

Dated: January 13, 2005.

Allegra F. McCullough,

*Associate Deputy Administrator for
Government Contracting and Business
Development.*

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE217; Notice No. 23-05-01-SC]

Special Conditions: AMSAFE, Incorporated; Mooney Models M20K, M20M, M20R, and M20S; Inflatable Three-Point Restraint Safety Belt With an Integrated Airbag Device

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This notice proposes special conditions for the installation of an AMSAFE, Inc., Inflatable Three-Point Restraint Safety Belt with an Integrated Airbag Device on Mooney models M20K, M20M, M20R, and M20S. These airplanes, as modified by AMSAFE, Inc., will have novel and unusual design features associated with the lap belt portion of the safety belt, which contains an integrated airbag device. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. The proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Comments must be received on or before February 18, 2005.

ADDRESSES: Comments on this proposal may be mailed in duplicate to: Federal Aviation Administration (FAA), Regional Counsel, ACE-7, Attention: Rules Docket, Docket No. CE217, 901 Locust, Room 506, Kansas City, Missouri 64106, or delivered in duplicate to the Regional Counsel at the above address. Comments must be marked: Docket No. CE217. Comments may be inspected in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: Mr. Mark James, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE-111, 901 Locust, Kansas City,

Missouri, 816-329-4137, fax 816-329-4090, e-mail mark.james@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of these proposed special conditions by submitting such written data, views, or arguments, as they may desire. Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments will be considered by the Administrator. The proposals described in this notice may be changed in light of the comments received. All comments received will be available in the Rules Docket for examination by interested persons, both before and after the closing date for comments. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. CE217." The postcard will be date stamped and returned to the commenter.

Background

On April 13, 2004, AMSAFE, Inc., Aviation Inflatable Restraints Division, 1043 North 47th Avenue, Phoenix, AZ 85043, applied for a supplemental type certificate for the installation of an inflatable lap belt restraint with a standard upper torso restraint (or shoulder harness) in Mooney models M20 (K, M, R, and S). The Mooney models M20 (K, M, R, and S) are single-engine, multi-place airplanes.

The inflatable restraint system is a three-point safety belt restraint system consisting of a traditional shoulder harness and an inflatable airbag lap belt. The inflatable portion of the restraint system will rely on sensors to electronically activate the inflator for deployment. The inflatable restraint system will be made available on the pilot, co-pilot, and passenger seats of these airplanes.

In the event of an emergency landing, the airbag will inflate and provide a protective cushion between the occupant's head and structure within the airplane. This will reduce the potential for head and torso injury. The inflatable restraint behaves in a manner that is similar to an automotive airbag, but in this case, the airbag is integrated into the lap belt. While airbags and

inflatable restraints are standard in the automotive industry, the use of an inflatable three-point restraint system is novel for general aviation operations.

The FAA has determined that this project will be accomplished on the basis of providing the same level of safety as the current Mooney models M20 (K, M, R, and S). The FAA has two primary safety concerns with the installation of airbags or inflatable restraints:

- That they perform properly under foreseeable operating conditions; and
- That they do not perform in a manner or at such times as to impede the pilot's ability to maintain control of the airplane or constitute a hazard to the airplane or occupants.

The latter point has the potential to be the more rigorous of the requirements. An unexpected deployment while conducting the takeoff or landing phases of flight may result in an unsafe condition. The unexpected deployment may either startle the pilot or generate a force sufficient to cause a sudden movement of the control yoke. Either action could result in a loss of control of the airplane, the consequences of which are magnified due to the low operating altitudes during these phases of flight. The FAA has considered this when establishing these special conditions.

The inflatable restraint system relies on sensors to electronically activate the inflator for deployment. These sensors could be susceptible to inadvertent activation, causing deployment in a potentially unsafe manner. The consequences of an inadvertent deployment must be considered in establishing the reliability of the system. AMSAFE, Inc., must show either that the effects of an inadvertent deployment in flight are not a hazard to the airplane or that an inadvertent deployment is extremely improbable. In addition, general aviation aircraft are susceptible to a large amount of cumulative wear and tear on a restraint system. It is likely that the potential for inadvertent deployment increases as a result of this cumulative damage. Therefore, the impact of wear and tear on inadvertent deployment must be considered. Due to the effects of this cumulative damage, a life limit must be established for the appropriate system components in the restraint system design.

There are additional factors to be considered to minimize the chances of inadvertent deployment. General aviation airplanes are exposed to a unique operating environment, since the same airplane may be used by both experienced and student pilots. The effect of this environment on

inadvertent deployment must be understood. Therefore, qualification testing of the firing hardware/software must consider the following:

- The airplane vibration levels appropriate for a general aviation airplane; and
- The inertial loads that result from typical flight or ground maneuvers, including gusts and hard landings.

