rulemaking action.

#### Cost

The FAA estimates the total cost of compliance with the final rule at \$689,000 (discounted) in 1988 dollars. This cost estimate takes into account the expectation that nearly all U.S. general aviation aircraft will become Mode C-equipped by the end of 1990 in conformity with the requirements of the recent FAA rule ("Transponder With Automatic Altitude Reporting Capability Requirement and Controlled Airspace Common Floor" (Mode C rule), 53 FR 23356, June 21, 1988).

Phase I of the above rule, commonly referred to as the Mode C rule, required by July 1, 1989, a transponder with Mode C for airplanes operating in the airspace at and above 10,000 feet MSL, and in the vicinity of TCA-primary airports. Phase II of the Mode C rule requires, by December 30, 1990, a transponder with Mode C for most operations in the vicinity of ARSA-primary airports and other designated airports.

Mode C for operators affected by this ADIZ rule is required by December 30, 1990. However, a basic transponder is required for these operators beginning 6 months from the date of publication of this rule. This rule imposes no cost impact on operators of those airplanes that presently are equipped with basic transponders (9,430) because they will conform fully with the Mode C requirements of this rule at the same time that they meet the requirements of Phase II of the Mode C rule on December 30, 1990. These operators'

cost for Mode C was attributed previously to the Mode C rule.

Since the Mode C rule required Mode C by July 1, 1989, for operations in the vicinity of a TCA, and by December 30, 1990, for operations in the vicinity of an ARSA, some of these operators of airplanes that presently are without transponders (7,198) conform fully with the requirements of this ADIZ rule at the same time that they met the requirements of the Mode C rule pertaining to TCA's, effective July 1, 1989. The remaining operators of these 7,198 airplanes, who must meet only the December 30, 1990, date under the Mode C rule, but whom this ADIZ rule also affects, will have to acquire a basic transponder prior to December 30, 1990. At that juncture, when they conform with Phase II of the Mode C rule, they also will satisfy fully the Mode C requirement of this ADIZ rule.

To assure calculating the maximum cost attributable to this ADIZ rule, the FAA is making two assumptions. First, rather than speculate about how many of the 7,198 airplanes either have or will conform with the Mode C rule's effective dates for operating in TCA's (July 1, 1989) or ARSA's (December 30, 1990), the FAA assumes that at the time of this writing, this rule requires the operators of all 7,198 aircraft to install a basic transponder 6 months before they otherwise would under the Mode C rule's December 30, 1990, effective date for operating in ARSA's. Second, although this ADIZ rule requires only the basic transponder before December 30, 1990, operators might make a personal choice to equip with Mode C at the same time they install transponders. The FAA assumes that all of the operators of these 7,198 airplanes would install Mode C concurrently.

The maximum incremental cost of this rule to these 7,198 operators will be opportunity cost of interest on capital expended to purchase, install, and maintain Mode C transponders 6 months sooner than the Mode C rule requires. The principal expenditure for the purchase, installation, and first-year maintenance normally would be allocated to this rule, but it already has been attributed to meeting the requirements of the recently issued Mode C rule.

An average cost for a basic transponder and an average cost for Mode C or altitude encoding equipment was ascertained on the basis of information supplied by avionics manufacturers. The most popular basic transponder model (low end of the market) costs approximately \$1,050 installed. Comparably priced Mode C

avionics that are compatible with nearly all basic transponders used in general aviation aircraft range in cost from approximately \$800 to \$900 installed. While avionics costs vary widely, the FAA is using the low cost equipment to make cost estimates because this equipment, without additional features, meets the FAA's regulatory requirements.

The FAA estimates the cost of new Mode C equipment at \$1,900. This estimate is made using \$1,050 as the cost for the transponder plus \$850 to upgrade a transponder to Mode C. Additionally, maintenance is necessary to assure that the avionics are properly calibrated and in good functioning order. The cost to maintain and inspect the avionics biennially is estimated at 5 percent of \$1,900 or \$95.

A cost of \$1,900 per unit to equip 7,198 aircraft not having transponders equals a cost of \$13,676,200. Maintenance costs an additional \$683,810 per year. The sum cost of the purchase and first-year maintenance requires a principal in the amount of \$14,360,010. This principal is the cost that already has been attributed to meeting the requirements of the recent Mode C rule.

The opportunity cost is the difference between the present value (on June 30, 1990, the anticipated effective date of this rule at the time of writing this evaluation) and the future value (on December 30, 1990, the effective date of Phase II of the previous rule). The present value of \$14,360,010 discounted over 6 months at 10 percent is \$13,670,730. Therefore, the opportunity cost is \$689,000 for the operators of 7,198 affected airplanes presently without transponders. The opportunity cost per airplane is \$96.

