

List of Subjects in 14 CFR Part 71

Airspace, Incorporation by reference, Navigation (air).

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend 14 CFR part 71 as follows:

PART 71—DESIGNATION OF CLASS A, B, C, D, AND E AIRSPACE AREAS; AIR TRAFFIC SERVICE ROUTES; AND REPORTING POINTS

1. The authority citation for 14 CFR part 71 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40103, 40113, 40120; E.O. 10854, 24 FR 9565, 3 CFR, 1959–1963 Comp., p. 389.

§ 71.1 [Amended]

2. The incorporation by reference in 14 CFR part 71.1 of the FAA Order 7400.9N, Airspace Designations and Reporting Points, dated September 1, 2005, and effective September 15, 2005, is amended as follows:

*Paragraph 6002—Class E Airspace***ANM MT E Kalispell, MT [Revised]**

Kalispell/Glacier Park International Airport, MT

(Lat. 48°18'38" N., long. 114°15'22" W.)

Smith Lake NDB

(Lat. 48°06'30" N., long. 114°27'40" W.)

Within a 4.3-mile radius of the Kalispell/Glacier Park International Airport, and within 1.8 miles each side of the 17°(M) 035°(T) bearing from the Smith Lake NDB extending southwest from the 4.3-mile radius to the Smith Lake NDB.

* * * * *

Issued in Seattle, Washington, on March 9, 2006.

R.D. Engelke,

Acting Area Director, Western En Route and Oceanic Operations.

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DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Parts 401, 404, 405, 406, 413, 420, 431, 437**

[Docket No. FAA–2006–24197]

RIN 2120–AI56

Experimental Permits for Reusable Suborbital Rockets

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The Federal Aviation Administration (FAA) proposes to amend its commercial space transportation regulations under the Commercial Space Launch Amendments Act of 2004. The FAA proposes application requirements for an operator of a reusable suborbital rocket to obtain an experimental permit. The FAA also proposes operating requirements and restrictions on launch and reentry of reusable suborbital rockets operated under a permit.

DATES: Send your comments on or before May 30, 2006.

ADDRESSES: You may send comments identified by Docket Number FAA–2006–24197 using any of the following methods:

- 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 20590–001.
- Fax: 1–202–493–2251.
- Hand Delivery: Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For more information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document.

Privacy: We will post all comments we receive, without change, to <http://dms.dot.gov>, including any personal information you provide. For more information, see the Privacy Act discussion in the **SUPPLEMENTARY INFORMATION** section of this document.

Docket: To read background documents or comments received, go to <http://dms.dot.gov> at any time or to Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Randy Repcheck, Office of Commercial Space Transportation, Systems Engineering and Training Division, AST–300, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267–8760; facsimile (202) 267–5463, e-mail randy.repcheck@faa.gov. For legal information, contact Laura Montgomery,

Senior Attorney, Office of the Chief Counsel, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267–3150; facsimile (202) 267–7971, e-mail laura.montgomery@faa.gov.

SUPPLEMENTARY INFORMATION:**Comments Invited**

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. We also invite comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. The docket is available for public inspection before and after the comment closing date. If you wish to review the docket in person, go to the address in the **ADDRESSES** section of this preamble between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. You may also review the docket using the Internet at the Web address in the **ADDRESSES** section.

Privacy Act: Using the search function of our docket Web site, anyone can find and read the comments received into any of our dockets, including the name of the individual sending the comment (or signing the comment on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (65 FR 19477–78) or you may visit <http://dms.dot.gov>.

Before acting on this proposal, we will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change this proposal in light of the comments we receive.

If you want the FAA to acknowledge receipt of your comments on this proposal, include with your comments a pre-addressed, stamped postcard on which the docket number appears. We will stamp the date on the postcard and mail it to you.

Availability of Rulemaking Documents

You can get an electronic copy using the Internet by:

(1) Searching the Department of Transportation's electronic Docket Management System (DMS) Web page (<http://dms.dot.gov/search>);

(2) Visiting the Office of Rulemaking's Web page at http://www.faa.gov/regulations_policies; or

(3) Accessing the Government Printing Office's Web page at <http://www.gpoaccess.gov/fr/index.html>.

You can also get a copy by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-9680. Make sure to identify the docket number, notice number, or amendment number of this rulemaking.

Authority for This Rulemaking

The FAA's authority to issue rules regarding space transportation safety is found under the general rulemaking authority, 49 U.S.C. 322(a), of the Secretary of Transportation to carry out 49 U.S.C. Subtitle IX, chapter 701, 49 U.S.C. 70101-70121 (Chapter 701). Additionally, the recently enacted Commercial Space Launch Amendments Act of 2004 (the CSLAA) mandates this rulemaking through section 70105, which creates the FAA's new permit authority, and section 70120, which requires that this rulemaking be complete by June 23, 2006. If the FAA does not issue a final rule by December 23, 2007, Congress prohibits the FAA from issuing any permits for launch or reentry until the final regulations are issued.

Background

Chapter 701 authorizes the Secretary of Transportation and, through delegations, the FAA's Associate Administrator for Commercial Space Transportation, to oversee, license, and regulate both launches and reentries of launch and reentry vehicles, and the operation of launch and reentry sites when carried out by U.S. citizens or within the United States. 49 U.S.C. 70104, 70105; U.S. Federal Aviation Administration, Commercial Space Transportation Delegations of Authority, N1100.240 (Nov. 21, 1995). Chapter 701 directs the FAA to exercise this responsibility consistent with public health and safety, safety of property, and the national security and foreign policy interests of the United States, and to encourage, facilitate, and promote commercial space launch and reentry by the private sector. 49 U.S.C. 70103, 70105.

On December 23, 2004, President Bush signed into law the Commercial Space Launch Amendments Act of 2004

(CSLAA). The CSLAA changes current law in several significant ways. One such change, which establishes an experimental permit regime for developmental reusable suborbital rockets, is the subject of this rulemaking. The FAA is implementing other provisions of the CSLAA in a companion rulemaking entitled, "Human Space Flight Requirements for Crew and Space Flight Participants."

A permit is available as an alternative to licensing for operators of reusable suborbital rockets. The CSLAA defines a suborbital rocket as a vehicle, rocket-propelled in whole or in part, intended for flight on a suborbital trajectory, and the thrust of which is greater than its lift for the majority of the rocket-powered portion of ascent. 49 U.S.C. 70102. To be eligible for an experimental permit, a reusable suborbital rocket must be flown for the following purposes:

- Research and development to test new design concepts, new equipment, or new operating techniques,
 - Showing compliance with requirements as part of the process for obtaining a license under Chapter 701, or
 - Crew training before obtaining a license for a launch or reentry using the design of the rocket for which the permit would be issued.¹
- 49 U.S.C. 70105a(d).

The reusable suborbital rocket must also be flown on suborbital trajectory, which the CSLAA defines as the intentional flight path of a launch vehicle, reentry vehicle, or any portion thereof, whose vacuum instantaneous impact point (the location on Earth where a vehicle would impact if it were to fail, calculated in the absence of atmospheric drag effects) does not leave the surface of the Earth. 49 U.S.C. 70102.

For operators of airplane-like vehicles, the CSLAA's definitions of suborbital rocket and suborbital trajectory establish the circumstances under which the operator will be required to conduct vehicle flights under an experimental permit or launch license, rather than through a special airworthiness certificate in the experimental category. For some vehicles, the proposed rule would make it possible to conduct early test flights, including glide tests or flights under jet power only, under a special

¹ The CSLAA defines crew as any employee of a licensee or transferee, or of a contractor or subcontractor of a licensee or transferee, who performs activities in the course of that employment directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings. 49 U.S.C. 70102.

airworthiness certificate, prior to transitioning to an experimental permit. The FAA will make the authorization process for operators of these vehicles as seamless as possible.

References

The FAA has cited the following references in this NPRM. Copies of each have been placed in the docket.

- Amateur-Built Aircraft and Ultralight Flight Testing Handbook*, AC 90-89A
- Department of Defense Standard Practice: System Safety*, MIL-STD-882D
- Equipment, Systems, and Installations in Part 23 Airplanes*, AC 23.1309
- Guide to the Identification of Safety-Critical Hardware Items for Reusable Launch Vehicle (RLV) Developers*, American Institute of Aeronautics and Astronautics (AIAA)
- Guidelines for Experimental Permits for Reusable Suborbital Rockets*, May, 2005
- Reusable Launch and Reentry Vehicle System Safety Process*, AC 431.35-2

Current Guidelines

Currently, the FAA issues an experimental permit on a case-by-case basis. To that end, the FAA issued Guidelines for Experimental Permits for Reusable Suborbital Rockets (May 2005) to assist applicants and the FAA pending implementation of regulations.

General Discussion of the Proposals

A. FAA Approach to Experimental Permits

Congress enacted an experimental permit regime to streamline the authorization process for developmental reusable suborbital rockets. As the legislative history states, Congress intended that, "[a]t a minimum, permits should be granted more quickly and with fewer requirements than licenses." H.Rep. 108-429 Sec. VII. Congressman Rohrabacher, chairman of the House Subcommittee on Space and Aeronautics, also clarified the intent of the experimental permit by noting that the experimental flight permits should make it easier for an operator to launch. Even more significantly, the House Science Committee questioned whether the FAA should use its traditional risk measure of expected casualty when issuing permits.²

Congress intends an experimental permit regime to reduce the regulatory burden on developers of reusable suborbital rockets. Accordingly, while still maintaining public safety, the FAA proposes to reduce the number of

² The CSLAA shares legislative history with H.R. 3752, for which the House prepared a conference report, H. Rep. 108-429. Although the Senate made significant changes to this bill, and no conference report was prepared, the original House report remains helpful.

requirements for a permit when compared to a license, and to model its experimental permit regime for space transportation on the special airworthiness certificates granted to experimental aircraft. The FAA does not propose to require satisfaction of its risk criteria for a permit as it does for a license. Likewise, of all the system safety management and engineering requirements the FAA requires for a license, the FAA only proposes to require a hazard analysis to obtain a permit. Containing a vehicle within an operating area, as proposed here, is similar to the approach used in granting special airworthiness certificates to experimental aircraft.

The FAA examined, for purposes of streamlining, the three-pronged approach currently used to license the launch of reusable launch vehicles (RLVs). The safety strategy for licensing launch and reentry consists of the following three interdependent safety requirements:

1. Quantified limits on individual and collective risk to the general public,
2. A system safety process that requires an operator to use a logical, disciplined approach to identifying hazards and mitigating and removing risks,³ and
3. Implementation of operating requirements.

Just as system redundancy may compensate for failure or flawed design or performance, the three-pronged approach protects the health and safety of the general public through these different yet interrelated means. The FAA proposes to apply a simplified version of this approach as discussed below.

1. Quantitative Risk Analysis

Under a launch license, a licensee must demonstrate that the risk from a launch falls below specified collective and individual risk criteria. The FAA proposes to relieve a launch operator from the requirement to calculate collective or individual risk under an experimental permit. An applicant would instead propose one or more operating areas that meet qualitative criteria.

Under the license regime, an applicant must demonstrate to the FAA that its launch will meet certain individual and collective risk criteria. Individual risk is the risk to an individual member of the public. Under a license, the risk level to an individual must not exceed 1×10^{-6} per mission.

Collective risk is the risk to a population. Under a license, the risk level to the collective members of the public exposed to vehicle debris impact hazards must not exceed an expected average number of 30×10^{-6} casualties per mission (commonly referred to as expected casualty).

Risk analysis accounts for vehicle reliability, effective casualty areas, the probability of impact, populations at risk, and potential consequences. The strength of any quantitative risk analysis lies not only in the resulting values, but also in the decisions reached during the analysis, where the decisions limit risk to the public. In that regard, a quantitative risk criterion may serve as an indicator of when sufficient mitigation measures and operating requirements have been applied. However, uncertainties in launch vehicle reliability, operating environments, and the extent of the consequences of a failure prevent such a straightforward application when addressing research, development, and flight-testing of new technologies, such as developmental reusable suborbital rockets. Because of the uncertainties, any risk analysis would need to include conservative assumptions in order to demonstrate that the criteria are met. Greater knowledge and certainty about expendable launch vehicle (ELV) reliability and operations, coupled with the benefits of operating from coastal sites, allows ELVs to be held to a criterion of 30 casualties per one million launches.

Most RLVs are intended to launch from inland launch sites near significant populations, such as airports. Even though the reusable suborbital rockets currently proposed are typically much smaller than their expendable counterparts,⁴ reusable launch vehicles operating from these sites under the same risk criterion would be required to have a lower probability of failure than those expendable counterparts. Preliminary calculations using the characteristics of several proposed and operational suborbital vehicles have shown that a probability of failure of 5% or less would have to be achieved to meet the criterion of 30 in one million. Unlike with ELVs, which have a historical probability of failure of approximately 10%, there is little operational experience and data available to support or refute that low a value for probability of failure.

The FAA considered requiring the operators of reusable suborbital rockets to produce the data needed to demonstrate the necessary probability of failure. This is the current approach for vehicles applying for a launch license. However, the data necessary to determine reliability does not yet exist for developmental suborbital rockets. This reliability data typically can be obtained by the very research and development testing that Congress intends permits to enable.

Alternatively, the FAA could have increased the risk threshold for research and development vehicles to reflect the lack of data. In an effort to determine a new risk criterion, the FAA researched the risks from similar activities, such as the risks to persons living near airports. Our research concluded that the involuntary risks to people living near a major U.S. airport are most similar to the risks to people living near a spaceport. However, in order to do a true one-to-one comparison, the empirical involuntary risks data, expressed as an annual risk to individuals living near a major U.S. airport, would have to be converted to a per-mission collective risk.

Converting annual individual risk data into a per-mission collective risk criterion for permitted activities is sensitive to the assumptions applied in the conversion. In particular, the flight rate (the number of flights in a given time period) of permitted vehicles and the extent of the population exposed are difficult to predict. Because of this sensitivity, the FAA could reasonably propose risk values spanning an order of magnitude from the same underlying data. Such uncertainty in the proper value has the potential for producing a value that would be too easy to meet, thus failing to require the safety decisions that make quantitative risk analyses so valuable, and perhaps leading to a false sense of safety. On the other hand, if the value was too difficult to meet, it could create a regulatory environment that would be too burdensome to be conducive to research and development activities. Accordingly, the FAA chose not to pursue a new criterion for allowable quantitative risk in the absence of conclusive data to support a particular value.

