

**DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration**

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Licensing and Safety Requirements for Launch

Frequently Asked Questions

The Associate Administrator for Commercial Space Transportation of the Federal Aviation Administration (FAA), Department of Transportation (DOT), published a notice of proposed rulemaking (NPRM) to amend the FAA's commercial space transportation regulations. Licensing and Safety Requirements for Launch, 65 Fed. Reg. 63921 (Oct. 25, 2000). The FAA proposes to amend its regulations to codify its license application process for launch from a non-federal launch site and to codify the safety requirements for launch operators regarding license requirements, criteria, and responsibilities in order to protect the public from the hazards of launch from a federal launch range or a non-federal launch site. The FAA has received a number of questions concerning the rule. This set of frequently asked questions and responses is designed to be of assistance in clarifying the proposed rule.

1. Q. What were the FAA's goals in developing the NPRM?

A. The FAA's approach in developing technical requirements for this proposed rule was to build on the safety success of federal launch ranges. Wherever appropriate for public safety, federal launch range practices were used as the basis for the development of the FAA's regulatory regime. The FAA sought to develop requirements that reflect the best of current practice and lessons learned at the federal ranges and present them in the appropriate regulatory form so that those requirements may be applied to the great majority of the expendable launch vehicle operations that must be licensed by the FAA. The FAA's overall objective is to ensure the same proven high level of public safety that the federal ranges have achieved.

2. Q. Some have found the NPRM to be a rigid requirements document. For example, standards that the federal range safety organizations describe as goals or preferred approaches are stated in the NPRM as hard requirements. What, if any, flexibility does the FAA intend to allow when enforcing the proposed requirements?

A. The FAA recognized early in the development of the NPRM that it was impossible to adopt the range safety standards as written in federal range safety documents because regulations must contain only that which is actually required. Recommended approaches may appear in guidance documents, such as FAA advisory circulars. Alternatives may be approved through the licensing process. When faced with a current standard that was in the form of a goal or preferred approach the FAA often had to either rewrite the standard as a requirement or omit it from the NPRM if it was determined to be unnecessary.

The NPRM contains provisions that would allow the FAA some flexibility in its application of the requirements. The NPRM would allow for flexibility through the use of performance requirements where appropriate. The FAA worked extensively with federal range safety personnel to refine and adapt many of the federal range standards to a performance requirement approach for incorporation into this proposed rule. One must keep in mind that there are many levels of performance requirements possible. For example, for hardware there may be performance requirements at the system level, component level, and piece part level. For each specific safety issue, the NPRM may contain different levels of performance requirements as needed to respond to the complexity of space launch systems and the potential for negative consequences to public safety.

In addition to the use of performance requirements, the FAA proposes to allow for flexibility by permitting a license applicant or a licensee applying for a license modification to demonstrate an equivalent level of safety for a proposed alternative approach. Although the proposed regulations would provide the requirements with which a licensee must comply, the FAA anticipates that a launch operator might wish to employ alternative means of achieving an equivalent level of safety. In that case, if a launch operator clearly and convincingly demonstrates an equivalent level of safety, the FAA would accept the alternative. Once accepted, an alternative approach would become part of the terms of the license and, the FAA would consider making it available for the benefit of others through the advisory circular process or some other means. The FAA has demonstrated its flexibility with the licensing of launches such as those of Sea Launch, where there are a number of aspects that do not conform to current practice at U.S. launch ranges. Also, the FAA recognizes that the NPRM only represents a version of current practice: the safety methodologies used at the U.S. ranges often differ from one another. The FAA has worked with the federal range organizations to ensure that the FAA requirements present a more generalized description of the current practices at the ranges. Range practices typically do provide an equivalent level of safety to that contained in the NPRM.

3. Q. **Some believe the traditional methods of achieving launch safety are outdated and that there must be a better, less time consuming and less costly approach. Why does the FAA feel that it must base its requirements on current launch range practices and not necessarily new and better approaches to safety?**
- A. The risk to the public associated with space launch results from an extensive array of complex hazards. The FAA understands that there is, and will likely continue to be, debate concerning the requirements, methodologies, and level of effort needed to ensure the safety of the public. However, the success achieved by the federal range safety organizations over the history of space launch in the U.S. is undeniable. The NPRM represents the FAA's first attempt to codify requirements that address all the hazards associated with the launch of an expendable launch vehicle. The current best practices were the most logical and cost effective starting point. It is essential to maintain the excellent U.S. launch safety record both for the public good and for the long term success of the growing commercial space launch industry. At the same time, the FAA does not want to place excessive burden on the launch industry if better alternatives exist. The

FAA is interested in learning about and promoting the development and implementation of improved safety methodologies that do at least two things: 1) streamline the licensing process and 2) maintain public safety. However, the FAA cannot accomplish this unilaterally. As an integral member of the U.S. launch safety community, the FAA will act as a proponent of new approaches to launch safety. As these approaches are developed and proven, they may be incorporated into the FAA's licenses and regulations. In the commercial venue, each launch operator is responsible for safety. The FAA encourages the industry to put its best minds to work on improved approaches to safety and present them for the FAA's consideration. The FAA has the necessary process in place to allow change for the better to occur.