This ADIZ rule imposes no cost to the operators of the 9,430 airplanes that already are transponder-equipped because they are allowed to operate into, within, or out of the ADIZ without Mode C until Phase II of the Mode C rule becomes effective on December 30, 1990. The total cost for a Mode C upgrade and maintenance is attributable to the requirements of the Mode C rule.

Although not attributable to this ADIZ rule, these costs are set out as follows in the interest of completeness. A cost of \$850 per unit for Mode C to upgrade these 9,430 aircraft equates to \$8,015,500. Additionally, biennial maintenance is necessary to assure that the avionics are properly calibrated and in good functioning order. The cost to maintain and inspect the avionics is estimated at 5 percent or \$400,755.

### *Benefits*

The FAA expects that this rule will yield potential benefits of three types. Primarily, it will improve the operating efficiency of law enforcement efforts to sort legal flights from illegal smuggling operations. Second, it will improve the effectiveness of drug interdiction efforts. Third, it will enhance aviation safety by reducing the direct threat to air commerce caused by smugglers engaged in extremely dangerous flight techniques to avoid detection and apprehension.

### *Efficient Sorting Operations*

Aircraft entering the United States through an ADIZ can be detected by means of various types of radar, pursuit aircraft, and advanced police techniques. When an aircraft operating to destinations inside the United States from outside is detected on radar, its position is correlated with known flight plan information and any previous position reports. An aircraft with an operating transponder and Mode C is identifiable more quickly and more positively than an aircraft without a transponder.

This final rule will enable drug enforcement personnel to improve significantly their ability to sort legal flights from illegal drug smuggling operations. Consequently, the USCS, as well as the United States Coast Guard (USCG), North American Air Defense Command (NORAD) and the Air National Guard (ANG), will reduce the number of unnecessary launches conducted in pursuit of suspect airplanes.

A reduction in unnecessary launches will generate a savings to the USCS, the USCG, NORAD, and the ANG in flight and personnel costs. The FAA has made estimates of these savings based on information obtained from the respective services. Because at the present time they cannot sort quickly enough certain legal flights which do not have transponders from illegal drug smuggling operations, the USCS launches approximately 225 flights per year to make such identifications of airplanes which turn out to be legal targets. In each instance, if the airplane had a transponder, the launch could have been avoided.

Each launch utilizes an interceptor aircraft and an apprehension aircraft. A Citation with three personnel aboard is used to intercept. A Blackhawk with five personnel aboard is used for apprehension. The flight duration is 1 to 2 hours, with an estimated 50 percent of 2 hours duration and an average duration of 1.5 hours for all flights. The 225 launches, each with 8 personnel for

an average 1.5 hours per flight, amounts to 2,700 personnel hours spent. Based on the 1988 pay scale for GS-11, 12, and 13 personnel, the combined wages paid for these launches is \$42,686 per year. The cost per hour to operate and maintain a Citation or a Blackhawk is \$750. The cost to operate both aircraft on 225 flights for an average 1.5 hours per flight is \$506,250. The annual personnel costs (\$42,686) added to the incremental cost of operating and maintaining the aircraft (\$506,250), amounts to a combined annual cost of \$548,936 or, for a 15-year period for a present value of \$4,175,207 (the useful life of a transponder with Mode C).

A reduction in unnecessary launches similarly will generate a savings to the USCG. These savings are estimated based on information obtained from the USCG, which has launched a USCG HU-25 interceptor aircraft to identify a non-squawking (no IFF transponder) radar target at least once per day on average. The HU-25C costs approximately \$2,096 per hour to operate (including personnel costs), and the launches or diverts to identify these targets have taken an average of 2 hours each. The cost for 365 launches per year, for an average 2 hours per flight, at a cost of \$2,096 per hour is \$1,530,080, or for a 15-year period, a present value of \$11,637,788.

During the previous 3 years, NORAD active duty and ANG interceptors launched an average of 35 times per year to pursue unknown targets later identified as privately owned U.S. and foreign aircraft. These launches took place for a variety of reasons, including failure to file a flight plan, navigation errors, and inoperative or missing transponders. Headquarters NORAD does not maintain records which show the cause for each intercept. Judging by the type of aircraft intercepted, the number of intercepts caused by private aircraft without transponders installed would be small.

The average cost per intercept is estimated at \$7,000, based on 1.2 hour sorties for two F-16 interceptors. Assuming a reduction of one launch per month in pursuit of suspect airplanes without operating transponders (one-third the average yearly number of launches in pursuit of unknown targets later identified as privately owned aircraft), the cost savings for 12 intercepts at \$7,000 per sortie is \$84,000, or for a 15-year period, a present value of \$638,904.

These estimates of savings the FAA expects will derive from this final rule and do not include wear and tear to the airframe, lost opportunity, or the cost of

maintaining more assets than are actually necessary under conditions of optimum sorting capability.