Any tendency for the firing mechanism to activate as a result of these loads or acceleration levels is unacceptable.

Other influences on inadvertent deployment include high intensity electromagnetic fields (HIRF) and lightning. Since the sensors that trigger deployment are electronic, they must be protected from the effects of these threats. To comply with HIRF and lightning requirements, the AMSAFE, Inc., inflatable restraint system is considered a critical system, since its inadvertent deployment could have a hazardous effect on the airplane.

Given the level of safety of the current Mooney M20 occupant restraints, the inflatable restraint system must show that it will offer an equivalent level of protection in the event of an emergency landing. In the event of an inadvertent deployment, the restraint must still be at least as strong as a Technical Standard Order approved belt and shoulder harness. There is no requirement for the inflatable portion of the restraint to offer protection during multiple impacts, where more than one impact would require protection.

The inflatable restraint system must deploy and provide protection for each occupant under a crash condition. The seats of the models M20 (K, M, R, and S) are not certificated to the requirements of § 23.562, and it is not known if they would remain in tact following exposure to the crash pulse identified in § 23.562. Therefore, the test crash pulse used to satisfy this requirement may have a peak longitudinal deceleration lower than that required by § 23.562. However, the test pulse onset rate (deceleration divided by time) must be equal to or greater than the onset rate of the pulse described in § 23.562. This will demonstrate that the crash sensor will trigger when exposed to a rapidly applied deceleration, like an actual crash event.

It is possible a wide range of occupants will use the inflatable restraint. Thus, the protection offered by this restraint should be effective for occupants that range from the fifth percentile female to the ninety-fifth percentile male. Energy absorption must be performed in a consistent manner for this occupant range.

In support of this operational capability, there must be a system to verify the integrity of this system before each flight. As an option, AMSAFE, Inc., can establish inspection intervals where they have demonstrated the system to be reliable between these intervals.

It is possible that an inflatable restraint will be "armed" even though no occupant is using the seat. While there will be means to verify the integrity of the system before flight, it is also prudent to require that unoccupied seats with active restraints not constitute a hazard to any occupant. This will protect any individual performing maintenance inside the cockpit while the aircraft is on the ground. The restraint must also provide suitable visual warnings that would alert rescue personnel to the presence of an inflatable restraint system.

In addition, the design must prevent the inflatable seatbelt from either being incorrectly buckled or installed such that the airbag would not properly deploy, or both. As an alternative, AMSAFE, Inc., may show that such deployment is not hazardous to the occupant and will still provide the required protection.

The cabins of the Mooney model airplanes identified in these special conditions are confined areas, and the FAA is concerned that noxious gasses may accumulate in the event of airbag deployment. When deployment does occur, either by design or inadvertently, there must not be a release of hazardous quantities of gas or particulate matter into the cockpit.

An inflatable restraint should not increase the risk already associated with fire. Therefore, the inflatable restraint should be protected from the effects of fire so that an additional hazard is not created by, for example, a rupture of the inflator.

Finally, the airbag is likely to have a large volume displacement and possibly impede the egress of an occupant. Since the bag deflates to absorb energy, it is likely that the inflatable restraint would be deflated at the time an occupant would attempt egress. However, it is appropriate to specify a time interval after which the inflatable restraint may not impede rapid egress. Ten seconds has been chosen as reasonable time. This time limit will offer a level of protection throughout the impact event.

Type Certification Basis

Under the provisions of § 21.101, AMSAFE, Inc., must show that the Mooney models M20 (K, M, R, and S), as changed, continue to meet the applicable provisions of the regulations

incorporated by reference in Type Certificate No. 2A3 or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations incorporated by reference in Type Certificate No. 2A3 are as follows:

Mooney M20K:

Model M20K (Serial Number 25–0001 through 25–2012) See Note 21 below (from Type Certificate Data Sheet). Civil Air Regulations (CAR) 3, effective November 1, 1949, as amended to May 18, 1954, with paragraph 3.74 of Amendment 3–13 dated August 25, 1955; CAR 3 effective May 15, 1956, as amended to October 1, 1959, paragraphs 3.109, 3.112, 3.115, 3.118, 3.120, and 3.441; in lieu of corresponding CAR 3 paragraphs, where applicable—14 CFR Part 23, effective February 1, 1965, as amended to September 14, 1969; §§ 23.33, 23.901 through 23.953, §§ 23.955 through 23.963, §§ 23.967 through 23.1047, §§ 23.1121 through 23.1193, §§ 23.1351 through 23.1401, § 23.1527, § 23.1553, as amended to June 17, 1970; §§ 23.1441 through 23.1449, as amended to February 1, 1977; §§ 23.1091 through 23.1105, as amended March 1, 1978; §§ 23.29; 14 CFR part 36, effective September 20, 1976.

