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Transportation

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Federal Aviation Administration

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14 CFR Parts 401 et al.  
Commercial Space Transportation  
Licensing Regulations; Final Rule

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****14 CFR Parts 401, 411, 413, 415 and 417**

[Docket No. 28851; Amdt. Nos. 401-01, 411-01, 413-01, 415-01 and 417-01]

RIN 2120-AF99

**Commercial Space Transportation Licensing Regulations**

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

**SUMMARY:** The Associate Administrator for Commercial Space Transportation of the Federal Aviation Administration (FAA), Department of Transportation (DOT) is amending the FAA's commercial space transportation licensing regulations. The FAA amends its licensing regulations in order to clarify its license application process generally, and for launches from federal launch ranges, specifically. The regulations are intended to provide applicants and licensees greater specificity and clarity regarding the scope of a license, and to codify and amend licensing requirements and criteria.

**EFFECTIVE DATE:** June 21, 1999. An application pending at the time of the effective date must conform to any new requirements of this rulemaking as of the effective date. All license terms and conditions, and all safety requirements of this rulemaking also apply as of the effective date.

**FOR FURTHER INFORMATION CONTACT:** J. Randall Repcheck, Licensing and Safety Division (AST-200), Associate Administrator for Commercial Space Transportation, Federal Aviation Administration, DOT, Room 331, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-8379; or Laura Montgomery, Office of the Chief Counsel (AGC-250), Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-3150.

**SUPPLEMENTARY INFORMATION:****Availability of Final Rules**

Any person may obtain a copy of this final rule by submitting a request to the Federal Aviation Administration, Office of Rulemaking, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-9680. Communications must identify the amendment number or docket number of this final rule. Persons interested in

being placed on a mailing list for future FAA notices of proposed rulemaking and final rules should request a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes application procedures.

An electronic copy of this document may be downloaded using a modem and suitable communications software from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: 703-321-3339) or the Government Printing Office's electronic bulletin board service (telephone 202-512-1661) or the FAA's Aviation Rulemaking Advisory Committee Bulletin Board service (telephone: 800-322-2722 or 202-267-5948). Internet users may reach the FAA's web page at <http://www.faa.gov/avr/arm/nprm/nprm.htm> or the Government Printing Office's webpage at <http://www.access.gpo.gov/nara/aces/aces140.html> for access to recently published rulemaking documents.

In order to enhance communications regarding commercial space transportation with the public, the FAA developed an internet-based information system, which provides the public with electronic access to the FAA. The system provides on-line information to interested parties, and allows applicants, through a secure portion of the system, to check the status of applications and licenses. The system currently contains a limited amount of information, but includes schedules of upcoming commercial launches, the FAA's regulations, guidance documents, and research studies. The address is: <http://ast.faa.gov/>.

**Small Entity Inquiries**

If you are a small entity and have a question, contact your local FAA official. If you do not know how to contact your local FAA official, you may contact Charlene Brown, Program Analyst Staff, Office of Rulemaking, ARM-27, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591, 1-888-551-1594. Internet users can find additional information on SBREFA in the "Quick Jump" section of the FAA's web page at <http://www.faa.gov> and may send electronic inquiries to the following Internet address: 9-AWA-SBREFA@faa.gov.

**Introduction**

By this rulemaking, the FAA clarifies license application procedures and requirements. The FAA's revisions to its regulations provide information regarding the scope of a launch license,

the criteria for obtaining a license for expendable launch vehicles (ELVs) launching from federal launch ranges, and the underlying safety rationale for the FAA's launch licensing regime. These regulations also explain that the FAA will license the operation of a launch site or the launch of a launch vehicle from a site that is not operated by a federal launch range on a case by case basis.

**History and Current Revisions**

The Commercial Space Launch Act of 1984, as codified at 49 U.S.C. Subtitle IX—Commercial Space Transportation, ch. 701, Commercial Space Launch Activities, 49 U.S.C. 70101-70121 (the Act), authorizes the Secretary of Transportation to oversee, license and regulate commercial launch and reentry activities and the operation of launch and reentry as carried out by U.S. citizens or within the United States. 49 U.S.C. 70104, 70105. The Act directs the Secretary 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, 49 U.S.C. 70105, and to encourage, facilitate and promote commercial space launches by the private sector, 49 U.S.C. 70103.

The FAA carries out the Secretary's responsibilities for licensing and regulating launches and the operation of launch sites. Prior to November 15, 1995, the Secretary's responsibilities were implemented by the Office of Commercial Space Transportation (the Office), which was located within the Office of the Secretary in the Department of Transportation. Now, the Associate Administrator for Commercial Space Transportation is part of DOT's Federal Aviation Administration. When this administrative change was effected, the Secretary delegated the statutory authority over the regulation of commercial space transportation to the Administrator of the Federal Aviation Administration, and the Administrator redelegated this authority to the Associate Administrator.