The transponder requirement will assist significantly in the sorting process and initially may result in an increased number of interdictions. In the long run, however, successful implementation of the air strategy will deter air narcotics traffickers and force them to attempt other modes and methods. While this will make them more susceptible to surface-based law enforcement efforts, there will be a lower rate of air seizure.

The FAA is unable to define in numerical terms the value to society of the achievements expected from the improved effectiveness of drug interdiction efforts that would result from implementing the final rule. Drug interdiction is only one aspect of a comprehensive system of law enforcement activity that is conducted in a synergistic fashion in the battle against illegal drug commerce and drug abuse in the United States. However, while quantifying these benefits on a monetary basis would be too speculative, the FAA is confident that the resulting benefit to society from enhanced drug interdiction will be significant and will exceed the costs of this rule.

#### *Enhanced Aviation Safety*

Improved identification of legitimate aircraft operations, and consequently the expeditious identification and apprehension of those conducting drug smuggling operations, will decrease the frequency of such illegal airborne activity. Fewer operators engaged in hazardous flight techniques to avoid detection and apprehension will enhance the margin of safety in that airspace for those operators conducting legitimate operations. Similarly, it will diminish the risk of injury to persons and property on the surface.

A review of the National Transportation Safety Board's data base for drug-related aviation accidents revealed that 127 fatalities and 33 serious injuries occurred between 1975 and 1984. In this timeframe, the statistics equate to an annual average of 13 fatalities and 3 serious injuries related to drug trafficking activity. The FAA expects that the final rule will have a positive impact on these rates, though the FAA is unable to estimate to what extent.

Moreover, collateral benefits to the National Airspace System will result from these requirements. Transponder and Mode C capability will become available for use elsewhere in the system once it is in place for use in an ADIZ. Additional aircraft equipped with

Mode C transponders in specified airspace will provide controllers with a continuous, more complete ATC picture. In areas in which aircraft are provided with Mode C transponders and ATC clearances, this will allow altitude, distance and azimuth information to be correlated and issuance of the proper control instructions developed to assure that safe separation is maintained between participating and nonparticipating aircraft. In addition, the need to communicate via two-way radio is reduced. For example, controllers will not repeatedly have to ask pilots to report aircraft altitude; aircraft climb/descent paths can be observed independently for possible conflicts with other traffic; and unnecessary traffic advisories concerning noncontrolled aircraft are eliminated.

Further, existing automated radar tracking systems currently are programmed to predict continually and update the path of Mode C-equipped aircraft being tracked by the system. These predictions are constantly compared with those of controlled aircraft that are also tracked by the system. In addition, these systems compare the data with pre-programmed terrain information. Controllers are given visual and aural alerts when comparisons render a potentially hazardous situation for controlled aircraft.

Mode C also has the ability to provide critical information to collision avoidance system (TCAS)-equipped aircraft. The TCAS equipment transmits periodic interrogation signals. If a nearby aircraft is equipped with a basic transponder, that aircraft's range and azimuth from the TCAS-equipped aircraft is generated to the TCAS-equipped aircraft. However, if a nearby aircraft is equipped with a Mode C transponder, altitude information is provided in addition to range and azimuth. TCAS processes the data into a collision risk prediction and issues traffic advisories to the flightcrew. The type of advisory differs according to the version of TCAS that is used.

Sufficiently precise data are not available to describe the benefits of the incremental usage of transponders with Mode C in the system attributable solely to this rule. Consequently, the FAA cannot calculate a numerical value for this substantial general benefit.

#### *Comparison of Benefits and Costs*

Using (1) the AOPA estimate that 28,000 U.S.-registered aircraft were processed by the Customs Service upon arrival in the United States in 1984, and (2) the FAA's estimate that of those

aircraft 9,430 will have to upgrade to Mode C and 7,198 will have to install a Mode C transponder to conform with the final rule; the FAA estimates that the only incremental cost of this rule is an opportunity cost of \$689,000 to the operators of the latter 7,198 affected airplanes. All other costs to these operators regarding requirements that conform with this rule are attributed to the recently adopted Mode C rule.

The USCS and the USCG will save, over the 15-year period, an estimated \$4.2 million and \$11.6 million respectively, through a reduction in unnecessary operations. NORAD and the ANG also will save \$639,000.

The potential benefits from increased aviation safety are not quantifiable in monetary terms nor are the benefits of enhanced drug interdiction efforts. These benefits would be obtained from:

- An unmeasurable diminution in the number of operators who use hazardous flight techniques to avoid detection and apprehension, thereby enhancing the margin of safety in that airspace for those operators conducting legitimate operations;
- An indeterminable positive impact on the rate of drug-related aviation accidents, which between 1975 and 1984, occurred with an average annual frequency of 13 fatalities and 3 serious injuries related to drug trafficking; and
- The unquantifiable incremental safety benefits to the National Airspace System from increased usage of Mode C transponders as a spillover phenomenon attributable solely to this final rule regarding entry into the United States through an ADIZ.