Nonetheless, quantitative risk analyses facilitate safety decision-making, and for that reason, the FAA will continue to conduct these quantitative risk analyses for the industry as a whole as well as recommend that launch operators perform these analyses for their own use. The FAA will continue to conduct

³ A hazard is an activity or condition that poses a threat. Risk is the potential for an undesirable consequence.

⁴ Vehicle size is relevant to risk because a smaller vehicle, in general, will have less of a potential for harm to people and property on the ground than a larger vehicle.

these analyses to provide further insight into safety issues, identify trends, and collect data that may assist in defining future criteria. In addition, the FAA will provide guidance and tools to assist the industry in performing its own quantitative analyses.

2. System Safety

To obtain an experimental permit, the FAA proposes that an applicant be required only to conduct a hazard analysis instead of, as for a launch license, establishing a comprehensive system safety program consisting of both system safety management and system safety engineering.⁵ A hazard analysis, which is typically part of a detailed system safety engineering process, identifies and characterizes hazards and qualitatively assesses risks. A license applicant uses this analysis to identify risk elimination and mitigation measures to reduce risk to an acceptable level.

The FAA realizes that by not requiring system safety engineering methods, other than a hazard analysis, some hazards may not be uncovered. A more rigorous approach would entail both "bottoms-up" subsystem analyses, such as a failure modes, effects, and criticality analysis, and "top-down" system analyses such as fault tree analysis and event tree analysis. However, containment within an FAA-approved operating area will ameliorate many of these unknown risks.

Unlike the system safety management requirements of a license, the FAA does not propose explicit requirements for documenting the system safety organization or for identifying specific safety personnel in the permit regime. Pioneers within the commercial RLV industry need freedom to organize their companies in various innovative ways to conduct launches. In these organizations the emphasis should not be on the management structure but on the commitment to safety throughout the organization. Effective safety organizations are created not only by identifying individuals responsible for safety, but also through developing a strong and effective safety culture. In a strong safety culture, responsibility for safety is spread throughout the organization, upper-level management is committed to public safety, employees have a voice in safety decisions, and safe behavior is rewarded. Therefore, a permittee should establish an organization that has a

strong safety culture to achieve safe operations.

An operator with a strong safety culture would incorporate prudent approaches to ensuring safe flight based on lessons learned from launch industry mishaps and experimental aircraft testing and inspection, such as those described in AC 90-89A, "Amateur-Built Aircraft and Ultralight Flight Testing Handbook." Permittees should familiarize themselves with and implement the guidance that the FAA has available for system safety management, particularly AC 431.35-2, "Reusable Launch and Reentry Vehicle System Safety Process." Copies of these documents have been placed in the docket for this rulemaking.

The FAA may reevaluate the need for prescriptive system safety management requirements if there are weaknesses in the industry's safety culture.

3. Operating Requirements

The FAA proposes only those operating requirements that directly involve activities authorized under an experimental permit. To operate under a license, a licensee must comply with the operating requirements of part 431.⁶ The FAA examined each operating requirement under part 431, as well as operating requirements derived from lessons learned from recent RLV launches conducted under a license. Many part 431 operating requirements involve preparatory activities. Preparatory activities would not be addressed in a permit application. For example, the FAA would still require flight rules; however, the FAA proposes not to require a mission readiness review where, among other things, flight rules are discussed. Operating requirements are discussed in detail later in this preamble.

4. Effect of a Less Burdensome Permitting Regime

The FAA's proposed permitting regime is designed so that a permittee will implement adequate safety measures. Ultimately, however, public health and safety will depend on each operator adopting a strong safety culture and using proven system safety principles that go beyond the FAA's regulatory requirements.

Imposing fewer requirements on permittees than licensees creates the potential for an increase in risk to the public compared to a similar launch or reentry licensed under part 431 or part

435. The FAA will carefully monitor the safety of space flight that takes place under a permit to ensure that the proposed approach does not result in inappropriate levels of risk. The FAA requests public comment on this approach, particularly the exclusion of quantitative risk criteria, the streamlining of system safety management and engineering, and the streamlined operating requirements.

B. Organization and Requirements of Proposed Rule

The FAA proposes a new part 437 with requirements for obtaining and maintaining an experimental permit. The proposed rule has been organized into four subparts. Subpart A would contain general information about an experimental permit, including eligibility, scope, and duration. Subpart B would contain demonstration and information requirements that an applicant must meet to obtain an experimental permit. The FAA would use selected information submitted for subpart B for an interagency review that allows government agencies such as the Department of Defense and the Department of State to examine the proposed mission from their unique perspectives. Subpart C would contain the safety standards with which a permittee would have to comply while conducting permitted activities.

Subparts B and C are necessarily interrelated. Subpart B would require a permit applicant to demonstrate how it would comply with certain subpart C requirements. An applicant would have to show how it would comply with the general performance-based safety standards proposed in subpart C, but would not have to demonstrate compliance with prescriptive subpart C requirements. For example, proposed rest rules for vehicle safety operations personnel are prescriptive and very specific. The FAA would not require an applicant to demonstrate in its application how it will implement those rules. Instead, the FAA would monitor the permit holder to verify that the permit holder is meeting the subpart C requirements. This should further ease the application burden in accordance with the streamlining goals of the CSLAA.

Last, subpart D would contain other responsibilities that would apply to a permittee. This subpart would include requirements for the continuing accuracy of the permit application, allowable design changes, maintaining records related to the permit application and operations, pre-flight reporting, for-hire prohibition, and compliance monitoring.

⁵ The mitigation measures and safety requirements resulting from systematic approaches to identifying and reducing risk serve to protect individuals and society through prudent safety measures that assist in preventing mishaps.

⁶ Operating requirements are often derived from the system safety process. Others, required by regulation, are based on historical best practices that mitigate the inherent uncertainty in the system safety process.

1. Subpart A—General Information

Subpart A would contain rules concerning the scope and organization of part 437, definitions, eligibility for an experimental permit, the scope of an experimental permit, issuance of an experimental permit, and the duration of an experimental permit. The duration of a permit would be one year from the date of issuance. A permittee could conduct an unlimited number of launches and reentries for a particular suborbital rocket design during that time. A permittee would be able to apply to renew its permit on a yearly basis. Subpart A would also note that the FAA may modify an experimental permit at any time during its term, that an experimental permit is not transferable, and that the issuance of an experimental permit does not relieve a permittee of its obligation to comply with any requirement of law that applies to its activities.

2. Subpart B—Application Requirements

a. Requirements for an Experimental Permit

This subpart would require an applicant to submit a program description, flight test plan, and operational safety documentation. The program description would include a description of the purpose for which the reusable suborbital rocket would be operated, dimensions, weights, thrust profiles, payloads, propellants, hazardous materials, and systems. An applicant would also have to describe any foreign ownership.

The flight test plan would include a description of the applicant's proposed flight test program, including estimated number of flights, key flight-safety events, and the maximum altitude of the reusable suborbital rocket. An applicant would have to propose and obtain FAA approval of an operating area for its flight tests.

Through operational safety documentation, an applicant would show how it would comply with the general performance standards proposed in subpart C.

b. Environmental Considerations

The FAA proposes to require an applicant to provide sufficient information for the FAA to analyze the environmental impacts associated with issuing reusable suborbital rocket launch and reentry permits. The information provided by an applicant would be used by the FAA to complete an appropriate environmental analysis and associated documentation to comply with the statutory requirements

that address public health and safety (e.g., the Clean Air Act), as well as the requirements of the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.* (NEPA), and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR parts 1500–1508. These requirements would be similar to those associated with a license, but the FAA is preparing a means of lessening the burden on a permit applicant.

The FAA is developing a programmatic environmental impact statement (PEIS) concurrent with this rulemaking. The PEIS will analyze potential environmental impacts (impacts on the human environment include social, economic, cultural and natural environmental impacts) associated with experimental permitting of launches of reusable suborbital rockets. The PEIS will address environmental issues, including potential impacts on human health and safety, and provide information common to all permits. The PEIS is designed to allow an individual applicant's environmental analysis to focus on the environmental effects specific to the permit application for launch and reentry of the applicant's reusable suborbital rocket. The FAA will use the PEIS and subsequent permit specific analyses to determine the appropriate level of NEPA analysis and documentation that can be used to substantiate FAA action on permits. The PEIS will assist the FAA by compiling trend data and focusing environmental monitoring efforts in the coming years.

An applicant will use the PEIS to develop analyses specific to its subsequent permit application. The FAA will obtain, use, and refine the data and information to meet the FAA's obligations under the National Environmental Policy Act and Chapter 701 when issuing permits authorizing reusable suborbital rocket launches and reentries.

c. Financial Responsibility

With the exception of eligibility for indemnification, the financial responsibility regime of Chapter 701 applies to permittees. Therefore, a permittee under this part would have to comply with the financial responsibility requirements of part 440 and as specified in its permit. Under Chapter 701, Congress establishes risk sharing for licensees by providing for the conditional payment of claims by the United States Government of those claims in excess of the required financial responsibility up to \$1,500,000,000, as adjusted for inflation,

for third party liability. After those limits, the licensee is responsible for all claims. The U.S. Government waives its claims for Government range property damage in excess of required maximum probable loss (MPL)-based property insurance.

Under a permit, the CSLAA provides that the Government is responsible for claims in excess of the required insurance amount for Government range property claims and the holder of the permit is responsible for all other claims. In short, the Government property provisions remain the same for both licensees and permittees. A licensee remains eligible for indemnification from third party claims; however, under the CLSAA a permittee is not. An applicant would provide the information required by part 3 of appendix A of part 440 for the FAA to conduct a maximum probable loss analysis.

d. Operation of a Private Launch Site

Under § 401.5 the operation of a launch site means the conduct of approved safety operations at a permanent site to support the launching of vehicles and payloads. A reusable suborbital rocket operator operating a private launch site that contains permanent facilities or supports continuous operations would have to obtain a launch site operator license in accordance with part 420, which contains licensing and operational requirements. Compliance with part 420 would require an explosive site plan and lightning protection and compliance with part 437.

Requiring a launch site operator license marks a slight shift from FAA policy to date. In the past, the FAA announced that a launch operator who operated a private site for its own launches did not need a license to operate a launch site. This is because its launch license would cover the safety issues associated with operating the launch site. *Licensing and Safety Requirements for Operation of a Launch Site*, 65 FR 62812, 62815 (October 19, 2000). The FAA has never issued such a license,⁷ but the FAA finds that it

⁷ Sea Launch offers its own unique circumstances. Because its launches take place outside the United States, Chapter 701 does not require that Sea Launch's launch license encompass activities in preparation for flight. Accordingly, Sea Launch's license did not cover activities in preparation for flight at the platform in the Pacific Ocean. Nor did the FAA require Sea Launch to obtain a license to operate a launch site. This determination was correct, in light of the discussion above, because Sea Launch was not conducting continuous operations or establishing permanent facilities at its launch point. Both the ship and the

must revisit this issue for both licenses and permits. The existing approach may leave safety issues unaddressed. A launch license would not, after all, cover the safety issues associated with operating a launch site, and perhaps the FAA should not have said so when promulgating part 420. Part 420, which governs operating a launch site, contains requirements for the storage of explosives and for mitigating lightning effects. Those requirements are necessary regardless of whether a launch vehicle is present at the launch site. Additionally, because the scope of a permit may be even more narrow than the scope of a license, the FAA could fail to address other safety issues as well.

When it issued part 420, the FAA noted in its discussion of the new requirements, if not in the regulations themselves, that “[a] launch operator proposing to launch from its own launch site need only obtain a launch license because a launch license will address safety issues related to a specific launch and because a launch license encompasses ground operations.” 65 FR at 62815. The FAA did not memorialize this exception in section 420.3, which describes those to whom part 420 applies, because the FAA anticipated that there would be select provisions in part 420 which the FAA would apply to a launch licensee through its license. Upon further reflection, the FAA proposes to abandon that approach as an incomplete method of fulfilling its mandate to oversee the operation of a launch site.

The existing approach neglects to take into account safety considerations that fall outside the scope of a launch license. Under 49 U.S.C. 70102(4), Congress defines launch to include activities involved in the preparation of a launch vehicle for launch when those activities take place at a launch site in the United States. This means that when a launch vehicle is not present at a launch site, the other activities at a launch site are not licensed. Some of those activities, such as the storage of explosives and mitigating the effects of lightning, create potential hazards addressed by part 420.

The question of whether a license to operate a launch site is necessary at a private site is especially relevant now because there are operators who hope to operate under an experimental permit on private land without having to obtain a license to operate a launch site. Under

the existing definition of operation of a launch site, it may not be necessary in all cases for launch operators at a private site to obtain a license to operate the site. The FAA defines operation of a launch site as the conduct of approved safety operations at a permanent site to support the launching of vehicles and payloads. 14 CFR 401.5. The FAA recently interpreted this to mean that a launch operator proposing to launch from a private site would not require a launch site operator license. *See* FAA Interpretation to Armadillo Aerospace (February 24, 2006). Because Armadillo planned to use a privately owned site intermittently, and build no infrastructure, it would be using a temporary site and thus not require a license to operate a launch site. The other avenue that must be explored is what it means to “conduct approved safety operations.” When promulgating section 401.5, the Department of Transportation observed that “the operation of a launch site involves continuing operations at a permanent location.” Licensing Regulations, 64 FR 11004, 1007 (April 4, 1988). This suggests that approved safety operations must be continuous. Although the 1988 rulemaking that created this test did not define or discuss what the agency meant by approved safety operations, the FAA has given flesh to these terms in later years. In 2000, when the FAA issued its regulations governing licensing the operation of a launch site, the FAA noted that, in addition to explosive siting and lightning mitigation requirements, “[t]he operational requirements * * * address, among other things, control of public access, [and] scheduling of operations at the site.” 65 FR at 62834. The FAA expects to further refine the meaning of operation as future questions arise.

e. Human Space Flight

An applicant proposing to conduct a reusable suborbital rocket launch or reentry with flight crew or a space flight participant on board would have to demonstrate compliance with part 460, Human Space Flight Requirements, which is being proposed under a separate notice.

f. Inspection Before Permit Issuance

Before issuing a permit, an FAA representative would inspect a built vehicle to ensure compliance with application representations. For example, the FAA would examine systems required for maintaining the vehicle’s instantaneous impact point (IIP) within an operating area. As with an experimental aircraft, any additional reusable suborbital rocket of the same

design could be launched or reentered under the permit after inspection by the FAA.

g. Other Requirements

The FAA may require additional analyses, information, or agreements if necessary to protect public health and safety, safety of property, and national security and foreign policy interests of the United States. This option is necessary because future reusable suborbital rocket concepts may entail unprecedented and unforeseen characteristics. The regulations proposed in this NPRM may not adequately cover all characteristics relevant to public safety and other U.S. interests.

