

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 101

[Docket No. 26965; Notice No. 92-12]

RIN: 2120-AB75

Model Rocket Operations

AGENCY: Federal Aviation Administration (FAA) DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This notice proposes to reduce the restrictions on the operation of model rockets that use not more than 125 grams (4.4 ounces) of propellant; that are made of paper, wood, or breakable plastic; that contain no substantial metal parts; and that weigh not more than 1,500 grams (53 ounces). The FAA believes that this amendment will foster an important aeronautical education activity while retaining appropriate safety precautions.

DATES: Comments must be received on or before December 9, 1992.

ADDRESSES: Comments on the proposal may be mailed or delivered in duplicate to: Federal Aviation Administration, Office of Chief Counsel, Attention: Rules Docket (AGC-10), Docket No. [26965], 800 Independence Avenue, SW., Washington, DC 20591. Comments may be examined in the Rules Docket weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m.

FOR FURTHER INFORMATION CONTACT: Mr. Joseph C. White, Air Traffic Rules Branch, ATP-230, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-8783.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested parties are invited to participate in this proposed rulemaking by submitting necessary written data, views, or arguments. Comments that provide the factual basis supporting the views and suggestions presented are particularly helpful in developing reasoned regulatory decisions on the proposal. Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address listed above. Commenters wishing the FAA to acknowledge receipt of their comments on the notice must submit with those comments a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. [26965]." The postcard will be date/time stamped and returned to the commenter. All

communications received on or before the specified closing date for comments will be considered by the Administrator before taking further rulemaking action. The proposals contained in this notice may be changed in light of comments received. All comments submitted will be available, both before and after the closing date for comments. A report summarizing each substantive public contact with FAA personnel concerned with this rulemaking will be filed in the docket.

Availability of NPRM's

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA-430, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-3484. Communications must identify the notice number of this NPRM. Persons interested in being placed on a mailing list for future notices should also request a copy of Advisory Circular No. 11-2A "Notice of Proposed Rulemaking Distribution System," which describes the application procedures.

Background

On September 12, 1984, the FAA announced in the *Federal Register* (49 FR 35789) a Regulatory Review Program for Part 101 of the Federal Aviation Regulations (FAR) and invited comments and recommendations as part of this review. Comments received during the Regulatory Review addressed the following areas of concern: (1) Balloon operations, including moored vs. tethered balloon requirements, lighting requirements and operations in the proximity of airports; and (2) model rocket operations. Comments on model rockets concerned proximity of operators to airports, increased gross weight, and propellant standards. Response to the announcement of the review program was very limited, except for those issues regarding the operation of model rockets. This notice addresses only those issues related to the operation of unmanned (model) rockets.

National Association of Rocketry

On May 24, 1985, the National Association of Rocketry (NAR), an affiliate of the National Aeronautic Association, representing thousands of model rocket consumers, and the Hobby Industry Association (HIA), representing the manufacturers of model rocket kits, motors, and accessories, petitioned the FAA to consider rulemaking action to amend FAR § 101.1, Applicability. The petitioners seek to raise the upper

weight limit on excepted model rockets from 16 ounces to 1,500 grams (approximately 53 ounces) and the allowable propellant mass from 4 ounces to 125 grams (approximately 4.4 ounces). According to the petitioners, these changes are based on studies conducted by the NAR and are recommended to help keep model rocketry in the U.S. abreast of advancements made in this educational aerospace hobby/sport.

Section of the FAR Affected

Section 101.1, in pertinent part, establishes the applicability of part 101 to the operation of any unmanned rockets using more than 4 ounces of propellant or having a total weight of more than 16 ounces, including the propellant.

A summary of the petitioners' request was published in the *Federal Register* on March 19, 1986 (51 FR 9458) for public comment. The only comment received was from one of the petitioners, who supported the petition.

Supporting Information

The petitioner stated that from 1959 to 1962, when the current part 101 was being drafted, the NAR played a major role in suggesting the present limits on propellant and gross weight for exclusion from Part 101, Applicability. At that time, model rocketry was strictly an American hobby/sport. The Federation Aeronautique Internationale first established its "Sporting Code for Space Models" in 1964. Considering the construction techniques, materials, and design principles of model rockets that existed in the 1959-1962 time period, the NAR considered 4 ounces of propellant and 16 ounces of gross weight to be the maximum value likely to be achieved in the model rocketry hobby in the foreseeable future. The FAA accepted these limits which formed the basis for the current FAR § 101.1.