The total potential benefits expected from all categories of improvement attributable to the final rule are expressed in monetary terms as:

- Operating Efficiency for Customs Service, \$4.2 million.
- Operating Efficiency for Coast Guard, \$11.6 million.
- Operating Efficiency for NORAD and Air National Guard, \$0.6 million.
- Total Operating Efficiency (All Services), \$16.4 million.
- Effective Drug Interdiction Value to Society, unquantifiable.
- Aviation Safety, unquantifiable.
- Total Benefits, \$16.4 million plus a substantial unquantifiable amount.

The potential benefit (\$16.4 million, discounted) exceeds the maximum potential cost (\$689,000) by a factor greater than 24 times over the 15-year life of the equipment for this rule, even without inclusion of the unquantifiable safety benefits that would be expected to result. Further, it is obvious that the

prevention of only one accident in which lives would be lost would, alone, more than pay for the cost of this rule. The FAA's opinion is that the data clearly indicate that the rule is justified on a benefit to cost basis.

#### Conclusion

For the reasons set forth above, the FAA has determined that this is not a major regulation as defined in Executive Order 12291. The FAA has further determined that this action is significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). In addition, it is certified that under the criteria of the Regulatory Flexibility Act this regulation, at promulgation, will not have a significant economic impact on a substantial number of small entities. A full regulatory evaluation has been placed in the public docket.

#### International Trade Impact Analysis

The final rule will have no impact on trade for both U.S. firms doing business in foreign countries and foreign firms doing business in the United States.

#### Regulatory Flexibility Determination

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

The FAA has adopted threshold values that define significant economic impact, and these values are stated in FAA Order 2100.14A. The threshold values for economic impact are adjusted for inflation and are expressed here in 1988 dollars. The size threshold value for small entity operators is a maximum number of nine aircraft owned or operated. The threshold value for a significant economic impact on an

unscheduled operator is an annualized cost of \$4,000.

The opportunity cost to install the equipment and to maintain it is \$96 per airplane. The opportunity cost is based on equipping a small low performance small airplane 6 months sooner than is otherwise required by a previous rule (Transponder with Automatic Altitude Reporting Capability Requirement and Controlled Airspace Common Floor, 53 FR 23356, June 21, 1988). No small entity reaches the annualized cost impact threshold of \$4,000. The threshold value (\$4,000) exceeds the maximum annualized cost for an owner or operator of nine airplanes ( $9 \times \$96 = \$864$ ). Therefore, this rule is not expected to have a significant economic impact on a substantial number of small entities who operate into, within, or out of an ADIZ.

#### Federalism Determination

The amendment set forth herein would 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 such regulations do not have federalism implications warranting the preparation of a Federalism Assessment.

#### List of Subjects in 14 CFR Part 99

Air traffic control, Airspace, National defense, Navigation (air), Security measures, Transponder.

#### The Amendment

Accordingly, the FAA amends FAR part 99 (14 CFR part 99) as follows:

#### PART 99—SECURITY CONTROL OF AIR TRAFFIC

1. The authority citation for part 99 continues to read:

Authority: 49 U.S.C. 1348, 1354(a), 1502, 1510, and 1522; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

2. By revising § 99.12 to read as follows:

#### § 99.12 Transponder-on requirements.

(a) *Aircraft transponder-on operation.* Each person operating an aircraft into or out of the United States into, within, or across an ADIZ designated in subpart B of this part, if that aircraft is equipped with an operable radar beacon transponder, shall operate the transponder, including altitude encoding equipment if installed, and shall reply on the appropriate code or as assigned by ATC.

(b) *ATC transponder equipment and use.* Effective September 7, 1990, unless otherwise authorized by ATC, no person may operate a civil aircraft into or out of the United States into, within, or across the contiguous U.S. ADIZ designated in subpart B of this part unless that aircraft is equipped with a coded radar beacon transponder.

(c) *ATC transponder and altitude reporting equipment and use.* Effective December 30, 1990, unless otherwise authorized by ATC, no person may operate a civil aircraft into or out of the United States into, within, or across the contiguous U.S. ADIZ unless that aircraft is equipped with a coded radar beacon transponder and automatic pressure altitude reporting equipment having altitude reporting capability that automatically replies to interrogations by transmitting pressure altitude information in 100-foot increments.

(d) Paragraphs (b) and (c) of this section do not apply to the operation of an aircraft which was not originally certificated with an engine-driven electrical system and which has not subsequently been certified with such a system installed, a balloon, or a glider.

Issued in Washington, DC, on February 26, 1990.

James B. Busey,

Administrator.

[FR Doc. 90-5134 Filed 3-6-90; 8:45 am]

BILLING CODE 4910-13-M