Model M20K (Serial Number 25–2013 and on) See Note 21 below (from Type Certificate Data Sheet). Civil Air Regulations (CAR) 3, effective November 1, 1949, as amended to May 18, 1954, with paragraph 3.74 of Amendment 3–13; CAR 3 effective May 15, 1956, as amended to October 1, 1959, paragraphs 3.109, 3.112, 3.115, 3.118, 3.120, and 3.441; in lieu of corresponding CAR 3 paragraphs, where applicable—14 CFR part 23, effective February 1, 1965; § 23.33, § 23.901 through 23.953, §§ 23.955 through 23.963, §§ 23.967 through 23.1047, §§ 23.1121 through 23.1193, §§ 23.1351 through 23.1401, § 23.1527, § 23.1553 of amendment 23–7; §§ 23.1441 through 23.1449 of amendment 23–9; §§ 23.1091 through 23.1105 of amendment 23–17; § 23.1301 of amendment 23–20; § 23.29 of amendment 23–21; § 23.1529 of amendment 23–26; §§ 23.45 through 23.77 of amendment 23–34; § 23.1587 of amendment 23–45; §§ 23.1323 and 23.1325 of amendment 23–42; 14 CFR part 36, latest amendment at time of certification.

Note 21: M20K S/N's 25–2000 thru 25–2012 may be retrofitted to TSIO–360–SB2 engine and gross weight increase to 3130 Lbs. when complied with M20K Gross Weight Increase Retrofit Instructions.

Mooney M20M:

Model M20 Civil Air Regulations (CAR) 3, effective November 1, 1949, as amended to May 18, 1954, paragraph 3.74, as amended to August 25, 1955; paragraphs 3.109, 3.112, 3.115, 3.118, 3.120, and 34.441 of CAR 3, effective May 15, 1956, as amended to October 1, 1959. In lieu of corresponding CAR 3 paragraphs, where applicable—14 CFR part 23, effective February 1, 1965; § 23.29, as amended to March 1, 1978; § 23.33, as amended to September 14, 1969; §§ 23.901 through 23.953, §§ 23.955 through 23.963, §§ 23.967 through 23.1063, as amended to September 14, 1969; §§ 23.1091 through 23.1105, as amended to February 1, 1977; §§ 23.1121 through 23.1193, §§ 23.1351 through 23.1399, as amended to September 14, 1969; §§ 23.1401, as amended to August 11, 1971; §§ 23.1441 through 23.1449, as amended to June 17, 1970; § 23.1521, as amended to December 1, 1978; § 23.1525; § 23.1527, as amended to September 14, 1969; §§ 23.1545, 23.1549, 23.1553, as amended to December 1, 1978; § 23.1557, as amended to December 20, 1973; § 23.1559, as amended to March 1, 1978; § 23.1563, as amended to September 14, 1969; § 23.1583, as amended to December 1, 1978; 14 CFR part 36, effective September 20, 1976, as amended to December 22, 1988.

Mooney M20R:

Model M20R Civil Air Regulations (CAR) 3, effective November 1, 1949, as amended to May 18, 1954, paragraph 3.74, as amended to August 25, 1955; paragraphs 3.109, 3.112, 3.115, 3.118, 3.120, and 34.441 of CAR 3, effective May 15, 1956, as amended to October 1, 1959. In lieu of corresponding CAR 3 paragraphs, where applicable—14 CFR part 23, effective February 1, 1965; § 23.29, as amended to March 1, 1978; § 23.33, as amended to September 14, 1969; §§ 23.901 through 23.953, §§ 23.955 through 23.963, §§ 23.967 through 23.1063, as amended to September 14, 1969; §§ 23.1091 through 23.1105, as amended to February 1, 1977; §§ 23.1121 through 23.1193, §§ 23.1351 through 23.1399, as amended to September 14, 1969; § 23.1401, as amended to August 11, 1971; §§ 23.1441 through 23.1449, as amended to June 17, 1970; § 23.1521, as amended to December 1, 1978; § 23.1525; §§ 23.1527, as amended to September 14, 1969; §§ 23.1545, 23.1549, and 23.1553, as amended to December 1, 1978; §§ 23.1557, as amended to December 20, 1973; § 23.1559, as amended to March 1, 1978; § 23.1563, as amended to September 14, 1969; § 23.1583, as amended to December 1, 1978; 14 CFR part 36, effective

September 20, 1976, as amended to December 22, 1988.