The petitioner further stated that the state of the art in model rocketry has progressed to the point where larger, heavier, and more powerful model rockets are both feasible and safe due to improved propellants, materials, and safety procedures. NAR stated that it had conducted an intensive and inclusive study of potential safety hazards of model rockets having increased gross weights. The study was undertaken by a special committee of the NAR that was established in 1983 and staffed by model rocketeers, aeronautical engineers, National Aeronautics and Space Administration sounding rocket experts, rocket propellant specialists, doctors of

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medicine, licensed pilots, and computer engineers. The study purports to validate the conclusion that no degradation of aviation safety will result from the proposed increase in propellant and rocket weights.

The study included an evaluation of the effects of crosswinds on the launching of model rockets. It concluded that heavier rockets would be less susceptible to tip-over or course derotation from wind than the lighter rockets.

The study also included an investigation regarding the potential of an incident between a 1,500-gram model rocket and an aircraft in flight. NAR's researchers assumed that any probable hazards to aircraft would fall in the following two areas: (1) Airframe penetration during high-speed powered flight of models; and (2) foreign object damage, similar to that posed by a bird, during the model's low-speed drifting return to the ground under a miniature parachute or other recovery device.

Potential for Damaging an Aircraft in Flight

The study concluded that the probability of a model rocket causing foreign object damage to an aircraft in flight during the model's slow descent to the ground, via a recovery device, depends on how much the model weighs, how high it flies, and how long it takes to return to the ground. The increase of allowable propellant, coupled with more powerful, modern model rocket motors when used with a very light rocket (less than one pound) could cause an increase in the maximum achievable altitude of only 20 percent (to 7,200 feet for a single-stage rocket and to 10,000 feet for a two-stage rocket). This could allow a model rocket to stay aloft under its recovery device for up to 10 minutes. The probability of an aircraft encountering such a rocket was estimated (by the NAR special committee) to be 1 in 48 million flights of these high performance model rockets. When a maximum of 125 grams of propellant is used with a 1,500-gram model rocket, the maximum achievable altitude is much less approximately 2,400 feet. In addition, impact with an aircraft during the upward powered flight of a 1,500-gram model rocket might cause airframe damage comparable to the impact of large hailstones.

The worst possible collision scenario that could occur would be during the model's slow descent phase, if it were to be ingested by a turbine engine. NAR noted that, since current regulations require aircraft turbine engines to remain controllable following ingestion of tire treads and 4-pound birds, turbine

engines also should be able to continue operating after ingesting gravel or 1.5-pound birds. According to the petitioner, low density, non-metallic, high performance model rockets weighing up to 1,500 grams would not pose greater damage potential than these.

To confirm the results obtained by computer analyses, literature searches, statistical analyses, and historical data, the petitioner conducted actual flight tests at a site 5 miles north of an airport. Sixteen high-powered, high-weight model rockets were launched. All models were tracked using the FAA-approved two station altitude/azimuth theodolite system. Comparisons were made between high-powered model rockets weighing up to 1,500 grams with 125 grams of propellant, and those currently excluded from regulation by the FAR. These flight tests confirmed the other analyses and data; however, these tests did not include verification of the potential for the occurrence of an impact with an aircraft in flight or the resulting consequences of such an occurrence.

The final report of the NAR Committee was presented to the NAR Board of Trustees in February 1985. The board accepted the committee's report and the recommendation that NAR-permissible model rocket gross weights be increased to 1,500 grams and propellant weights to 125 grams. The report also was accepted to the Model Rocket Division of the HIA. The recommendations were forwarded to the National Fire Protection Association's (NFPA) committee on pyrotechnics, for their consideration in revising NFPA 1122 Code for Unmanned Rockets. This is a voluntary standard that is widely accepted by state legislatures and public safety officials having rulemaking powers.

FAA Analysis

The FAA has reviewed the NAR study as well as other pertinent data. The FAA also notes that the NAR estimates that there have been approximately 250,000 launches of model rockets since the inception of the sport and that the National Transportation Safety Board (NTSB) reports that there have been no midair collisions between model rockets and aircraft in flight. The FAA considers that it is to the public's benefit to foster interest in aeronautics and that model rocketry provides a valuable means for hobbyists to pursue that interest. The FAA further believes that the educational value of this activity is enhanced by remaining abreast of the state of the art technology.

The FAA commissioned a study of its own to evaluate the potential for a

hazard to aviation safety resulting from the operation of model rockets.