On August 4, 1994, President Clinton announced a new National Space Transportation Policy reaffirming the government's commitment to the commercial space transportation industry and the critical role of the Department of Transportation in encouraging and facilitating private sector launch activities. In 1996, President Clinton signed a National Space Policy, which recognized the Department of Transportation as the lead federal agency for regulatory guidance regarding commercial space transportation activities. The FAA's

rules, by offering greater specificity and certainty regarding licensing requirements and the scope of a license, should assist the launch industry in its business and operational planning. This will facilitate the private sector's launch activities by increasing certainty and by easing its regulatory burden.

#### *Background on the FAA's Commercial Launch Licensing History and Process*

The FAA licenses commercial launches and the commercial operation of launch sites through 14 CFR Ch. III. In April 1988, when the then Office of Commercial Space Transportation first issued final regulations, no licensed launches had yet taken place. Accordingly, the Office established a flexible regime intended to be responsive to an emerging industry while at the same time ensuring public safety. The Office noted that it would "continue to evaluate and, when necessary, reshape its program in response to growth, innovation and diversity in this critically important industry." Commercial Space Transportation Licensing Regulations, 53 FR 11004, 11006 (Apr. 4, 1988). Under the 1988 regulations the Office implemented a case-by-case approach for the evaluation of launch license applications. All commercial launches at the time took place from federal launch ranges.

In conjunction with information guidelines describing the Office's application process, the Office's regulations reflected the intent of Congress that the Office evaluate the policy aspects and safety of a proposed launch. The Office followed a case-by-case approach to performing these reviews, tailoring its information requests to the specifics of a given launch proposal.

Later, the Office took further steps designed to simplify the licensing process for launch operators with established safety records. For example, before issuing its final rules in 1988, the Office issued interim regulations, in which it had contemplated the possibility that "one license could cover a specified series of launches where the same safety resources [would] support identical or similar missions." Commercial Space Transportation Licensing Regulations: Interim Final Rule and Request for Comments, 51 FR 6870, 6872 (Feb. 26, 1986). In 1991, the Office implemented this option by instituting a launch operator license for similar launches carried out by a single licensee. The launch operator license currently authorizes a licensee to conduct any number of launches within defined parameters over the course of a

two year period. The FAA has continued to apply a case by case analysis to licenses authorizing a single launch or to licenses authorizing a set of specifically identified launches.

The FAA, in accordance with 49 U.S.C. 70112 and 14 CFR Ch. III, part 440, imposes financial responsibility requirements on a licensee, commensurate with the scope of its license, pursuant to which a licensee is required either to purchase insurance to protect launch participants in the event of claims by third parties and to protect against damage to government property, or to otherwise demonstrate financial responsibility. In the event that there were a launch accident and third party claims arising out of that launch exceeded the financial responsibility required by the FAA, the Act contains procedures through which the government of the United States may pay those excess claims up to a statutory ceiling. See 49 U.S.C. 70113. The possible payment of excess claims by the government for damages related to a particular launch is commonly referred to, albeit erroneously, as "indemnification" of the launch industry. The payment of excess claims constitutes, in fact, only a provisional agreement by the government of the United States subject to conditions, including Congressional appropriation of funds.

#### *Growth and Current Status of Launch Industry*

The number of commercial space launches has steadily grown over the years since the first licensed commercial launch in 1989. As of April 13, 1999, 110 licensed launches have taken place from five different federal launch ranges, and from two non-federal launch sites. Launch vehicles have included traditional orbital launch vehicles such as the Atlas, Titan and Delta, as well as suborbital vehicles such as the Starfire. New vehicles using traditional launch techniques include Lockheed Martin's Athena I and II, EER's Conestoga, Orbital Sciences Corporation's Taurus, and Boeing's Delta III. Unique vehicles such as the Pegasus are also included in this count. New launch vehicles are proposed every year. For example, the Pegasus air-launched rocket has been developed since the passage of the Act. On the horizon are sea-launched rockets, Lockheed Martin's Atlas III and Boeing's and Lockheed Martin's evolved expendable launch vehicles. A number of companies are proposing partially and fully reusable launch vehicles. Several companies are participating in partnership with the National Aeronautics and Space Administration

(NASA) to develop X-33 and X-34 launch vehicles incorporating reusable and single-stage-to-orbit technology, which could result in vehicles for commercial use.

Currently, commercial launches take place from federal launch ranges operated by the Department of Defense and NASA. Launch operators bring launch vehicles to federal ranges such as Cape Canaveral Air Station, Vandenberg Air Force Base, White Sands Missile Range and Wallops Flight Facility for launch. A launch operator obtains a number of services from a federal range, including radar, tracking and telemetry, flight termination and other launch services. Pursuant to an agreement between a federal launch range and a launch operator, the federal range has final authority over decisions regarding whether to allow a launch to proceed. A federal range operates pursuant to its own internal rules and procedures, and the launch operator must comply with those rules and procedures in addition to the requirements of the FAA.