Mooney M20S:

Model M20S Civil Air Regulations (CAR) 3, effective November 1, 1949, as amended May 18, 1954; except for paragraph 3.74 amended August 25, 1955; paragraph 3.109, .112, .115, .118, .120, and .441 of CAR 3, effective May 15, 1956, as amended October 1, 1959; and in lieu of corresponding CAR 3 paragraphs, where applicable—14 CFR part 23, effective February 1, 1965: Section 23.29, as amended by Amendment 23–21, dated March 1, 1978; §§ 23.33, dated September 14, 1969; §§ 23.45 through 23.77, as amended by Amendment 23–34, dated January 15, 1987; §§ 23.777, as amended by Amendment 23–7, dated September 14, 1969; §§ 23.901 through 23.953, §§ 23.955 through 23.963, §§ 23.967 through 23.1063, as amended by Amendment 23–7, dated September 14, 1969; §§ 23.1091 through 23.1105, as amended by Amendment 23–17, dated February 1, 1977; §§ 23.1121 through 23.1193, §§ 23.1351 through 23.1399, as amended by Amendment 23–7, dated September 14, 1969; § 23.1311, as amended by Amendment 23.49, dated March 11, 1996; § 23.1337(b), as amended by Amendment 23–7, dated September 14, 1969; § 23.1401, as amended by Amendment 23–11, dated August 11, 1971; §§ 23.1441 through 23.1449, as amended by Amendment 23–9, dated June 17, 1970; § 23.1521, as amended by Amendment 23–21, March 1, 1978; §§ 23.1525 and 23.1527, as amended by Amendment 23–7, dated September 14, 1969; § 23.1529, as amended by Amendment 23–26, dated October 14, 1980; §§ 23.1545, 23.1549, and 23.1553, as amended by Amendment 23–23, dated December 1, 1978; § 23.1555(a), as amended by Amendment 23–7, dated September 14, 1969; § 23.1557, as amended by Amendment 23–14, dated December 20, 1973; § 23.1559, as amended by Amendment 23–21, dated March 1, 1978; § 23.1563, as amended by Amendment 23–7, dated September 14, 1969; §§ 23.1581 through 23.1589, as amended by Amendment 23–34, dated January 15, 1987; 14 CFR part 36, effective September 20, 1976, the current amendment in effect at date of certification; and Equivalent.

For the models listed above, the certification basis also includes all exemptions, if any; equivalent level of safety findings, if any; and the special conditions adopted by this rulemaking action.

If the Administrator finds that the applicable airworthiness regulations (*i.e.*, part 23 as amended) do not contain

adequate or appropriate safety standards for the AMSAFE, Inc., inflatable restraint as installed on these Mooney models because of a novel or unusual design feature special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, as defined in § 11.19, are issued in accordance with § 11.38, and become part of the type certification basis in accordance with § 21.101.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, the special conditions would also apply to that model under the provisions of § 21.101.

Novel or Unusual Design Features

The Mooney models M20 (K, M, R, and S) will incorporate the following novel or unusual design feature:

The AMSAFE, Inc., Inflatable Three-Point Restraint Safety Belt With an Integrated Airbag Device. The purpose of the airbag is to reduce the potential for injury in the event of an accident. In a severe impact, an airbag will deploy from the lap belt portion of the restraint, in a manner similar to an automotive airbag. The airbag will deploy between the head of the occupant and airplane interior structure. This will, therefore, provide some protection to the head of the occupant. The restraint will rely on sensors to electronically activate the inflator for deployment.

The Code of Federal Regulations state performance criteria for seats and restraints in an objective manner. However, none of these criteria are adequate to address the specific issues raised concerning inflatable restraints. Therefore, the FAA has determined that, in addition to the requirements of part 21 and part 23, special conditions are needed to address the installation of this inflatable restraint.

Applicability

As discussed above, these special conditions are applicable to the Mooney models M20 (K, M, R, and S) equipped with the AMSAFE, Inc., three-point inflatable restraint system. Should AMSAFE, Inc., apply at a later date for a supplemental type certificate to modify any other model on the Type Certificates identified in these special conditions to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101.

Conclusion

This action affects only certain novel or unusual design features on the Mooney models M20 (K, M, R, and S). It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.101; and 14 CFR 11.38 and 11.19.