The March 1991 final report included an analysis of the likelihood for damage to an aircraft in flight if impacted by a model rocket, as well as a conclusion of the probability of such an occurrence. The researchers, the Galaxy Scientific Corporation, of Mays Landing, NJ, made the following conclusions:

- Model rockets have the capability to reach the theoretical speed of 600 knots and the altitude of 4,000 feet based on the calculations performed in the report.
 - Searches of FAA and NTSB data bases from 1984 to 1989 indicate that the probability of collision between model rockets and aircraft is remote.
 - The two most vulnerable types of aircraft are general aviation aircraft and rotorcraft, due to lower operational altitude and velocity and different structural design conditions.
 - The results of structural analysis show that model rockets under present and proposed rules have the capability to damage aircraft, assuming that a collision occurs.
 - Some operational limits for model rockets should be specified, (i.e., do not operate model rockets in controlled airspace or within 5 miles of the boundary of any airport). This notice would limit the operations of model rockets at least 5 nautical miles from the airports and further reduce the chance of collision between a model rocket and an aircraft.
- The study, in its entirety, has been placed in the docket for public inspection.

Conclusions

The FAA must balance considerations of advancing the study of and interest in aeronautics resulting from model rocket activities with concern for the protection of aircraft in flight. The Agency also must balance the remote likelihood of a collision between a model rocket and an aircraft and the consequences of such an occurrence. The FAA has concluded that the outstanding safety record of model rocketry to date is due, in part, to the establishment and compliance with voluntary standards such as the NAR's Model Rocket Safety Code. That code provides, in part, for a launch safety officer to terminate activity when aircraft are observed entering the area where model rockets are being launched. The FAA also believes that if the size and mass of model rockets are increased, there is an increase in the potential for harm to an aircraft in flight should a collision occur. It is therefore essential to ensure that persons

operating larger model rockets observe such safety precautions. The FAA has determined that it is in the public interest to accommodate the advancement of model rocketry with regulations that also will provide an adequate level of assurance that such rockets will not jeopardize the safety of aircraft in flight.

The Proposal

The FAA proposes to add § 101.22 to part 101 for the FAR to allow the operation of model rockets with up to 125 grams (approximately 4.4 ounces) of propellant and a maximum gross weight of 1,500 grams (approximately 53 ounces), including propellant, as long as certain precautions are taken. As is now the case, model rocketeers still would be prohibited from launching rockets into, or through, clouds, from flying near aircraft in flight, or from being hazardous to people or property. The prohibition against operating such model rockets in controlled airspace, within 5 miles of an airport, within 1,500 feet of any non-participant, or between sunset and sunrise, however, will not apply provided the person operating the model rocket complies with the provisions of § 101.25, which the FAA is proposing to modify in this NPRM requiring that model rocketeers provide pertinent information about the operation to the nearest FAA Air Traffic Control (ATC) facility. The FAA has determined that organizations that previously were excluded from the requirements regarding spectator proximity or night operations have demonstrated a very effective safety record. The FAA believes that reestablishing the threshold at not more than 125 grams (approximately 4.4 ounces) of propellant and not more than 1500 grams (approximately 53 ounces) of total rocket weight, does not warrant spectator restraint or operational time prohibitions.

The FAA is proposing to make an editorial change to § 101.25 to clarify the intent of the existing language dealing with notification of an intended operation. The current language requires FAA notification "within 24 to 48 hours" of an intended operation. A literal interpretation of the requirement would allow a proponent to notify the FAA anytime preceding the actual time of the operation and up to 48 hours prior to the operation. Such interpretation is not the original intent of the requirement. The intent is for the FAA to receive notification at least 24 hours prior to the operation but no more than 48 hours prior to the operation. The 24-hour prior notification is the minimum necessary for the FAA and airport management, as

appropriate, to advise pilots planning to operate in the area where unmanned rocket operations are planned. The maximum 48-hour notification is the optimum amount of time that a proponent would have finalized his/her intended operation. Therefore, the FAA believes it minimizes the revisions to advisories given to pilots concerning a planned unmanned rocket operation. Accordingly, the language in the rule would be changed to reflect the original intent of the rule.

Regulatory Evaluation Summary

Introduction

This section summarizes the full regulatory evaluation that provides more detailed estimates of the economic consequences of this regulatory action. This summary and the full evaluation quantify, to the extent practicable, anticipated benefits and estimated costs to the private sector, consumers, and Federal, State, and local governments.