3. Subpart C—Safety Requirements

a. Vehicle Safety Operations Personnel Rest Rules

The FAA would require that vehicle safety operations personnel adhere to specified rest rules. Under current regulations, vehicle safety operations personnel are those persons whose job performance is critical to public health and safety or the safety of property during RLV or reentry operations. They include personnel on board the vehicle and on the ground.

Risk elimination and mitigation measures, no matter how well thought out or implemented, can be undone if personnel performing safety-critical functions are not physically and mentally capable of performing their assigned function. The Federal government and private entities performing launches have historically imposed rest rules for safety-critical personnel.

b. Pre-Flight and Post-Flight Operations

A permittee would have to protect the public from adverse effects of hazardous operations and systems associated with preparing a permitted vehicle for flight at a launch site in the United States, and with returning the vehicle to a safe condition after flight. A permittee would have to establish a safety clear zone large enough to contain the adverse effects of each hazardous operation. A safety clear zone would, for example, have to contain the hazards of propulsion system testing or propellant loading. A permittee would have to verify that the public was outside that safety clear zone before and during a hazardous operation. Systems such as high pressure gas facilities and facilities for storing liquid and solid propellant are hazardous even when operations are not being performed. An applicant would have to demonstrate in its

launch platform depart after each launch. Although the FAA has said that Sea Launch did not require a site license because it was not offering its site to others, the lack of permanence provides a better reason.

application to the FAA how it would meet these requirements.

The ground activities covered by these requirements would depend on the scope of activities covered by an experimental permit. For launch of expendable launch vehicles, the FAA defines launch to begin with the arrival of a vehicle at a launch site in the United States. 14 CFR 401.5. The FAA proposes to change that definition for reusable suborbital rockets operating under a permit. The FAA proposes to use a four-part test to determine the scope of a permit. The House Science Committee originated the four-part test in 1995, as guidance to the FAA to assist it in defining a "launch" for purposes of exercising licensing jurisdiction under Chapter 701. H.R. Rep. No. 233, 104th Cong., 1st Sess., at 60 (1995). The Committee report recommended that there are pre-flight activities that may properly be regulated as part of a "launch," because they—

- (1) Are closely proximate in time to ignition or lift-off;
- (2) Entail critical steps preparatory to initiating flight;
- (3) Are unique to space launch; and
- (4) Are inherently so hazardous as to warrant the FAA's regulatory oversight under 49 U.S.C. chapter 701.

The same committee later explained that this test was the basis for changing the definition of "launch" in the Commercial Space Act of 1998. Public Law 105–303, 112 Stat. 2843 (1998), 49 U.S.C. 70102(3). In that Act, Congress revised the definition of launch to include activities "involved in the preparation of a launch vehicle or payload for launch, when those activities take place at a launch site in the United States." 49 U.S.C. 70102(3).

Although the four-part test is not a statutory requirement, the FAA believes that it provides a rational approach to determining whether a pre-flight activity should be authorized under a permit.

c. Hazard Analysis

An applicant must perform a hazard analysis and provide the results to the FAA. A hazard analysis is an integral part of a system safety engineering process, which applies scientific and engineering principles necessary to identify and eliminate hazards and reduce the associated risk to the public. Typical elements of a hazard analysis include:

- Identifying and describing hazards,
- Assessing risk using qualitative severity and likelihood levels,
- Identifying and describing risk elimination and mitigation measures to

reduce the risk to acceptable levels, as defined below, and

- Demonstrating that the risk elimination and mitigation measures are correct, complete, and achieve an acceptable reduction in risk through validation and verification.

The FAA proposes the following criteria to determine the acceptability of the risks:

- The occurrence of any hazardous condition that may cause death or serious injury to the public must be extremely unlikely, and
- The likelihood of an occurrence of any hazardous condition that may cause major property damage to the public, major safety-critical system damage or reduced capability, decreased safety margins, or increased workload must be remote.

In developing qualitative criteria to assess risk, the FAA examined industry practice and existing government standards. The FAA based its criteria on MIL–STD–882D, "Department of Defense Standard Practice: System Safety," and FAA AC 23.1309, "Equipment, Systems, and Installations in Part 23 Airplanes." The U.S. Department of Defense, the National Aeronautics and Space Administration, and the aerospace industry have successfully used hazard analyses for decades to reduce risks to acceptable levels. The FAA proposes that an operator provide the results of the hazard analysis to FAA during the application process. An acceptable hazard analysis could be a Preliminary Hazard Analysis, as described in MIL–STD–882D, a Failure Modes, Effects, and Criticality Analysis, as described in FAA's "Guide to Reusable Launch and Reentry Vehicle Reliability Analysis" and AC 431.35–2, or a Functional Hazard Analysis, as described in AC 23.1309. Other analyses that provide an equivalent level of fidelity may be acceptable.

A key step in the hazard analysis process is to identify and describe either risk elimination or risk mitigation measures. The recommended order of precedence for eliminating or mitigating risk is as follows:

- Design for minimum risk. The first priority should be to eliminate risks through appropriate design or operation choices.
- Incorporate safety devices. If risks cannot be eliminated through design or operation selection, an operator should reduce risks through the use of active and passive safety devices. The operator should make provisions for periodic functional checks of safety devices.
- Provide warning devices. When neither design nor safety devices can

effectively eliminate identified risks or adequately reduce risks, an operator should use devices to detect the condition and produce an adequate warning signal. The operator should design warning signals and their application to minimize the likelihood of inappropriate human reaction and response.

- Develop and implement procedures and training. When it is impractical to eliminate risks through design selection or specific safety and warning devices, an applicant should develop and implement procedures and training.

Selection of a risk elimination or mitigation approach is usually based on a number of factors, such as the type of operation, the feasibility of implementing the approach, the effectiveness of the approach, and the impact on system performance. The applicant's analysis should also consider whether the risk mitigation measures introduce new hazards.

The mitigation measures of procedures and training deserve special mention. These may include the following:

- Conducting dress rehearsals to ensure crew readiness under nominal and non-nominal flight conditions;
- Creating and using current and consistent checklists that ensure safe conduct of flight operations during nominal and non-nominal flights;
- Consolidating flight rules, procedures, checklists, contingency abort plans, and emergency plans in a safety directive, notebook, or other compilation;
- Establishing communication protocols, including defined radio communications terminology and a common intercom channel for communications; and
- Conducting flight readiness reviews.

To allow flexibility in reducing risk and to encourage innovation in improving safety, the FAA is not mandating any one particular approach, such as checklists or dress rehearsals. Nevertheless, the FAA notes that these could become permit requirements if the characteristics of a permittee's operations make them necessary for safety. For example, a permittee conducting a procedurally simple operation might not need to conduct dress rehearsals. A permittee with a highly complex operation might have to do so.

d. Operating Area Containment

The FAA would require that a permittee operate its reusable suborbital rocket such that its IIP remained within an operating area and outside any

exclusion areas. An operating area would be a three-dimensional region where permitted flights could take place. The FAA would approve an operating area based on the following criteria:

- No densely populated area could be present within or adjacent to an operating area,
- An operating area would have to be large enough to contain each of an applicant's planned trajectories, accounting for expected dispersions,
- An operating area would have to contain enough unpopulated or sparsely populated area to perform key flight-safety events, and
- The operating area could not contain significant automobile traffic, railway traffic, waterborne vessel traffic, or large concentrations of members of the public.

The FAA would use the above criteria to prohibit the operation of reusable suborbital rockets over areas where the consequences of an uncontrolled impact of the vehicle or its debris would be catastrophic. Given the number of people in a densely populated area and their proximity to each other, the likelihood of multiple casualties from an uncontrolled impact of a vehicle or its debris would be much higher in densely populated areas than in sparsely populated areas.

The FAA has not proposed definitions for unpopulated, sparsely populated, or densely populated area. The FAA does not have sufficient experience with reusable suborbital rocket flight activity at this time to define these terms. The FAA did consider, but does not propose to adopt, the following definitions:

Unpopulated means devoid of people.

Sparsely populated means a population density of less than 10 people per square statute mile in an area of at least one square statute mile.

Densely populated area means a census designated place, as defined by the United States Census Bureau, with a population in excess of 100,000 people, or any area with a population density in excess of 1,000 people per square statute mile and an area of at least one square statute mile.

Although proposing precise definitions may be premature, the FAA offers the following observations as preliminary guidance. The term "unpopulated" would mean no people, period. The term "sparsely populated" suggests an area with a few scattered people where the risk to those few persons from the overflight of a suborbital rocket, even one being tested, would likely be negligible. The term "densely populated area" would have two characteristics.

One would be strictly related to numbers of people, without regard to population density. Any area with 100,000 people is not a good area to test rockets. The second characteristic would be density—an area would have to be large enough to allow an applicant to find a workable operating area in certain parts of the country, but small enough to keep the risk to the people within the area negligible, given the flight constraints discussed below. The FAA requests comments on the definitions that it considered and on its preliminary observations.

Proposed agreements between a permittee and Air Traffic Control would influence the size and location of the operating area. An operating area might also include "exclusion areas," defined by the FAA, which would consist of areas where a reusable suborbital rocket's IIP could not traverse. The operating area proposed here is similar to that used in granting special airworthiness certificates to experimental aircraft, in that the FAA would allow an applicant to propose an area. An operator could also propose different operating areas for different flight tests in its application.

During the application process, an applicant would identify and describe the methods and systems used to meet the requirement to contain its reusable suborbital rocket's IIP within the operating area and outside any exclusion area. Acceptable methods and systems would include:

- Proof of physical limitations on a vehicle's ability to leave the operating area, and
- Abort criteria and safety measures derived from a system safety process.

Proof of physical limitations on a vehicle's ability to leave the operating area could be obtained through an analysis that showed that the maximum achievable range of the reusable suborbital rocket from the launch point was within the boundaries of the operating area, assuming the rocket flew a trajectory optimized for range and that all safety systems failed. Such a proof would simplify an operator's requirements considerably when compared to the use of active containment methods.

An applicant could use its hazard analysis to determine safety measures that keep a reusable suborbital rocket's IIP within its operating area. Alternatively, an applicant could perform a separate and more comprehensive system safety analysis solely for containment. For example, an operator could use a hazard analysis to identify the safety measures necessary to avoid the hazards of a propulsion

shutdown system not operating properly. Such a hazard analysis would use qualitative risk criteria approved by the FAA. An applicant could also use the American Institute of Aeronautics and Astronautics (AIAA) "Guide to the Identification of Safety-Critical Hardware Items for Reusable Launch Vehicle (RLV) Developers" to assist in the analysis of hardware. The FAA also plans to provide guidance in the future for the analysis of hazards created by errors in software and computing systems.

Specific safety measures obtained from a system safety process could include a dedicated flight safety system or other safety measures derived from the hazard analysis that are not necessarily dedicated only to flight safety. A dedicated flight safety system could protect the public and property from harm, if a vehicle did not stay on its intended course, by stopping the vehicle's flight. A flight safety system consists of all components that provide the ability to end a launch vehicle's flight in a controlled manner. For example, a reusable suborbital rocket may use a thrust termination system in combination with other measures, such as propellant dumping, to keep a vehicle from reaching a populated area. Safety measures may also include systems and procedures that, while not dedicated exclusively to flight safety, help to protect the public. For example, an operator may choose to use a real-time IIP ground or cockpit display. The display may include the real-time IIP, and an operator would use abort criteria to assist in containment of the IIP.

The FAA proposes to require an applicant to show that the system or method selected will contain the vehicle's IIP. That demonstration could include flight demonstration test data; component, system, or subsystem test data; inspection results; or analysis. The FAA would determine whether the proposed containment approach was acceptable, and might require more detailed analyses or verification for that containment approach. The FAA might also require additional safety measures to protect the public, such as propellant dumping to reduce explosive potential or fire hazards.

Note that permits, as well as licenses, are available to the public on request. For permits, the FAA will publish approved operating areas on its web site.

e. Key Flight-Safety Event Limitations

Operating within an acceptable operating area and implementing safety measures obtained from a hazard analysis are only part of what would be

necessary to maintain public safety. The FAA would also impose additional operating requirements for flight events with an increased likelihood of failure compared to other portions of flight. These operating requirements would include requiring an operator to perform key flight-safety events over unpopulated or sparsely populated areas. Events such as rocket engine ignition (for air-dropped and multi-mode propulsion vehicles), staging, and envelope expansion have historically had the highest probability of catastrophic failure for rocket-propelled vehicles. In its application, an operator would have to identify and describe how it would keep these key flight-safety events over unpopulated or sparsely populated areas and demonstrate to the FAA that it had verified the operation of these systems.

The FAA would also require an operator to conduct each reusable suborbital rocket flight so that the reentry impact point would not loiter over a populated area. The reentry impact point is the location of a reusable suborbital rocket's IIP during the period of unpowered suborbital flight outside the atmosphere.

f. Landing and Impact Locations

The FAA would require an operator to use a location for nominal landing, any contingency abort landing, or any reusable suborbital rocket component impact or landing that—

- Is of sufficient size to contain an impact, including any debris dispersion on impact; and
- At the time of landing or impact, does not contain any members of the public.

Subpart B would require an applicant to demonstrate that the identified sites were suitable.

g. Agreements

To obtain a permit, the FAA would require an applicant to complete certain written agreements. The FAA would require that an applicant enter into an agreement with a Federal launch range, a licensed launch site operator or anyone else who provides access to and use of property and services required to support a permitted flight. Public safety related support would include the use of a local fire department for emergency response or a local police department for crowd control.