4. **Q. Some of the requirements appear to be new. Is the FAA imposing new requirements on industry?**

A. Often, what may appear to be new requirements are merely current requirements that are unfamiliar to the launch operator. The requirements contained in part 415, subpart F of the NPRM apply only to license applications to launch from a non-federal launch site and are intended to formalize existing practices that have evolved on a case-by-case basis. In effect, this is the first time that such requirements have been provided in writing. Launch operators who only launch from a federal range are unaccustomed to providing this level of detail to the FAA as part of the safety review portion of a launch license; however, they do provide similar data to the federal range safety organization. Thus, for a licensed launch from a federal launch range, part 415, subpart C continues to apply as long as the safety related processes of the federal range do not change from those documented in the FAA's Baseline Assessment of the range. A launch operator launching from a non-federal launch site has previously provided the level of safety review data outlined in the NPRM to the FAA. The safety requirements in part 417 of the NPRM would apply to licensed launches from both federal ranges and non-federal launch sites. There are many functions that the federal range safety organizations currently perform for each launch for which there may be only limited input from the launch operator. At a non-federal launch site the launch operator and his subcontractors would have to perform all the safety functions, including those that are currently performed by the federal ranges. Some of the requirements may appear to be new to people unfamiliar with all that range safety entails. This appearance may be most frequent with respect to the various required flight safety analyses and the development of input data needed to perform the analyses. **All the safety requirements in part 417 can be traced directly to current practice at the federal launch ranges, although the methodologies used to satisfy the requirements may differ.**

5. **Q. The license application data requirements in part 415 seem extensive. Why does the FAA need so much data as part of a license application and what will the FAA do with it?**

A. Part 415, subpart F, would require a license applicant to demonstrate how it would satisfy the requirements of part 417 in order to obtain a license. The FAA would issue a safety approval if an applicant demonstrated that it would meet the safety responsibilities and requirements for launch. The safety review would require an applicant to submit data, prepare test plans, conduct and supply analyses and do so in accordance with specified

timetables. Not unlike what a launch operator must submit to a federal launch range in order to launch from a site such as Cape Canaveral Air Force Station or Vandenberg Air Force Base, a launch operator must demonstrate that it will satisfy the FAA's regulatory requirements. The FAA will verify the accuracy of the data submitted during the licensing process and the data will become part of the FAA's license file as a demonstration of the licensee's ability to satisfy the safety requirements and to define the licensee's safety program. The FAA will use the license file to prepare for compliance inspections to verify that a licensee's operations are in accordance with part 417 safety requirements and the representations made in its license application. Additionally, as the FAA identified the safety review data requirements for the NPRM, the FAA had to be mindful of the rulemaking requirement that an agency provide the public sufficient notice of the requirements it was contemplating to give the public an opportunity to respond and comment. When developing a final rule from an NPRM, requirements may be deleted without undergoing the rigors of another rulemaking; however, entirely new requirements may usually not be added without a second comment period for the proposed new requirements. Accordingly, when developing data requirements like those contained in the NPRM an agency is well advised to propose all requirements that may be necessary. These requirements may be streamlined for the final rule.

6. Q. **The safety requirements in part 417 apply to launch from both federal ranges and non-federal launch sites. When launching from a federal range, are the FAA requirements in addition to the federal range requirements? Will there be duplication of effort? How will issues between the launch operator, the FAA, and the federal range be resolved?**

A. The FAA issues a license to an applicant proposing to launch from a federal launch range if the applicant satisfies the requirements of part 415, subpart C of the licensing regulations and has contracted with the federal launch range for the provision of launch services and property, as long as the safety related launch services and proposed use of property are within the experience of the federal launch range. The FAA does not duplicate analyses performed by the federal launch ranges or routinely review those analyses during the launch safety review. Instead, the FAA relies on its knowledge of the range processes as documented in the FAA's Baseline Assessments. The FAA's Baseline Assessments document each federal launch range's capabilities, safety program, standards and policies. A federal launch range, however, may not adequately address some regulatory safety issues. The failure of federal launch range safety systems or procedures may, for example, affect the FAA's ability to rely on those aspects of federal launch range services. Although the FAA expects such occurrences to be rare, when faced with such a situation, the FAA may require the applicant to demonstrate safety with respect to those specific areas of concern on a case-by-case basis. In addition to requiring a showing of safety from the applicant, the FAA will also work with the federal launch range to address the issue, and will update the FAA's Baseline Assessment as appropriate. With respect to licensed launches from Air Force ranges, on January 16, 2001, the FAA and the Air Force signed a Memorandum of Agreement (MOA) on safety for commercial space transportation and range activities. This agreement explains the roles and responsibilities of the Air Force and the FAA for overseeing safety of commercial space launch and reentry. A copy of the MOA is available on our web site (<http://ast.faa.gov>).