Executive Order 12291, dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if potential benefits to society outweigh potential costs for each regulatory change. 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 controversial or 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 rule is not "major" as defined in the Executive Order; therefore, a full regulatory analysis, which includes the identification and evaluation of cost-reducing alternatives to this rule, has not been prepared. Instead, the agency has prepared a more concise document, termed a regulatory evaluation, that analyzes only this rule without identifying alternatives. In addition to a summary of the regulatory evaluation, this section also contains a summary of the regulatory flexibility determination required by the 1980 Regulatory Flexibility Act (Pub. L. 96-354) and an international trade impact assessment. If more economic information is desired than is contained in this summary, the reader is referred to the full regulatory evaluation contained in the docket.

Benefits

The proposed rule likely would provide benefits. The FAA has determined that the proposed

regulations will accommodate the advancement of model rocketry and simultaneously provide an adequate level of assurance that such rockets will not jeopardize the safety of aircraft in flight.

Costs

The proposed rule for unmanned rockets consists of provisions that specify the requirements for operating certain model rockets (rockets using not more than 125 grams of propellant; made of paper, wood, or breakable plastic; containing no substantial metal parts, and weighing not more than 1,500 grams including propellant). The proposed rule is designed to accommodate the advancement of model rocketry with regulations that also will provide an adequate level of assurance so that such rockets will not jeopardize the safety of aircraft in flight.

The FAA estimates that the proposed changes in the NPRM would have no cost impact to users of model rockets. In fact, the proposed changes might produce a cost savings. The savings associated with these changes, however, are considered negligible and unquantifiable.

This provision may impose minor costs on the FAA. Persons operating model rockets would have to provide the information required in existing § 101.25 to the airport manager and to the FAA ATC facility that is nearest the place of the intended operation. The FAA would incur costs associated with receiving, recording, and evaluating the material that has been received. The FAA believes that these costs would be minor.

Conclusions

Based on the fact that there are little or no compliance costs coupled with the potential benefits, the FAA concludes that the proposed rule would be cost-beneficial.

International Trade Impact Analysis

The proposed amendments would apply to users of model rockets in the United States only. There would be no economic impact resulting from any of the proposed amendments and the FAA has determined that these regulations would not have an impact on international trade, if promulgated.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires agencies to review

rules that may have "a significant cost impact on a substantial number of small entities."

With regard to this regulatory evaluation, there would be no cost associated with any of the proposed amendments. The FAA has determined that the proposed amendments contained in this NPRM would not have a significant economic impact on a substantial number of small entities.

Federalism Implications

The regulations proposed 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 a regulation does not have federalism implications warranting the preparation of a Federalism Assessment.

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 proposed regulation is not major under Executive Order 12291. In addition, the FAA certifies that this proposal, if adopted, will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. This proposal is not considered significant under DOT Regulatory Policies and Procedures (44

FR 11034; February 26, 1979). An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT."

List of Subjects in 14 CFR Part 101

Aircraft, Kites, Moored balloons, Unmanned free balloons, Unmanned rockets.

The Proposed Amendment

In consideration of the foregoing, the FAA proposes to amend Part 101 of the Federal Aviation Regulations, as follows:

PART 101—[AMENDED]

1. The authority citation for part 101 continues to read as follows:

Authority: 49 U.S.C. App. 1348, 1354, 1372, 1421, 1442, 1443, 1472, 1510, and 1522; E.O. 11514; 49 U.S.C. 106(g).

Subpart C—Unmanned Rockets

2. Section 101.22 is added to read as follows:

§ 101.22 Special provisions for large model rockets.

Persons operating model rockets that use not more than 125 grams of propellant; that are made of paper, wood, or breakable plastic; that contain no substantial metal parts, and that weigh not more than 1,500 grams, including the propellant, need not

comply with subparagraphs 101.23 (b), (c), (g), and (h) provided:

(a) That person complies with all provisions of § 101.25; and

(b) The operation is not conducted within 5 nautical miles of an airport runway or other landing area unless the information required in § 101.25 is also provided to the manager of that airport.

3. Section 101.25 is amended by revising the introductory text and paragraphs (a), (b), (c), and (d) to read as follows:

§ 101.25 Notice requirements.

No person may operate an unmanned rocket unless that person gives the following information to the FAA ATC facility nearest to the place of intended operation no less than 24 hours prior to and no more than 48 hours prior to beginning the operation:

(a) The names and addresses of the operators, except when there are multiple participants at a single event, a single name may be designated for all operations in the event;

(b) The estimated number of rockets to be operated;

(c) The estimated size and the estimated weight of each rocket; and

(d) The estimated highest altitude or flight level to which each rocket will be operated.

Issued in Washington, DC, on September 2, 1992.

L. Lane Speck,

Director, Air Traffic, Rules and Procedures Service.

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