If an applicant proposed to launch over water, the FAA would require an applicant to complete an agreement with the local United States Coast Guard (USCG) district to establish procedures for issuing a Notice to Mariners before a permitted flight. The FAA would also

require an applicant to complete an agreement with the responsible Air Traffic Control authority having jurisdiction over the airspace through which a flight was to take place. That agreement would contain measures necessary to ensure the safety of aircraft, including procedures for notices to airmen and temporary flight restrictions. An applicant would not have to complete these two agreements if a Federal launch range or a licensed launch site operator already had agreements addressing these procedures in place. Federal launch ranges already coordinate these matters for range users. A licensed launch site operator is required, under part 420, to have agreements with the FAA and USCG for launches taking place from its launch site.

h. Collision Avoidance

Based on an analysis of a catalog of orbiting objects performed by the U.S. Strategic Command (USSTRATCOM), the FAA proposes a collision avoidance analysis for a suborbital launch with a planned maximum altitude greater than 150 kilometers. The collision avoidance analysis would establish each period of time during which a permittee could not initiate flight in order to ensure that a permitted vehicle and any jettisoned components did not pass closer than 200 kilometers to a manned or mannable orbital object throughout the flight. This analysis would be performed by USSTRATCOM based on information provided by the permittee. The FAA may approve the use of an alternate separation distance on a case-by-case basis.

i. Tracking

The FAA would require a permittee to operate a reusable suborbital rocket in a manner that provided Air Traffic Control with the real time position and velocity of the reusable suborbital rocket while operating in the National Airspace System (NAS). Air traffic controllers will require this information to integrate reusable suborbital rockets into the NAS. At this time, the FAA does not propose explicit requirements for the necessary tracking methods.

The FAA would also require a permittee to operate a reusable suborbital rocket in a manner that provides position and velocity data for post-flight use. The FAA would use this data for compliance monitoring. The FAA would also use this data to focus on the continuous improvement of the safety of this industry. The CSLAA, 49 U.S.C. § 70103(c), states, “[i]n carrying out the responsibilities under subsection (b), the Secretary shall

encourage, facilitate, and promote the continuous improvement of the safety of launch vehicles designed to carry humans, and the Secretary may, consistent with this chapter, promulgate regulations to carry out this subsection.” An applicant would have to demonstrate to the FAA how it would meet these tracking requirements in its application.

j. Communications

The FAA would require that a permittee be in contact with Air Traffic Control while operating in the NAS. The FAA would also require a permittee to record communications affecting the safety of flight. Recording communication is necessary for mishap investigations. Some suborbital operators will use a central control room for communications, while others plan to rely solely on a pilot communicating with Air Traffic Control. In either case, the FAA proposes that the permit holder record these communications. The FAA would verify that the permit holder is in compliance with this requirement during inspections.

k. Flight Rules

The FAA continues to find that the use of flight rules and procedures by a launch operator contribute significantly to the overall safety of the flight during all phases of flight. Therefore, the FAA would require an operator to implement flight rules associated with—

- Conducting operations within a pre-approved operating area;
- Conducting key flight-safety events over unpopulated or sparsely-populated areas;
- Using suitable locations for nominal landing, any contingency abort landing, or any reusable suborbital rocket component impact or landing; and
- Implementing the hazard analysis process.

In addition, the FAA would require that, before initiating flight, the operator check that all systems required for safe flight are within acceptable limits. An applicant must provide its flight rules to the FAA in its application.

The FAA would require certain flight rules similar to those used in aviation. A permittee would be forbidden to operate a reusable suborbital rocket in a careless or reckless manner so as to endanger members of the public. A permittee would also be forbidden to operate a reusable suborbital rocket within Class A, Class B, Class C, or Class D airspace or within the boundaries of the surface area of Class E airspace designated for an airport, unless the permittee has prior authorization from the air traffic control

facility having jurisdiction over that airspace. A permittee would not be permitted to operate a reusable suborbital rocket in areas designated in a Notice to Airmen under § 91.137, § 91.138, § 91.141, or § 91.145 of this title, unless authorized by air traffic control or a Flight Standards Certificate of Waiver or Authorization.

Lastly, for phases of flight where a reusable suborbital rocket is operated like an aircraft in the National Airspace System, the FAA may specify in the permit those portions of 14 CFR part 91 necessary to protect public health and safety and safety of property. 14 CFR part 91 prescribes rules governing the operation of aircraft within the United States, including the waters within 3 nautical miles of the U.S. coast.

l. Anomaly Recording and Reporting

The FAA proposes to require that a permittee record anomalies, analyze the root cause of each anomaly, and implement corrective actions for those anomalies. An operator would have to report to the FAA any anomaly to any system or process associated with containing the vehicle's IIP within an operating area, restricting the location of key flight-safety events, and the mitigation and safety measures obtained from a hazard analysis. The permittee would have to report to the FAA any anomaly or failure of those systems or processes during verification (including ground test and inspection) or flight.

Analyses of mishaps often show that clues existed prior to the mishap in the form of anomalies during the project life cycle. Examination and understanding of launch vehicle system and subsystem anomalies throughout the life cycle can warn of an impending mishap and can provide important information about what conditions need to be controlled to mitigate risk to the public.

The FAA requires reporting of certain anomalies so it can analyze and evaluate operations under permits and verify that the operator is making informed safety decisions. Anomaly reporting to the FAA also facilitates continuous improvement of the safety of launch vehicles.

m. Mishap Reporting, Responding, and Investigating

The FAA proposes to require a permittee to respond to mishaps in accordance with a mishap response plan. The FAA would require that the plan be submitted as part of an application. The FAA would also require a permittee to report mishaps to the FAA, to investigate mishaps, and to cooperate with any FAA or National

Transportation Safety Board (NTSB) investigation.

n. Additional Safety Requirements

Applicants proposing activities creating hazards not otherwise addressed in proposed part 437, such as the use of toxic materials or solid propellants, may be subject to additional requirements. These hazards may pose risks to the public that may require additional analyses or mitigation measures.

4. Subpart D—Terms and Conditions of an Experimental Permit

a. Public Safety Responsibility

A permittee would be responsible for ensuring the safe conduct of a launch or reentry conducted under an experimental permit, and for protecting public health and safety and the safety of property during the conduct of the launch or reentry.

b. Compliance With Experimental Permit

As is the case for a licensee, a permittee would have to conduct all launches and reentries under an experimental permit in accordance with representations made in its application, with subparts C and D, and with terms and conditions contained in the permit. A permittee would be responsible for the continuing accuracy of representations contained in its application for the entire term of the experimental permit and would have to inform the FAA of any proposed changes.

c. Permit Modifications

The FAA will identify in a permit the type of modifications that the permittee may make to the vehicle design without invalidating the permit. The FAA will work closely with applicants on a case-by-case basis to determine what modifications may be made.

Once a permit has been issued, except for the allowable design changes, the permittee must apply to the FAA for modification of the permit. If a permittee proposes to conduct permitted activities in a manner not authorized by the permit, it must apply to the FAA to modify the permit. It must also apply to the FAA to modify the permit if any representation contained in the permit application that is material to public health and safety or the safety of property is no longer accurate or complete.

The FAA realizes that a flight test program may also entail frequent operational changes throughout the term of a permit. If an applicant desires, the FAA will work with the applicant to set

up an alternate method for applying for modifications to the permit.

d. Records

The FAA would require a permittee, like a licensee, to maintain for three years all records, data, and other material necessary to verify that a permitted launch is conducted in accordance with representations contained in the permittee's application. In the event of a launch accident or launch incident, a permittee must preserve all records related to the event. Records would be retained until completion of any Federal investigation and the FAA advised the permittee that the records no longer need to be retained. The permittee would make all records required to be maintained under the regulations available to Federal officials for inspection and copying.

e. Pre-Flight Reporting

The FAA proposes that not later than 30 days before each flight or series of flights conducted under an experimental permit, a permittee would provide the FAA with the following information:

- Any payload to be flown, including any payload operations during the flight,
- When the flight or series of flights are planned,
- The operating area for each flight, and
- The planned maximum altitude for each flight.

Not later than 15 days before each permitted flight planned to reach greater than 150 km altitude, a permittee would need to provide its planned trajectory to the FAA. This information is needed for a USSTRATCOM collision avoidance analysis.

f. For-Hire Prohibition

Under 49 U.S.C. 70105a(h), no person may operate a reusable suborbital rocket under a permit for carrying any property or human being for compensation or hire. With one exception, the definition of "compensation or hire" is the same as that used in the aviation context where it is broadly interpreted and includes an operator furthering his economic interest by transporting persons or property by air. For aviation, it is not necessary that there be an actual payment of cash for the flight or that there be actual profit to constitute compensation. Compensation may include—

- Any form of payment—including payment of operating costs such as fuel and oil;
- A tax deduction—if a flight is for charity;

- Goodwill—a person is carried without any payment of cash but the operator expects or receives paying customers because of the free flight;
- Payment by a third party, such as when a third party arranges and pays for the flight;
- A non-monetary exchange—for carrying a person for free the operator receives free advertising, parts, maintenance, etc; or
- Any exchange of value, including bartering goods or services in exchange for the transportation.

The FAA proposes to allow the launch of a space flight participant so long as the space flight participant or a representative does not provide compensation to the holder of a permit. With the exception of allowing goodwill, the FAA proposes to use the aviation approach to determining when compensation is provided for a flight. An operator would also be able to receive payment for the display of logos because it is a service and thus not a person or property launched for compensation. Events such as the X Prize Cup provide an incentive for research and development. The FAA does not propose to consider as compensation any prize money won at such events.

g. Compliance Monitoring

As is the case for a licensee, a permittee would have to allow access by, and cooperate with, Federal officers or employees or other individuals authorized by the FAA to observe any activities of the permittee, or of the permittee's contractors or subcontractors, associated with the conduct of permitted pre-flight and flight operations.

C. Changes to Existing Regulations

In addition to the requirements to obtain and operate under an experimental permit, the FAA proposes to amend existing regulations to reflect the CSLAA's new authority. Many of the proposed amendments consist simply of replacing the term "license" with "license or permit." Other changes are minor, such as updating references to a "Director" to the "Associate Administrator." The FAA proposes to revise the definition of amateur rocket activities, which do not require a license or permit, to encompass only unmanned activities because the CSLAA prohibits the FAA from authorizing the launch or reentry of a launch vehicle or a reentry vehicle without a license or permit if a human being will be on board. The FAA proposes to add application procedures for experimental permits to part 413, including a review period of 120 days

for permits as congressionally mandated, in addition to the licensing review period of 180 days.

The FAA proposes to revise the launch site location review of part 420. Currently, a launch site operator applicant must demonstrate that its proposed launch site can support the launch of a launch vehicle meeting a specified collective risk criteria. The FAA proposes that for any launch site operated solely for permitted flights, an FAA-approved operating area will be sufficient demonstration.

D. Other Issues and Recommendations

1. Contrasts Between Licenses and Permits

Before the CSLAA, a launch license was the only mechanism available to the FAA to authorize the launch of a launch vehicle. Although the FAA proposes here a number of ways that a permit will be different from a license, there are also those that are mandated by statute and of which an operator should be aware. Under the CSLAA, an experimental permit differs from a license in several ways.

- The FAA must determine whether to issue an experimental permit within 120 days of receiving an application. For a license, the FAA must make a similar determination within 180 days of receiving an application.
- No person may operate a reusable suborbital rocket under a permit for carrying any property or human being for compensation or hire. No such restriction applies for a license.
- A permit is not transferable. A license is transferable from one entity to another. This is usually sought after a merger or acquisition.
- Damages arising out of a permitted launch or reentry are not eligible for "indemnification," the provisional payment of claims under 49 U.S.C. 70113. To the extent provided in an appropriation law or other legislative authority, damages caused by licensed activities are eligible for the provisional payment of claims.
- A permit must authorize an unlimited number of launch and reentries for a particular reusable suborbital rocket design. Although licenses can be structured to authorize an unlimited number of launches, no statutory mandate to do so exists.

2. Considerations for Obtaining a License After Operating Under a Permit

One purpose of conducting operations under a permit would be for an operator to show compliance with the requirements for obtaining a license. The FAA recommends that all permit

applicants be well versed in the requirements of both the RLV mission license and the experimental permit. The FAA particularly recommends that a permittee plan the flight test program under a permit to collect all the validation and verification data on systems and subsystems needed to provide to the FAA during the license application process.

It should be noted that a reusable suborbital rocket operator would not be required to get a permit before applying for a license. However, applicants proposing certain vehicle operations may not be capable of demonstrating compliance with the collective and individual risk criteria of a license without the flight test data obtained under a permit. This is particularly true for operations at inland launch sites.

Paperwork Reduction Act

This proposal contains the following new information collection requirements. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has submitted the information requirements associated with this proposal to the Office of Management and Budget (OMB) for its review. Persons are not required to respond to a collection of information unless it displays a currently valid OMB number.

Title: Experimental Permits for Reusable Suborbital Rockets.

Summary: The Associate Administrator for Commercial Space Transportation of the Federal Aviation Administration (FAA), Department of Transportation, proposes to amend the FAA's commercial space transportation regulations under the Commercial Space Launch Amendments Act of 2004. The FAA proposes application requirements for an operator of a reusable suborbital rocket to obtain an experimental permit. The FAA also proposes operating requirements and restrictions on permitted launch and reentry.

Use of: The information collected will be used by the FAA to decide whether or not to issue an experimental permit to an applicant, and to monitor a permittee's compliance with its permit and with applicable regulations.

Respondents (including number of): The likely respondents to this proposed information requirement are private entities planning to conduct developmental testing of reusable suborbital rockets. The FAA estimates that there will be eight to twelve private operators who would obtain permits over ten years.

Frequency: The frequency of this collection is determined by the respondents. They notify the FAA on

the occasion of launching or applying for a permit.

Annual Burden Estimate: This rule contains information collections that are subject to review by OMB under the Paperwork Reduction Act of 1995 (Pub. L. 104–13). The title, description, and respondent description of the annual burden are shown below.