The Proposed Special Conditions

The FAA has determined that this project will be accomplished on the basis of not lowering the current level of safety for the Mooney models M20 (K, M, R, and S) occupant restraint system. Accordingly, the FAA proposes the following special conditions as part of the type certification basis for the Mooney models M20 (K, M, R, and S), as modified by AMSAFE, Inc.

Inflatable Three-Point Restraint Safety Belt With an Integrated Airbag Device on Mooney Models M20 (K, M, R, and S)

1. It must be shown that the inflatable restraint will deploy and provide protection under crash conditions. Compliance will be demonstrated using the dynamic test condition specified in § 23.562, which may be modified as follows:

a. The peak longitudinal deceleration may be reduced; however, the onset rate of the deceleration must be equal to or greater than the crash pulse identified in § 23.562.

b. The peak longitudinal deceleration must be above the deployment threshold of the crash sensor and equal to or greater than the forward static design longitudinal load factor required by the original certification basis of the airplane.

c. The means of protection must take into consideration a range of stature from a 5th percentile female to a 95th percentile male. The inflatable restraint must provide a consistent approach to energy absorption throughout the range.

2. The inflatable restraint must provide adequate protection for each occupant. In addition, unoccupied seats that have an active restraint must not constitute a hazard to any occupant.

3. The design must prevent the inflatable restraint from either being incorrectly buckled or incorrectly

installed, or both, such that the airbag would not properly deploy. Alternatively, it must be shown that such deployment is not hazardous to the occupant and will provide the required protection.

4. It must be shown that the inflatable restraint system is not susceptible to inadvertent deployment as a result of wear and tear or the inertial loads resulting from in-flight or ground maneuvers (including gusts and hard landings) that are likely to be experienced in service.

5. It must be extremely improbable for an inadvertent deployment of the restraint system to occur, or an inadvertent deployment must not impede the pilot's ability to maintain control of the airplane or cause an unsafe condition (or hazard to the airplane). In addition, a deployed inflatable restraint must be at least as strong as a Technical Standard Order (C114) certificated belt and shoulder harness.

6. It must be shown that deployment of the inflatable restraint system is not hazardous to the occupant or result in injuries that could impede rapid egress. This assessment should include occupants whose restraint is loosely fastened.

7. It must be shown that an inadvertent deployment that could cause injury to a standing or sitting person is improbable. In addition, the restraint must also provide suitable visual warnings that would alert rescue personnel to the presence of an inflatable restraint system.

8. It must be shown that the inflatable restraint will not impede rapid egress of the occupants 10 seconds after its deployment.

9. For the purposes of complying with HIRF and lightning requirements, the inflatable restraint system is considered a critical system since its deployment could have a hazardous effect on the airplane.

10. It must be shown that the inflatable restraints will not release hazardous quantities of gas or particulate matter into the cabin.

11. The inflatable restraint system installation must be protected from the effects of fire such that no hazard to occupants will result.

12. There must be a means to verify the integrity of the inflatable restraint activation system before each flight or it must be demonstrated to reliably operate between inspection intervals.

13. A life limit must be established for appropriate system components.

14. Qualification testing of the internal firing mechanism must be performed at vibration levels

appropriate for a general aviation airplane.

Issued in Kansas City, Missouri, on January 11, 2005.

Michael K. Dahl,

Acting Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 05-973 Filed 1-18-05; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2005-20081; Directorate Identifier 2004-NM-132-AD]

RIN 2120-AA64

Airworthiness Directives; Boeing Model 777-200 and 777-300 Series Airplanes

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for certain Boeing Model 777-200 and -300 series airplanes. This proposed AD would require modification of the operational program software (OPS) of the air data inertial reference unit (ADIRU). This proposed AD is prompted by a report of the display of erroneous heading information to the pilot due to a defect in the OPS of the ADIRU. We are proposing this AD to prevent the display of erroneous heading information to the pilot, which could result in loss of the main sources of attitude data, consequent high pilot workload, and subsequent deviation from the intended flight path.

DATES: We must receive comments on this proposed AD by March 7, 2005.

ADDRESSES: Use one of the following addresses to submit comments on this proposed AD.

- *DOT Docket Web site:* Go to <http://dms.dot.gov> and follow the instructions for sending your comments electronically.

- *Government-wide rulemaking Web site:* Go to <http://www.regulations.gov> and follow the instructions for sending your comments electronically.

- *Mail:* Docket Management Facility, U.S. Department of Transportation, 400 Seventh Street SW., Nassif Building, room PL-401, Washington, DC 20590.

- *By fax:* (202) 493-2251.

- *Hand Delivery:* Room PL-401 on the plaza level of the Nassif Building,