7. **Q. There may be a number of acceptable methods for performing the analyses required in part 417 of the NPRM. Why are there requirements for analysis methods in the NPRM?**

A. The analysis methods included in the NPRM demonstrate the required level of fidelity. The FAA will consider alternative analysis methods based on the launch operator's demonstration of an equivalent level of safety. In addition, the FAA believes that providing analysis methods in the regulation will allow for some efficiency in the licensing process. The regulation method provides an applicant and the FAA with a starting point. The FAA will be able to vary the level of review and evaluation of the applicant's analysis method depending on how far it deviates from the regulation method. The FAA recognizes that analysis methods often vary from one federal launch range to another. The FAA worked with the federal range organizations to ensure that their current analysis methods provide an equivalent level of safety to the methods provided in the NPRM. The FAA's Baseline Assessments of each federal range will document how each range's methods satisfy the FAA's requirements for licensed launches from that range.

8. **Q. Some believe that satisfying the proposed FAA requirements will be costly and place the U.S. launch operators at a disadvantage when competing in the international launch market. How can the U.S. launch industry reduce the cost of safety?**

A. The FAA recognizes that there are costs associated with achieving safety and that those costs can be significant depending on the specifics of a launch system. Because the FAA's goal in developing the NPRM was to codify current practice, the cost of safety achieved by satisfying the requirements in the NPRM should not significantly differ from what the launch industry has experienced to date. Some may not realize the extent of work currently performed.

The FAA is interested in learning about and promoting cost effective approaches to achieving safety with respect to current launch technologies, and ensuring that safe, cost effective, advancements are made in the development of future launch systems. For example, an advancement that the FAA believes would yield tremendous benefits to safety as well as launch system capability and operability and reduce overall costs would be the development of propulsion, attitude control, and station keeping systems for launch vehicle stages and payloads that do not rely on highly toxic propellants.

9. **Q. Is the FAA duplicating the requirements of other agencies for ground operations?**

A. In addressing the area of ground safety, the FAA had to consider, first and foremost, its goal of codifying safety standards that govern the unique issues associated with launch. Secondary to this goal, the FAA faced the question of overlapping jurisdiction between the FAA and other agencies such as the Environmental Protection Agency and the Occupational Safety and Health Administration which has jurisdiction over worker safety. Such overlapping jurisdiction raised the question of how much information concerning ground safety the FAA should request in the course of a license application review, and issues regarding the consequences to a launch operator and the FAA in undertaking such a review. As a means of resolving the issues raised by such overlap, the

FAA proposes to require that an applicant assess its hazards and institute controls that will keep those hazards from reaching the public. The FAA does not intend to second guess the regulatory requirements of other agencies or purport to issue approvals on their behalf.

10. Q. Do the ground safety requirements apply outside of the United States?

A. No. Proposed part 417 would contain ground safety requirements that apply to the preflight preparation of a launch vehicle and related post-launch activities at a launch site in the United States. The governing statute, popularly referred to as the Commercial Space Launch Act, defines “launch” to include not only the flight of a launch vehicle but “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). Accordingly, the FAA intends to employ the term “launch processing” to describe the preparation for flight of a launch vehicle at a launch site. Because the Act gives the FAA licensing authority only over the preparatory activities at a launch site in the United States, the FAA does not seek to impose its requirements under this proposed subpart to launch processing activities that may occur outside the United States.

11. Q. How may a licensee participate in or influence the FAA’s rulemaking decisions?

A. A licensee may participate in the FAA’s rulemaking decisions through a number of different avenues. During the course of a rulemaking such as this one, providing written comments supported by data and analysis provides a most effective means of participation. Review of past FAA commercial space transportation rulemakings will show that the FAA has, on a variety of occasions, modified the requirements it originally proposed in response to comments. The FAA’s regulations also provide the public, including licensees, an opportunity to petition for rulemaking. See 14 C.F.R. § 404.3. Additionally, the FAA’s Commercial Space Transportation Advisory Committee (COMSTAC) provides licensees an opportunity to share their views. Most specifically, the FAA may request that COMSTAC establish a working group to address issues of launch safety for expendable launch vehicles.