Estimated Burden: The FAA expects that private entities would incur reporting and recordkeeping costs when applying for and operating under a permit, as follows:

- Permittees would take 178.4 to 267.6 hours annually to submit materials to the FAA to renew their permits at an annual cost of \$12,381 to \$18,571.
- Permit applicants would spend 432 to 648 hours annually to provide information for the FAA to analyze environment impacts and to conduct a maximum probable loss analysis at a cost of \$29,981 to \$44,971 annually.
- Permit applicants would need 7.68 to 11.52 hours annually to describe methods used to meet tracking requirements at a cost of \$533 to \$799 annually.
- Permit applicants would need 1,248 to 1,872 hours annually to demonstrate to the FAA that their operations would protect public safety at an annual cost of \$86,611 to \$129,917.
- Permit applicants would need 96 to 144 hours annually to prepare a mishap response plan at a cost of \$6,662 to \$9,994 annually.
- Permittees would need 91 to 182 hours annually to provide the FAA with pre-flight information at an annual cost of \$6,315 to \$12,631.

The total estimated industry annual paperwork burden would range from 2,053 to 3,125 at a cost ranging from \$142,483 to \$216,883. The estimated average annual hour burden would be 2,589 at an estimated average cost of \$179,683.

The proposed rule would also increase paperwork costs for the Federal government because the FAA would have to spend hours on the following activities.

- The FAA would spend 4,992 to 7,488 hours annually at an annual cost of \$259,784 to \$389,676 consulting with applicants and reviewing and approving permit applications.
- The FAA would spend 57.6 to 86.4 hours annually at an annual cost of \$5,651 to \$8,475 (including travel expenses) to travel to and inspect suborbital rockets.
- The FAA would spend 96 to 144 hours annually at an annual cost of \$4,996 to \$7,494 identifying the types of changes that may be made to each

reusable suborbital rocket without invalidating its permit.

- The FAA would spend 84 to 132 hours annually at an annual cost of \$4,371 to \$6,869 to re-inspect a vehicle during the permit renewal process.
- The FAA would require 436.8 to 686.4 hours annually at an annual cost of \$22,731 to \$35,721 to conduct the reviews required to determine whether a permit can be renewed.

The total estimated FAA annual paperwork burden would range from 5,666 to 8,537 hours at a cost ranging from \$297,533 to \$448,235. The estimated average annual hour burden to the Federal government would be 7,102 at an estimated average cost of \$372,884.

The agency is soliciting comments to—

- (1) Evaluate whether the proposed information requirement is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;
- (2) Evaluate the accuracy of the agency's estimate of the burden;
- (3) Enhance the quality, utility, and clarity of the information to be collected; and
- (4) Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology.

Individuals and organizations may submit comments on the information collection requirement by May 30, 2006, and should direct them to the address listed in the **ADDRESSES** section of this document. Comments also should be submitted to the Office of Information and Regulatory Affairs, OMB, New Executive Building, Room 10202, 725 17th Street, NW., Washington, DC 20053, Attention: Desk Officer for FAA.

Economic Assessment, Regulatory Flexibility Determination, Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866, "Regulatory Planning and Review," (58 FR 51736, September 30, 1993) directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act, (19 U.S.C. 2531–2533), prohibits agencies from setting

standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act requires agencies to consider international standards and, where appropriate, to use the international standards as the basis for U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of \$100 million or more annually as adjusted for inflation.

In conducting these analyses, FAA has determined this rule: (1) Has benefits that justify its costs, (2) is not an economically "significant regulatory action" as defined in section 3(f) of Executive Order 12866, and is "significant" as defined in DOT's Regulatory Policies and Procedures; (3) will not have a significant economic impact on a substantial number of small entities; (4) will have a neutral impact on international trade; and (5) does not impose an unfunded mandate on state, local, or tribal governments, or on the private sector. These analyses, available in the docket, are summarized below.

Potentially Impacted Parties

Private Sector

- Operators who would be conducting reusable suborbital rocket launches for the three purposes mentioned above.
- The public who might be exposed to more risk.

Government

- Federal Aviation Administration that would be reviewing and approving applications, inspecting the vehicles and permitted operations, identifying allowable changes to the vehicle, and renewing permits.

Assumptions and Ground Rules Used in Analysis (Discount Rate, Period of Analysis, Value of Life, Cost of Injuries)

- All monetary values are expressed in 2004 dollars.
- The time horizon for the analysis is 10 years (2006 to 2016).
- Costs are discounted at 7%.
- Hourly burdened industry rate is \$69.40.
- Hourly burdened government rate is \$52.04.
- 8 to 12 private sector entities would obtain permits over ten years.
- Permit issued to an entity is used for one year. It is renewed only once for the following year.

• Each permit holder would construct one vehicle to carry out all flights under the permit.

• Private sector entities would perform from 455 to 910 flights under experimental permits over ten years.

• Requirements fulfilled by Scaled Composites to license SpaceShipOne launches are considered current practice.

Some provisions would cause a private sector entity to incur additional

costs over the requirements of a license. The estimated additional person hours required per permit for each proposed rule section are as follows:

Proposed section	Person-hours incurred per permit
§ 437.21 General	24
§ 437.37 Tracking	96
§ 437.67 Tracking.	
§ 413.23 License or permit renewal	24

Some provisions would allow a private sector entity to realize cost

savings over the licensing regime. The estimated person hours saved per

permit under each proposed rule section are as follows:

Proposed rule section	Person-hours avoided per permit or per flight
§ 437.25 Flight test plan	4,680
§ 437.27 Pre-flight and post-flight operations.	
§ 437.29 Hazard analysis.	
§ 437.31 Verification evidence of operating area containment and key flight-safety event limitations.	
§ 437.53 Pre-flight and post-flight operations.	
§ 437.55 Hazard analysis.	
§ 437.57 Operating area containment.	
§ 437.59 Key flight-safety event limitations.	
§ 437.41 Mishap response plan	120
§ 437.75 Mishap reporting, responding and investigating.	
§ 437.69 Communications	160
§ 431.33 Safety organization	2,080
§ 431.37 Mission readiness ^a	40
§ 431.43 Reusable launch vehicle mission operational requirements and restrictions	2,080

^aPerson hours avoided are per flight.

Some provisions would cause the FAA to incur additional costs over the

requirements of a license. The estimated additional person hours required per

permit for each proposed rule section are as follows:

Proposed rule section	Person-hours incurred per permit
§ 437.21 General	72
§ 437.85 Allowable design changes; Modification of an experimental permit	120
§ 413.23 License or permit renewal	120

Some provisions would allow the FAA to realize cost savings over the launch licensing regime. The estimated

person hours saved per permit for each proposed rule section are as follows:

Proposed rule	Person-hours avoided per permit
Pre-application consultation, and permit application review and issuance activities	10,400

Benefits

The proposed rule would provide an expeditious avenue for experimental commercial space transportation initiatives that would enhance and

accelerate advances in this arena. This could lead to significant engineering breakthroughs that would benefit public consumption of commercial space transportation. Further, the cost savings

realized by the commercial space transportation industry could be used to advance the overall safety of reusable suborbital rocket technology.

The FAA solicits comments and any other information to help validate and derive quantitative estimates pertaining

to the costs and benefits of this rulemaking.

Total Net Costs

SUMMARY OF INCREMENTAL COST IMPACTS AND COST SAVINGS ATTRIBUTABLE TO THE PROPOSED RULE FOR THE TEN-YEAR PERIOD, 2006 THROUGH 2015

[In 2004 dollars]

Category	Upper bound		Lower bound	
	Undiscounted	Discounted ^a	Undiscounted	Discounted ^a
Commercial Space Transportation Industry Compliance Costs	\$141,058	\$97,469	\$93,483	\$63,475
Federal Aviation Administration Administrative Costs	264,862	180,919	173,387	116,757
Total Costs	405,920	278,388	266,870	180,232
Commercial Space Transportation Industry Cost Savings	11,709,168	8,049,830	7,336,968	4,976,830
Federal Aviation Administration Cost Savings	6,494,592	4,512,659	4,329,728	2,951,467
Total Cost Savings	18,203,760	12,562,489	11,666,696	7,928,297
Total Net Cost Savings	17,797,840	12,284,101	11,399,826	7,748,065

^a Calculated using a discount factor of seven percent over a ten-year period. (See Tables A-5 to A-30 in the Appendix.)

Comparison of Benefits and Costs

The proposed rule would result in a net cost savings of \$11.4 million (\$7.7 million discounted) to \$17.8 million dollars (\$12.3 million discounted). The proposed rule is expected to enhance and accelerate advances in commercial space transportation. It would do so by making it less costly for the industry to fly research and development missions to test new design concepts, new equipment or new operating techniques, to perform crew training, and to demonstrate compliance with license requirements. Without the new availability of a permit, an operator would have to obtain a license, which imposes more costs for these activities.

The proposed rule might increase risk to public safety because it would require fewer safety analyses and would eliminate other requirements such as mission readiness review, a communications plan prepared in advance of the launch (the proposed rule would require the private sector entity to be in contact with Air Traffic), and a safety organization that are required under a launch license. At this stage of industry development, and the FAA having yet to issue a permit, it is premature to quantify any potential risk increase because too little is known about the safety impacts these measures may have. Additionally, the FAA has attempted to counterbalance any negative effects on safety of the more lenient permitting requirements by requiring operations to occur within a specified area where risk of harming others is reduced even further. The FAA anticipates that it will eventually obtain the experience and information necessary to quantify any increase in

risk in a measurable fashion. This is because the FAA plans to monitor the safety of permitted launches to ensure that the proposed approach is adequate to protect public safety.

Regulatory Flexibility Determination

The proposed rule would not have a significant economic impact on a substantial number of small entities. The FAA concludes that a substantial number of firms in the human space flight industry would be affected by the rule because many of the companies in the fledgling industry are small. The proposed rule would allow these entities to realize cost savings that they would otherwise not have gained under a license-only regime. Because, with the exception of Virgin Galactic, all the entities assessed in the regulatory evaluation are small entities, the same analysis used there applies to the regulatory flexibility determination. Accordingly, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 605(b), the FAA Administrator certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities.

Trade Impact Assessment

The FAA has assessed the potential effect of this proposed rule and determined that it would impose the same costs on domestic and international entities launching from the U.S. under an experimental permit, and thus would have a neutral trade impact.

Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (the Act) is intended, among other things, to curb the practice of imposing unfunded Federal mandates

on State, local, and tribal governments. Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of \$100 million or more (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action." The FAA currently uses an inflation-adjusted value of \$120.7 million in lieu of \$100 million.

This proposed rule does not contain an unfunded mandate. The requirements of Title II do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism. We determined that this action would not have a substantial direct effect 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, and therefore would not have federalism implications.

Plain English

Executive Order 12866 (58 FR 51735, October 4, 1993) requires each agency to write regulations that are simple and easy to understand. We invite your comments on how to make these proposed regulations easier to understand, including answers to questions such as the following:

- Are the requirements in the proposed regulations clearly stated?

- Do the proposed regulations contain unnecessary technical language or jargon that interferes with their clarity?

- Would the regulations be easier to understand if they were divided into more (but shorter) sections?

- Is the description in the preamble helpful in understanding the proposed regulations?

Please send your comments to the address specified in the **ADDRESSES** section.

Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this proposed rulemaking action qualifies for the categorical exclusion identified in paragraph 312f and involves no extraordinary circumstances.

Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA has analyzed this NPRM under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). We have determined that it is not a “significant energy action” under the executive order because it is not a “significant regulatory action” under Executive Order 12866, and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

List of Subjects

14 CFR Part 401

Organization and functions (Government agencies), Space safety, Space transportation and exploration.

14 CFR Part 404

Administrative practice and procedure, Space safety, Space transportation and exploration.

14 CFR Part 405

Investigations, Penalties, Space safety, Space transportation and exploration.

14 CFR Part 406

Administrative practice and procedure, Space safety, Space transportation and exploration.

14 CFR Part 413

Confidential business information, Human space flight, Reporting and recordkeeping requirements, Space safety, Space transportation and exploration.

14 CFR Part 420

Airspace, Human space flight, Space safety, Space transportation and exploration.

14 CFR Part 431

Aviation safety, Environmental protection, Investigations, Human space flight, Reporting and recordkeeping requirements, Rockets, Space safety, Space transportation and exploration.

14 CFR Part 437

Aviation safety, Airspace, Human space flight, Rockets, Space safety, Space transportation and exploration.

The Proposed Amendment

V. The Proposed Amendment

For the reasons discussed above, the Federal Aviation Administration proposes to amend Chapter III of Title 14, Code of Federal Regulations, as follows:

TITLE 14—AERONAUTICS AND SPACE

CHAPTER III—COMMERCIAL SPACE TRANSPORTATION, FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

PART 401—ORGANIZATION AND DEFINITIONS

1. The authority citation for part 401 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

2. Revise § 401.3 to read as follows:

§ 401.3 The Associate Administrator of Commercial Space Transportation.

The Office is headed by an Associate Administrator to exercise the Secretary's authority to license or permit and otherwise regulate commercial space transportation and to discharge the Secretary's responsibility to encourage, facilitate, and promote commercial space transportation by the United States private sector.

3. Amend § 401.5 as follows:

A. Add definitions for “experimental permit”, “validation”, and “verification” in alphabetical order to read as set forth below.

B. Revise the definitions for “amateur rocket activities”, “launch”, “launch incident”, and “reentry incident” to read as set forth below.

§ 401.5 Definitions.

* * * * *

Amateur rocket activities means unmanned launch activities conducted at private sites involving rockets powered by a motor or motors having a total impulse of 200,000 pound-seconds or less and a total burning or operating

time of less than 15 seconds, and a rocket having a ballistic coefficient—that is, gross weight in pounds divided by frontal area of rocket vehicle—less than 12 pounds per square inch.

* * * * *

Experimental permit or *permit* means an authorization by the FAA to a person to launch or reenter a reusable suborbital rocket.

* * * * *

Launch means to place or try to place a launch vehicle or reentry vehicle and any payload from Earth in a suborbital trajectory, in Earth orbit in outer space, or otherwise in outer space, and includes preparing a launch vehicle for flight at a launch site in the United States. Launch includes the flight of a launch vehicle and pre-flight ground operations beginning, under a license, with the arrival of a launch vehicle or payload at a U.S. launch site. For launch of an expendable launch vehicle (ELV), flight ends after the licensee's last exercise of control over its launch vehicle. For launch of an orbital reusable launch vehicle (RLV) launch with a payload, flight ends after deployment of the payload. For any other orbital RLV, flight ends upon completion of the first sustained, steady-state orbit of an RLV at its intended location. For a suborbital RLV launch, flight ends after vehicle landing or impact on Earth, and after activities necessary to return the reusable suborbital rocket to a safe condition on the ground end.

* * * * *

Launch incident means an unplanned event during the flight of a launch vehicle, other than a launch accident, involving a malfunction of a flight safety system or safety-critical system, or a failure of the licensee's or permittee's safety organization, design, or operations.

* * * * *

Reentry incident means any unplanned event occurring during the reentry of a reentry vehicle, other than a reentry accident, involving a malfunction of a reentry safety-critical system or failure of the licensee's or permittee's safety organization, procedures, or operations.

* * * * *

Validation means an evaluation to determine that each safety measure derived from a system safety process is correct, complete, consistent, unambiguous, verifiable, and technically feasible. Validation ensures that the right safety measure is implemented, and that the safety measure is well understood.

Verification means an evaluation to determine that safety measures derived from a system safety process are effective and have been properly implemented. Verification provides measurable evidence that a safety measure reduces risk to acceptable levels.

PART 404—REGULATIONS AND LICENSING REQUIREMENTS

4. The authority citation for part 404 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

5. Revise § 404.1 to read as follows:

§ 404.1 Scope.

This part establishes procedures for issuing regulations to implement 49 U.S.C. Subtitle IX, chapter 701, and for eliminating or waiving requirements for licensing or permitting of commercial space transportation activities under that statute.

6. Revise § 404.3 to read as follows:

§ 404.3 Filing of petitions to the Associate Administrator.

(a) Any person may petition the Associate Administrator to:

(1) Issue, amend, or repeal a regulation to eliminate as a requirement for a license or permit any requirement of Federal law applicable to commercial space launch and reentry activities and the operation of launch and reentry sites;

(2) Waive any such requirement in the context of a specific application for a license or permit; or

(3) Waive the requirement for a license or permit.

(b) Each petition filed under this section must:

(1) Be submitted in duplicate to the Documentary Services Division, Attention Docket Section, Room 4107, U.S. Department of Transportation, 400 Seventh Street, SW., Washington, DC 20590;

(2) Set forth the text or substance of the regulation or amendment proposed, the regulation to be repealed, or the licensing or permitting requirement to be eliminated or waived, or the type of license or permit to be waived;

(3) In the case of a petition for a waiver of a particular licensing or permitting requirement, explain the nature and extent of the relief sought;

(4) Contain any facts, views, and data available to the petitioner to support the action requested; and

(5) In the case of a petition for a waiver, be submitted at least 60 days before the proposed effective date of the waiver unless good cause for later submission is shown in the petition.

(c) A petition for rulemaking filed under this section must contain a summary, which the Associate Administrator may cause to be published in the **Federal Register**, which includes:

(1) A brief description of the general nature of the action requested; and

(2) A brief description of the pertinent reasons presented in the petition for instituting the rulemaking.

7. Revise § 404.17 to read as follows:

§ 404.17 Additional rulemaking proceedings.

The FAA may initiate other rulemaking proceedings, if necessary or desirable. For example, it may invite interested people to present oral arguments, participate in conferences, appear at informal hearings, or participate in any other proceedings.

PART 405—INVESTIGATIONS AND ENFORCEMENT

8. The authority citation for part 405 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

9. Revise § 405.1 to read as follows:

§ 405.1 Monitoring of licensed and other activities.

Each licensee or permittee must allow access by and cooperate with Federal officers or employees or other individuals authorized by the Associate Administrator to observe licensed facilities and activities, including launch sites and reentry sites, as well as manufacturing, production, testing, and training facilities, or assembly sites used by any contractor, licensee, or permittee to produce, assemble, or test a launch or reentry vehicle and to integrate a payload with its launch or reentry vehicle. Observations are conducted to monitor the activities of the licensee, permittee, or contractor at such time and to such extent as the Associate Administrator considers reasonable and necessary to determine compliance with the license or permit or to perform the Associate Administrator's responsibilities pertaining to payloads for which no Federal license, authorization, or permit is required.

10. Revise § 405.3(a), (b), and (d) to read as follows:

§ 405.3 Authority to modify, suspend or revoke.

(a) The FAA may modify a license or permit issued under this chapter upon application by the licensee or permittee or upon the FAA's own initiative, if the FAA finds that the modification is consistent with the requirements of the Act.

(b) The FAA may suspend or revoke any license or permit issued to such licensee or permittee under this chapter if the FAA finds that a licensee or permittee has substantially failed to comply with any requirement of the Act, any regulation issued under the Act, the terms and conditions of a license or permit, or any other applicable requirement, or that public health and safety, the safety of property, or any national security or foreign policy interest of the United States so require.

* * * * *

(d) Whenever the FAA takes any action under this section, the FAA immediately notifies the licensee or permittee in writing of the FAA's finding and the action, which the FAA has taken or proposes to take regarding such finding.

11. Revise § 405.5, introductory text and paragraph (a) to read as follows:

§ 405.5 Emergency orders.

The Associate Administrator may immediately terminate, prohibit, or suspend a licensed or permitted launch, reentry, or operation of a launch or reentry site if the Associate Administrator determines that—

(a) The licensed or permitted launch, reentry, or operation of a launch or reentry site is detrimental to public health and safety, the safety of property, or any national security or foreign policy interest of the United States; and

* * * * *

PART 406—INVESTIGATIONS, ENFORCEMENT, AND ADMINISTRATIVE REVIEW

12. The authority citation for part 406 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

13. Revise § 406.1 heading and paragraphs (a)(2) through (3), and add paragraphs (a)(4) and (5) to read as follows:

§ 406.1 Hearings in license, permit, and payload actions.

(a) * * *

(2) An owner or operator of a payload regarding any decision to prevent the launch or reentry of the payload;

(3) A licensee regarding any decision to suspend, modify, or revoke a license or to terminate, prohibit, or suspend any licensed activity therefore;

(4) An applicant for a permit regarding an FAA decision to issue a permit with conditions or to deny the issuance of the permit; and

(5) A permittee regarding any decision to suspend, modify, or revoke a permit

or to terminate, prohibit, or suspend any permitted activity.

* * * * *

14. Revise § 406.3 heading and paragraph (a) to read as follows:

§ 406.3 Submissions; oral presentation in license, permit, and payload actions.

(a) The FAA will make decisions about license, permit, and payload actions under this subpart based on written submissions unless the administrative law judge requires an oral presentation.

* * * * *

§ 406.5 Administrative law judge's recommended decision in license, permit, and payload actions.

15. Revise § 406.5 heading to read as set forth above.

16. Revise § 406.9(a), (c) introductory text, and (f)(3) to read as follows:

§ 406.9 Civil penalties.

(a) *Civil penalty liability.* Under 49 U.S.C. 70115(c), a person found by the FAA to have violated a requirement of the Act, a regulation issued under the Act, or any term or condition of a license or permit issued or transferred under the Act, is liable to the United States for a civil penalty of not more than \$100,000 for each violation, as adjusted for inflation. A separate violation occurs for each day the violation continues.

* * * * *

(c) *Notice of proposed civil penalty.* A civil penalty action is initiated when the agency attorney advises a person, referred to as the respondent, of the charges or other reasons upon which the FAA bases the proposed action and allows the respondent to answer the charges and to be heard as to why the civil penalty should not be imposed. A notice of proposed civil penalty states the facts alleged; any requirement of the Act, a regulation issued under the Act, or any term or condition of a license or permit issued or transferred under the Act allegedly violated by the respondent; and the amount of the proposed civil penalty. Not later than 30 days after receipt of the notice of proposed civil penalty the respondent may elect to proceed by one or more of the following:

* * * * *

(f) * * *

(3) The compromise order may not be used as evidence of a prior violation in any subsequent civil penalty action, license, or permit action.

* * * * *

17. Revise § 406.127(a)(3)(ii) to read as follows:

§ 406.12 Complaint and answer in civil penalty adjudications.

(a) * * *

(3) * * *

(ii) Any requirement of the Act, a regulation issued under the Act, or any term or condition of a license or permit issued or transferred under the Act allegedly violated by the respondent.

* * * * *

PART 413—LICENSE AND EXPERIMENTAL PERMIT APPLICATION PROCEDURES

18. The authority citation for part 413 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

19. Revise § 413.1 to read as follows:

§ 413.1 Scope of this part.

(a) This part explains how to apply for a license or experimental permit. These procedures apply to all applications for issuing a license or permit, transferring a license, and renewing a license or permit.

(b) Use the following table to locate specific requirements:

Subject	Part
Obtaining a Launch License	415
License to Operate a Launch Site	420
Launch and Reentry of a Reusable Launch Vehicle (RLV)	431
License to Operate a Reentry Site	433
Reentry of a Reentry Vehicle other than a Reusable Launch Vehicle (RLV)	435
Experimental Permits	437

20. Revise § 413.3 to read as follows:

§ 413.3 Who must obtain a license or permit.

(a) A person must obtain a license in accordance with this section, unless eligible for an experimental permit under paragraph (f) of this section.

(b) A person must obtain a license to—

(1) Launch a launch vehicle from the United States;

(2) Operate a launch site within the United States;

(3) Reenter a reentry vehicle in the United States; or

(4) Operate a reentry site within the United States.

(c) A person who is a U.S. citizen or an entity organized under the laws of the United States or any State must obtain a license to—

(1) Launch a launch vehicle outside the United States;

(2) Operate a launch site outside of the United States;

(3) Reenter a reentry vehicle outside of the United States; or

(4) Operate a reentry site outside of the United States.

(d) A foreign entity in which a United States citizen has a controlling interest must obtain a license to launch a launch vehicle from or to operate a launch site in—

(1) Any place that is outside the territory or territorial waters of any nation, unless there is an agreement in force between the United States and a foreign nation providing that such foreign nation has jurisdiction over the launch or the operation of the launch site; or

(2) The territory of any foreign nation, including its territorial waters, if there is an agreement in force between the United States and that foreign nation providing that the United States has jurisdiction over the launch or the operation of the launch site.

(e) A foreign entity in which a U.S. citizen has a controlling interest must obtain a license to reenter a reentry vehicle or to operate a reentry site in—

(1) Any place that is outside the territory or territorial waters of any nation, unless there is an agreement in force between the United States and a foreign nation providing that such foreign nation has jurisdiction over the reentry or the operation of the reentry site; or

(2) The territory of any foreign nation if there is an agreement in force between the United States and that foreign nation providing that the United States has jurisdiction over the reentry or the operation of the reentry site.

(f) A person, individual, or foreign entity otherwise requiring a license under this section may instead obtain an experimental permit to launch or reenter a reusable suborbital rocket under part 437 of this chapter.

21. Revise § 413.5 to read as follows:

§ 413.5 Pre-application consultation.

A prospective applicant must consult with the FAA before submitting an application to discuss the application process and possible issues relevant to the FAA's licensing or permitting decision. Early consultation helps an applicant to identify possible regulatory issues at the planning stage when changes to an application or to proposed licensed or permitted activities are less likely to result in significant delay or costs to the applicant.

22. Revise § 413.7(b)(3) and (c)(1) and (3) to read as follows:

§ 413.7 Application.

* * * * *

(b) * * *

(3) The type of license or permit for which the applicant is applying.

(c) * * *

(1) For a corporation: An officer or other individual authorized to act for the corporation in licensing or permitting matters.

* * * * *

(3) For a joint venture, association, or other entity: An officer or other individual authorized to act for the joint venture, association, or other entity in licensing or permitting matters.

23. Revise § 413.11 to read as follows:

§ 413.11 Acceptance of an application.

The FAA will initially screen an application to determine whether it is complete enough for the FAA to start its review. After completing the initial screening, the FAA will notify the applicant in writing of one of the following:

(a) The FAA accepts the application and will initiate the reviews required to make a decision about the license or permit; or

(b) The application is so incomplete or indefinite that the FAA cannot start to evaluate it. The FAA will reject it and notify the applicant, stating each reason for rejecting it and what action the applicant must take for the FAA to accept the application. The FAA may return a rejected application to the applicant or may hold it until the applicant takes those actions.

24. Revise § 413.13 to read as follows:

§ 413.13 Complete application.

The FAA's acceptance of an application does not mean it has determined that the application is complete. If, in addition to the information required by this chapter, the FAA requires other information necessary for a determination that public health and safety, safety of property, and national security and foreign policy interests of the United States are protected during the conduct of a licensed or permitted activity, an applicant must submit the additional information.

25. Revise § 413.15 to read as follows:

§ 413.15 Review period.

(a) *Review period duration.* Unless otherwise specified in this chapter, the FAA reviews and makes a decision on an application within 180 days of receiving an accepted license application or within 120 days of receiving an accepted permit application.

(b) *Review period tolled.* If an accepted application does not provide sufficient information to continue or complete the reviews or evaluations required by this chapter for a licensing or permitting determination, or an issue

exists that would affect a determination, the FAA notifies the applicant, in writing, and informs the applicant of any information required to complete the application. If the FAA cannot review an accepted application because of lack of information or for any other reason, the FAA will toll the 180-day or 120-day review period until the FAA receives the information it needs or the applicant resolves the issue.

(c) *Notice.* If the FAA does not make a decision within 120 days of receiving an accepted license application or within 90 days of receiving an accepted permit application, the FAA informs the applicant, in writing, of any outstanding information needed to complete the review, or of any issues that would affect the decision.

26. Revise § 413.17 to read as follows:

§ 413.17 Continuing accuracy of application; supplemental information; amendment.

(a) An applicant must ensure the continuing accuracy and completeness of information furnished to the FAA as part of a pending license or permit application. If at any time the information an applicant provides is no longer accurate and complete in all material respects, the applicant must submit new or corrected information. As part of this submission, the applicant must recertify the accuracy and completeness of the application under § 413.7. If an applicant does not comply with any of the requirements set forth in this paragraph, the FAA can deny the license or permit application.

(b) An applicant may amend or supplement a license or permit application at any time before the FAA issues or transfers the license or permit.

(c) Willful false statements made in any application or document relating to an application, license, or permit are punishable by fine and imprisonment under section 1001 of Title 18, United States Code, and by administrative sanctions in accordance with part 405 of this chapter.

27. Revise § 413.19 to read as follows:

§ 413.19 Issuing a license or permit.

After the FAA completes its reviews and makes the decisions required by this chapter, the FAA issues a license or permit to the applicant.

28. Revise § 413.21 (a), (b) introductory text, and (b)(1) to read as follows:

§ 413.21 Denial of a license or permit application.

(a) The FAA informs an applicant, in writing, if it denies an application and states the reasons for denial.

(b) If the FAA has denied an application, the applicant may either:

(1) Attempt to correct any deficiencies identified and ask the FAA to reconsider the revised application. The FAA has 60 days or the number of days remaining in the review period, whichever is greater, within which to reconsider the decision; or

* * * * *

29. Revise § 413.23 to read as follows:

§ 413.23 License or permit renewal.

(a) *Eligibility.* A licensee or permittee may apply to renew its license or permit by submitting to the FAA a written application for renewal at least 90 days before the license expires or at least 60 days before the permit expires.

(b) *Application.* (1) A license or permit renewal application must satisfy the requirements set forth in this part and any other applicable part of this chapter.

(2) The application may incorporate by reference information provided as part of the application for the expiring license or permit, including any modifications to the license or permit.

(3) An applicant must describe any proposed changes in its conduct of licensed or permitted activities and provide any additional clarifying information required by the FAA.

(c) *Review of application.* The FAA reviews the application to determine whether to renew the license or permit for an additional term. The FAA may incorporate by reference any findings that are part of the record for the expiring license or permit.

(d) *Renewal of license or permit.* After the FAA finishes its reviews, the FAA issues an order modifying the expiration date of the license or permit. The FAA may impose additional or revised terms and conditions necessary to protect public health and safety and the safety of property and to protect U.S. national security and foreign policy interests.

(e) *Denial of license or permit renewal.* The FAA informs a licensee or permittee, in writing, if the FAA denies the application for renewal and states the reasons for denial. If the FAA denies an application, the licensee or permittee may follow the procedures of section 413.21 of this part.

PART 415—LAUNCH LICENSE

30. The authority citation for part 415 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

31. Revise § 415.1 to read as follows:

§ 415.1 Scope.

This part prescribes requirements for obtaining a license to launch a launch

vehicle, other than a reusable launch vehicle (RLV), and post-licensing requirements with which a licensee must comply to remain licensed. Requirements for preparing a license application are in part 413 of this subchapter.

PART 420—LICENSE TO OPERATE A LAUNCH SITE

32. The authority citation for part 420 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

33. Revise the definition of “public” in § 420.5 to read as follows:

§ 420.5 Definitions.

* * * * *

Public means people and property that are not involved in supporting a licensed or permitted launch, and includes those people and property that may be located within the boundary of a launch site, such as visitors, any individual providing goods or services not related to launch processing or flight, and any other launch operator and its personnel.

* * * * *

34. Revise § 420.25(b) to read as follows:

§ 420.25 Launch site location review—risk analysis.

* * * * *

(b) For licensed activities, if the estimated expected casualty exceeds 30×10^{-6} , the FAA will not approve the location of the proposed launch point.

35. Add § 420.30 to read as follows:

§ 420.30 Launch site location review for permitted launch vehicles.

If an applicant plans to use its proposed launch site solely for launches conducted under an experimental permit, the FAA will approve a launch site location if the FAA has approved an operating area under part 437 for launches from the proposed launch site.

PART 431—LICENSE FOR LAUNCH AND REENTRY OF A REUSABLE LAUNCH VEHICLE (RLV)

36. The authority citation for part 431 continues to read as follows:

Authority: 49 U.S.C. 70101–70121.

37. Revise § 431.35(d)(7) to read as follows:

§ 431.35 Acceptable reusable launch vehicle mission risk.

* * * * *

(d) * * *

(7) Provide data that verifies the applicant's system safety analyses

required by paragraph (c) of this section; and

* * * * *

38. Add part 437 to read as follows:

PART 437—EXPERIMENTAL PERMITS

Subpart A—General Information

Sec.

- 437.1 Scope and organization of this part.
- 437.3 Definitions.
- 437.5 Eligibility for an experimental permit.
- 437.7 Scope of an experimental permit.
- 437.9 Issuance of an experimental permit.
- 437.11 Duration of an experimental permit.
- 437.13 Additional experimental permit terms and conditions.
- 437.15 Transfer of an experimental permit.
- 437.17 Rights not conferred by an experimental permit.

Subpart B—Requirements to Obtain an Experimental Permit

437.21 General.

Program Description

437.23 Program description.

Flight Test Plan

437.25 Flight test plan.

Operational Safety Documentation

- 437.27 Pre-flight and post-flight operations.
- 437.29 Hazard analysis.
- 437.31 Verification of operating area containment and key flight-safety event limitations.
- 437.33 Landing and impact locations.
- 437.35 Agreements.
- 437.37 Tracking.
- 437.39 Flight rules.
- 437.41 Mishap response plan.

Subpart C—Safety Requirements

- 437.51 Rest rules for vehicle safety operations personnel.
- 437.53 Pre-flight and post-flight operations.
- 437.55 Hazard analysis.
- 437.57 Operating area containment.
- 437.59 Key flight-safety event limitations.
- 437.61 Landing and impact locations.
- 437.63 Agreements with other entities involved in a launch or reentry.
- 437.65 Collision avoidance analysis
- 437.67 Tracking a reusable suborbital rocket.
- 437.69 Communications.
- 437.71 Flight rules.
- 437.73 Anomaly recording and reporting.
- 437.75 Mishap reporting, responding, and investigating.
- 437.77 Additional safety requirements.

Subpart D—Terms and Conditions of an Experimental Permit

- 437.81 Public safety responsibility.
- 437.83 Compliance with experimental permit.
- 437.85 Allowable design changes; Modification of an experimental permit.
- 437.87 Records.
- 437.89 Pre-flight reporting.
- 437.91 For-hire prohibition.
- 437.93 Compliance monitoring.
- 437.95 Inspection of additional reusable suborbital rockets.

Authority: 49 U.S.C. 70101–70102.

Subpart A—General Information

§ 437.1 Scope and organization of this part.

(a) This part prescribes requirements for obtaining an experimental permit. It also prescribes post-permitting requirements with which a permittee must comply to maintain its permit. Part 413 of this subchapter contains procedures for applying for an experimental permit.

(b) Subpart A contains general information about an experimental permit. Subpart B contains requirements to obtain an experimental permit. Subpart C contains the safety requirements with which a permittee must comply while conducting permitted activities. Subpart D contains terms and conditions of an experimental permit.

§ 437.3 Definitions.

Anomaly means an apparent problem or failure that occurs during verification or operation and affects a system, a subsystem, a process, support equipment, or facilities.

Envelope expansion means any portion of a flight where planned operations will subject a reusable suborbital rocket to the effects of altitude, velocity, acceleration, or burn duration that exceed a level or duration successfully verified during an earlier flight.

Exclusion area means an area, within an operating area, that a reusable suborbital rocket's instantaneous impact point may not traverse.

Failure means any anomalous condition that causes or potentially causes a reusable suborbital rocket, its components, or its debris to impact the Earth or leave the operating area during a flight.

Instantaneous impact point means an impact point, following thrust termination of a launch vehicle, calculated in the absence of atmospheric drag effects.

Key flight-safety event means a permitted flight activity that has an increased likelihood of causing a failure compared with other portions of flight.

Operating area means a three-dimensional region where permitted flights may take place.

Permitted vehicle means a reusable suborbital rocket operated by a launch operator under an experimental permit.

Reentry impact point means the location of a reusable suborbital rocket's instantaneous impact point during its unpowered exoatmospheric suborbital flight.

§ 437.5 Eligibility for an experimental permit.

The FAA will issue an experimental permit to a person to launch or reenter a reusable suborbital rocket only for—

(a) Research and development to test new design concepts, new equipment, or new operating techniques;

(b) A showing of compliance with requirements for obtaining a license under this subchapter; or

(c) Crew training before obtaining a license for a launch or reentry using the design of the rocket for which the permit would be issued.

§ 437.7 Scope of an experimental permit.

An experimental permit authorizes launch and reentry of a reusable suborbital rocket. The authorization includes pre- and post-flight ground operations as defined in this section.

(a) A pre-flight ground operation includes each operation that—

(1) Takes place at a U.S. launch site; and

(2) Meets the following criteria:

(i) Is closely proximate in time to flight,

(ii) Entails critical steps preparatory to initiating flight,

(iii) Is unique to space launch, and

(iv) Is inherently so hazardous as to warrant the FAA's regulatory oversight.

(b) A post-flight ground operation includes each operation necessary to return the reusable suborbital rocket to a safe condition after it lands or impacts.

§ 437.9 Issuance of an experimental permit.

The FAA issues an experimental permit authorizing an unlimited number of launches or reentries for a suborbital rocket design for the uses described in § 437.5.

§ 437.11 Duration of an experimental permit.

An experimental permit lasts for one year from the date it is issued. A permittee may apply to renew a permit yearly under part 413 of this subchapter.

§ 437.13 Additional experimental permit terms and conditions.

The FAA may modify an experimental permit at any time by modifying or adding permit terms and conditions to ensure compliance with 49 U.S.C. Subtitle IX, ch. 701.

§ 437.15 Transfer of an experimental permit.

An experimental permit is not transferable.

§ 437.17 Rights not conferred by an experimental permit.

Issuance of an experimental permit does not relieve a permittee of its obligation to comply with any requirement of law that applies to its activities.

Subpart B—Requirements To Obtain an Experimental Permit**§ 437.21 General.**

To obtain an experimental permit an applicant must make the demonstrations and provide the information required by this section.

(a) *This subpart.* An applicant must provide a program description, a flight test plan, and operational safety documentation as required by this subpart.

(b) *Other regulations.* (1) *Environmental.* An applicant must provide enough information for the FAA to analyze the environmental impacts associated with proposed reusable suborbital rocket launches or reentries. The information provided by an applicant must be sufficient to enable the FAA to comply with the requirements of the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.*, and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR parts 1500–1508.

(2) *Financial responsibility.* An applicant must provide the information required by part 3 of appendix A of part 440 for the FAA to conduct a maximum probable loss analysis.

(3) *Operation of a private launch site.* An applicant proposing to launch from a private launch site that contains permanent facilities or supports continuous operations must obtain a launch site operator license under part 420.

(4) *Human space flight.* An applicant proposing launch or reentry with flight crew or a space flight participant on board a reusable suborbital rocket must demonstrate compliance with §§ 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51 and 460.53 of this subchapter.

(c) *Inspection before issuing a permit.* Before the FAA issues an experimental permit, an applicant must make each reusable suborbital rocket planned to be flown available to the FAA for inspection. The FAA will determine whether each reusable suborbital rocket is built as represented in the application.

(d) *Other requirements.* The FAA may require additional analyses, information, or agreements if necessary to protect public health and safety,

safety of property, and national security and foreign policy interests of the United States.

Program Description**§ 437.23 Program description.**

(a) An applicant must provide—

(1) Dimensioned three-view drawings or photographs of the reusable suborbital rocket; and

(2) Gross liftoff weight and thrust profile of the reusable suborbital rocket.

(b) An applicant must describe—

(1) All reusable suborbital rocket systems, including structural, flight control, thermal, pneumatic, hydraulic, propulsion, electrical, environmental control, software, avionics, and guidance systems used in the reusable suborbital rocket;

(2) The types and quantities of all propellants used in the reusable suborbital rocket;

(3) Any hazardous materials in the reusable suborbital rocket;

(4) The purpose for which a reusable suborbital rocket is to be flown; and

(5) Each payload or payload class planned to be flown.

(c) An applicant must identify any foreign ownership of the applicant as follows:

(1) For a sole proprietorship or partnership, identify all foreign ownership,

(2) For a corporation, identify any foreign ownership interests of 10% or more, and

(3) For a joint venture, association, or other entity, identify any participating foreign entities.

Flight Test Plan**§ 437.25 Flight test plan.**

An applicant must—

(a) Describe any flight test program, including estimated number of flights, key flight-safety events, and maximum altitude.

(b) Identify and describe the geographic boundaries of one or more proposed operating areas where it plans to perform its flights and that satisfy § 437.57(b) of subpart C. The FAA may designate one or more exclusion areas in accordance with § 437.57(c) of subpart C.

Operational Safety Documentation**§ 437.27 Pre-flight and post-flight operations.**

An applicant must demonstrate how it will meet the requirements of § 437.53(a) and (b) to establish a safety clear zone and verify that the public is outside that zone before and during any hazardous operation.

§ 437.29 Hazard analysis.

(a) An applicant must perform a hazard analysis that complies with § 437.55(a).

(b) An applicant must provide to the FAA all the results of each step of the hazard analysis required by paragraph (a) of this section.

§ 437.31 Verification of operating area containment and key flight-safety event limitations.

(a) An applicant must identify, describe, and provide verification evidence of the methods and systems used to meet the requirement of § 437.57(a) to contain its reusable suborbital rocket's instantaneous impact point within an operating area and outside any exclusion area. The description must include, at a minimum—

(1) Proof of physical limits on the ability of the reusable suborbital rocket to leave the operating area; or

(2) Abort procedures and other safety measures derived from a system safety engineering process.

(b) An applicant must identify, describe, and provide verification evidence of the methods and systems used to meet the requirements of § 437.59 to conduct any key flight-safety event so that the reusable suborbital rocket's instantaneous impact point, including its expected dispersions, is over unpopulated or sparsely populated areas, and to conduct each reusable suborbital rocket flight so that the reentry impact point does not loiter over a populated area.

§ 437.33 Landing and impact locations.

An applicant must demonstrate that each nominal landing, contingency abort landing, and reusable suborbital rocket component impact or landing location satisfies § 437.61.

§ 437.35 Agreements.

The applicant must complete the agreements required by § 437.63, and provide a copy to the FAA.

§ 437.37 Tracking.

An applicant must identify and describe each method or system used to meet the tracking requirements of § 437.67.

§ 437.39 Flight rules.

An applicant must provide flight rules as required by § 437.71.

§ 437.41 Mishap response plan.

An applicant must provide a mishap response plan that meets the requirements of § 437.75(b).

Subpart C—Safety Requirements**§ 437.51 Rest rules for vehicle safety operations personnel.**

A permittee must ensure that all vehicle safety operations personnel adhere to the work and rest standards in this section during permitted activities.

(a) No vehicle safety operations personnel may work more than:

- (1) 12 consecutive hours,
- (2) 60 hours in the 7 days preceding a permitted activity, and
- (3) 14 consecutive work days.

(b) All vehicle safety operations personnel must have at least 8 hours of rest after 12 hours of work.

(c) All vehicle safety operations personnel must receive a minimum 48-hour rest period after 5 consecutive days of 12-hour shifts.

§ 437.53 Pre-flight and post-flight operations.

A permittee must protect the public from adverse effects of hazardous operations and systems in preparing a reusable suborbital rocket for flight at a launch site in the United States and returning the reusable suborbital rocket and any support equipment to a safe condition after flight. At a minimum, a permittee must—

(a) Establish a safety clear zone that will contain the adverse effects of each operation involving a hazard; and

(b) Verify that the public is outside of the safety clear zone before and during any hazardous operation.

§ 437.55 Hazard analysis.

(a) A hazard analysis must identify and characterize each of the hazards and assess the risk to public health and safety and the safety of property resulting from each permitted flight. A hazard analysis must—

- (1) Identify and describe hazards, including but not limited to each of those that result from—
 - (i) Component, subsystem, or system failures or faults;
 - (ii) Software errors;
 - (iii) Environmental conditions;
 - (iv) Human errors;
 - (v) Design inadequacies; or
 - (vi) Procedural deficiencies.
- (2) Determine the likelihood of occurrence and consequence for each hazard.

(3) Identify and describe the risk elimination and mitigation measures necessary to ensure that the likelihood and consequence of each hazard meets the criteria of paragraph (a)(3)(i) of this section.

(i) Criteria:

(A) Any hazardous condition that may cause death or serious injury to the public must be extremely unlikely.

(B) The likelihood of any hazardous condition that may cause major property damage to the public, major safety-critical system damage or reduced capability, decreased safety margins, or increased workload must be remote.

(ii) Risk elimination and mitigation measures include one or more of the following:

- (A) Designing for minimum risk,
- (B) Incorporating safety devices,
- (C) Providing warning devices, or
- (D) Developing and implementing procedures and training.

(4) Demonstrate that the risk elimination and mitigation measures achieve the risk levels of paragraph (a)(3)(i) of this section through validation and verification. Verification includes:

- (i) Test data,
- (ii) Inspection results, or
- (iii) Analysis.

(b) During permitted activities, a permittee must carry out the risk elimination and mitigation measures derived from its hazard analysis.

(c) A permittee must ensure the continued accuracy and validity of its hazard analysis throughout the term of its permit.

§ 437.57 Operating area containment.

(a) During each permitted flight, a permittee must contain its reusable suborbital rocket's instantaneous impact point within an operating area determined in accordance with paragraph (b) and outside any exclusion area defined by the FAA in accordance with paragraph (c) of this section.

(b) An operating area—

(1) Must be large enough to contain each planned trajectory and all expected vehicle dispersions;

(2) Must contain enough unpopulated or sparsely populated area to perform key flight-safety events as required by § 437.59;

(3) May not contain or be adjacent to a densely populated area; and

(4) May not contain significant automobile traffic, railway traffic, waterborne vessel traffic, or large concentrations of members of the public.

(c) The FAA may prohibit a reusable suborbital rocket's instantaneous impact point from traversing certain areas within an operating area, by designating one or more areas as exclusion areas, if necessary to protect public health and safety, safety of property, or foreign policy or national security interests of the United States. An exclusion area may be confined to a specific phase of flight.

§ 437.59 Key flight-safety event limitations.

(a) A permittee must conduct any key flight-safety event so that the reusable suborbital rocket's instantaneous impact point, including its expected dispersion, is over an unpopulated or sparsely populated area. At a minimum, a key flight-safety event includes:

- (1) Ignition of any primary rocket engine,
- (2) Any staging event, or
- (3) Any envelope expansion.

(b) A permittee must conduct each reusable suborbital rocket flight so that the reentry impact point does not loiter over a populated area.

§ 437.61 Landing and impact locations.

A permittee must use a location for nominal landing, any contingency abort landing, or any reusable suborbital rocket component impact or landing that—

- (a) Is big enough to contain an impact, including debris dispersion upon impact; and
- (b) At the time of landing or impact, does not contain any members of the public.

§ 437.63 Agreements with other entities involved in a launch or reentry.

A permittee must enter into and comply with the agreements required by this section.

(a) An applicant must enter into a written agreement with a Federal launch range operator, a licensed launch site operator, or any other party that provides access to or use of property and services required to support a permitted flight.

(b) Unless otherwise addressed in agreements with a licensed launch site operator or a Federal launch range, an applicant must complete the following:

- (1) For overflight of water, a written agreement between the applicant and the local USCG district to establish procedures for issuing a Notice to Mariners before a permitted flight, and
- (2) A written agreement between the applicant and responsible Air Traffic Control authority having jurisdiction over the airspace through which a flight is to take place, for measures necessary to ensure the safety of aircraft.

§ 437.65 Collision avoidance analysis

(a) For a permitted flight with a planned maximum altitude greater than 150 kilometers, a permittee must obtain a collision avoidance analysis from United States Strategic Command.

(b) The collision avoidance analysis must establish each period during which a permittee may not initiate flight to ensure that a permitted vehicle and any jettisoned components do not pass

closer than 200 kilometers to a manned or mannable orbital object. A distance of less than 200 kilometers may be used if the distance provides an equivalent level of safety, and if the distance accounts for all uncertainties in the analysis.

§ 437.67 Tracking a reusable suborbital rocket.

A permittee must operate a reusable suborbital rocket to provide—

- (a) Air Traffic Control with the ability to know the real time position and velocity of the reusable suborbital rocket while operating in the National Airspace System; and
- (b) Position and velocity data for post-flight use.

§ 437.69 Communications.

- (a) A permittee must be in communication with Air Traffic Control during all phases of flight.
- (b) A permittee must record communications affecting the safety of the flight.

§ 437.71 Flight rules.

(a) Before initiating rocket-powered flight, a permittee must confirm that all systems and operations necessary to ensure that safety measures derived from §§ 437.55, 437.57, 437.59, 437.61, 437.63, 437.65, 437.67, and 437.69 are within acceptable limits.

(b) During all phases of flight, a permittee must—

- (1) Follow flight rules that ensure compliance with §§ 437.55, 437.57, 437.59, and 437.61; and
- (2) Abort the flight if it would endanger the public.

(c) A permittee may not operate a reusable suborbital rocket in a careless or reckless manner that would endanger any member of the public during any phase of flight.

(d) A permittee may not operate a reusable suborbital rocket within Class A, Class B, Class C, or Class D airspace or within the boundaries of the surface area of Class E airspace designated for an airport unless the permittee has prior authorization from the air traffic control facility having jurisdiction over that airspace.

(e) A permittee may not operate a reusable suborbital rocket in areas designated in a Notice to Airmen under § 91.137, § 91.138, § 91.141, or § 91.145 of this title, unless authorized by:

- (1) Air traffic control; or
- (2) A Flight Standards Certificate of Waiver or Authorization.

(f) For any phase of flight where a permittee operates a reusable suborbital rocket like an aircraft in the National Airspace System, a permittee must

comply with the provisions of part 91 of this title specified in an experimental permit issued under this part.

§ 437.73 Anomaly recording and reporting.

(a) A permittee must record anomalies and implement corrective actions for those anomalies.

(b) A permittee must report to the FAA any anomaly of any system that is necessary for complying with §§ 437.55(a)(3), 437.57, and 437.59 and the corrective action for that anomaly. A permittee must take each corrective action before the next flight.

§ 437.75 Mishap reporting, responding, and investigating.

A permittee must report, respond to, and investigate mishaps that occur during permitted activities.

(a) Reporting requirements. A permittee must—

- (1) Immediately notify the FAA Washington Operations Center if there is a launch or reentry accident or incident or a mishap that involves a fatality or serious injury, as defined in 49 CFR 830.2;
- (2) Notify within 24 hours the FAA's Office of Commercial Space Transportation if there is a mishap that does not involve a fatality or serious injury, as defined in 49 CFR 830.2; and
- (3) Submit within 5 days of the event a written preliminary report to the FAA's Office of Commercial Space Transportation if there is a launch or reentry accident or incident during a permitted flight. The report must identify the event as a launch or reentry accident or incident, and must include:

- (i) The date and time of occurrence,
- (ii) A description of the event and sequence of events leading to the launch or reentry accident, or launch or reentry incident, to the extent known,
- (iii) The intended and actual location of launch or reentry, including landing or impact on Earth,
- (iv) A description of any payload,
- (v) The number and general description of any fatalities and injuries,
- (vi) Property damage, if any, and an estimate of its value,
- (vii) A description of any hazardous materials involved in the event, whether on the reusable suborbital rocket or on the ground,
- (viii) Action taken by any person to contain the consequences of the event, and
- (ix) Weather conditions at the time of the event.

(b) Response requirements. A permittee must—

- (1) Immediately—
- (i) Ensure the consequences of a mishap are contained and minimized; and

(ii) Ensure data and physical evidence are preserved.

(2) Report to and cooperate with FAA and National Transportation Safety Board (NTSB) investigations and designate one or more points of contact for the FAA or NTSB; and

(3) Identify and adopt preventive measures for avoiding a recurrence of the event.

(c) Investigation requirements. A permittee must—

(1) Investigate the root cause of an event described in paragraph (a) of this section;

(2) Report investigation results to the FAA; and

(3) Identify responsibilities, including reporting responsibilities, for personnel assigned to conduct investigations and for any unrelated persons that the permittee retains to conduct or participate in investigations.

§ 437.77 Additional safety requirements.

The FAA may impose additional safety requirements on an applicant or permittee proposing an activity with a hazard not otherwise addressed in this part. This may include a toxic hazard or the use of solid propellants. The FAA may also require the permittee to conduct additional analyses of the cause of any anomaly and corrective actions.

Subpart D—Terms and Conditions of an Experimental Permit

§ 437.81 Public safety responsibility.

A permittee must ensure that a launch or reentry conducted under an experimental permit is safe, and must protect public health and safety and the safety of property.

§ 437.83 Compliance with experimental permit.

A permittee must conduct any launch or reentry under an experimental permit in accordance with representations made in its permit application, with subparts C and D of this part, and with terms and conditions contained in the permit.

§ 437.85 Allowable design changes; Modification of an experimental permit.

(a) The FAA will identify in the experimental permit the type of changes that the permittee may make to the reusable suborbital rocket design without invalidating the permit.

(b) Except for design changes made under paragraph (a) of this section, a permittee must ask the FAA to modify the experimental permit if—

(1) It proposes to conduct permitted activities in a manner not authorized by the permit; or

(2) Any representation in its permit application that is material to public

health and safety or the safety of property is no longer accurate or complete.

(c) A permittee must prepare an application to modify an experimental permit and submit it in accordance with part 413 of this subchapter. If requested during the application process, the FAA may approve an alternate method for requesting permit modifications. The permittee must indicate any part of its permit that would be changed or affected by a proposed modification.

(d) When a permittee proposes a modification, the FAA reviews the determinations made on the experimental permit to decide whether they remain valid.

(e) When the FAA approves a modification, it issues the permittee either a written approval or a permit order modifying the permit if a stated term or condition of the permit is changed, added, or deleted. An approval has the full force and effect of a permit order and is part of the permit record.

§ 437.87 Records.

(a) Except as required by paragraph (b) of this section, a permittee must maintain for 3 years all records, data, and other material necessary to verify that a permittee conducted its launch or reentry in accordance with its permit.

(b) If there is a launch or reentry accident or incident, a permittee must preserve all records related to the event. A permittee must keep the records until after any Federal investigation and the FAA advises the permittee that it may dispose of them.

(c) A permittee must make all records that it must maintain under this section available to Federal officials for inspection and copying.

§ 437.89 Pre-flight reporting.

(a) Not later than 30 days before each flight or series of flights conducted under an experimental permit, a permittee must provide the FAA with the following information:

(1) Any payload to be flown, including any payload operations during the flight,

(2) When the flight or series of flights are planned,

(3) The operating area for each flight, and

(4) The planned maximum altitude for each flight.

(b) Not later than 15 days before each permitted flight planned to reach greater than 150 km altitude, a permittee must provide the FAA its planned trajectory for a collision avoidance analysis.

§ 437.91 For-hire prohibition.

No permittee may carry any property or human being for compensation or hire on a reusable suborbital rocket.

§ 437.93 Compliance monitoring.

A permittee must allow access by, and cooperate with, federal officers or employees or other individuals authorized by the FAA to observe any activities of the permittee, or of its contractors or subcontractors, associated with the conduct of permitted activities.

§ 437.95 Inspection of additional reusable suborbital rockets.

A permittee may launch or reenter additional reusable suborbital rockets of the same design under the permit after the FAA inspects each additional reusable suborbital rocket.

Issued in Washington, DC, on March 22, 2006.

Patricia Grace Smith,

Associate Administrator for Commercial Space Transportation.

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[R03–OAR–2006–0151; FRL–8051–5]

Approval and Promulgation of Air Quality Implementation Plans; State of Maryland; Revised Definition of Volatile Organic Compound

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA proposes to approve the State Implementation Plan (SIP) revision submitted by the State of Maryland. The revisions update the SIP's reference to the EPA definition of volatile organic compounds (VOC). In the Final Rules section of this **Federal Register**, EPA is approving the State's SIP submittal as a direct final rule without prior proposal because the Agency views this as a noncontroversial submittal and anticipates no adverse comments. A detailed rationale for the approval is set forth in the direct final rule. If no adverse comments are received in response to this action, no further activity is contemplated. If EPA receives adverse comments, the direct final rule will be withdrawn and all public comments received will be addressed in a subsequent final rule based on this proposed rule. EPA will not institute a second comment period.