The U.S. commercial space transportation industry faces strong international competition. Ariane, Europe's launch vehicle, continues to be the market leader, with other competition coming from China, Russia, and Ukraine. The U.S. industry still obtains a significant percentage of launch contracts, and AST projects over seventy commercial orbital launches within the next three years.

Additionally, U.S. participation in international ventures is increasing. For example, International Launch Services (ILS), comprised of Lockheed Martin Corporation, Khrunichev Enterprise and NPO Energia, markets Russia's Proton rockets and the U.S. Atlas. Another international partnership, Sea Launch Limited Partnership (Sea Launch), involves Boeing Commercial Space Company, S.P. Korolev Rocket and Space Corporation Energia, KB Yuzhnoye and PO Yuzhnoye Mashinostroitelny Zavod, and Kvaerner Moss Technologies a.s., which are U.S., Russian, Ukrainian and Norwegian companies, respectively. Sea Launch has launched a commercial rocket from a modified oil rig located in the Pacific Ocean. Orbital Sciences Corporation has conducted a launch outside the United States and envisions more.

#### *Current Revisions to Licensing Regulations*

With six years of experience in regulating the commercial launch industry, the DOT Office of Commercial Space Transportation initiated a process for standardizing its licensing

regulations. Originally, when the Office first initiated its licensing program, the Office did not possess standardized rules or requirements. Accordingly, it evaluated each license application individually to ensure that a proposed launch would not jeopardize public health and safety, the safety of property, U.S. national security or foreign policy interests or international obligations of the United States. Over the course of time, and with the input of licensees and federal launch ranges, the FAA has evolved a standardized approach to licensing launches from federal launch ranges. Accordingly, the FAA now implements that approach through revisions to its regulations.

On October 13, 1994, in anticipation of issuing a notice of proposed rulemaking, the Office of Commercial Space Transportation, DOT, announced that it was holding a public meeting to obtain industry's views to assist the Office in developing an NPRM that would address specific requirements for launch and launch site operator licenses. Notice of Public Meeting, 59 FR 52020 (1994). The Office stated that it would streamline its launch licensing process by standardizing requirements and by codifying certain information requirements in its regulations. *Id.* The Office also advised the public that it would promulgate rules concerning licensing the operation of a launch site. *Id.* The FAA proposes to implement rules of general applicability for operation of a launch site through an additional notice of proposed rulemaking in order to foster certainty for this new industry as well. *Id.* The public meeting took place on October 27, and 28, 1994, and was attended by representatives of the commercial launch industry, payload companies, prospective commercial launch site operators, interested government agencies, both state and federal, and the public.

On March 19, 1997, the FAA released a notice of proposed rulemaking proposing to amend its licensing requirements. Commercial Space Transportation Licensing Regulations, Notice of Proposed Rulemaking (NPRM), 62 FR 13216 (Mar. 19, 1997). In the NPRM, the FAA proposed to narrow its definition of launch from "gate to gate," which resulted in the licensing of the launch related activities of a launch operator at a federal launch range prior to the arrival of the launch vehicle, to "vehicle at the gate," which encompasses only the launch operator's activities once its vehicle arrives. The NPRM proposed a launch license application process developed through its case by case license history,

including the implementation of certain safety proposals recommended by the National Transportation Safety Board. The FAA also proposed to streamline and reorganize a variety of other licensing provisions. The comment period closed May 19, 1997. At the request of several launch operators, the FAA reopened the comment period until August 4, 1997. The FAA received comments from a number of interested parties, including launch operators, a payload provider, a launch site operator and prospective reusable launch vehicle operators.

The Environmental Protection Agency commented on the FAA's environmental procedures. The launch operators who filed comments included Boeing Commercial Space Company, Lockheed Martin Corporation, McDonnell Douglas Aerospace, and Orbital Sciences Corporation. Reusable launch vehicle operators' views were represented by Kistler Aerospace Corporation, Rotary Rocket Company, and Space Access. Hughes Electronics, Spaceport Florida Authority, and the National Transportation Safety Board also filed comments. The comments focused on several major issues, with the proposed definition of launch eliciting the most attention. Foreign ownership of a license applicant also proved a topic of concern, as did issues surrounding the FAA's proposed risk threshold and various safety requirements. In light of the great variety of topics encompassed by this rulemaking, rather than devoting a single section to all of the comments, the FAA addresses the comments by subject matter throughout the preamble and section by section analysis in the relevant context.

On October 28, 1998, the Commercial Space Act of 1998 was signed into law. Among other things, it 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." P.L. 105-303 (1998), 49 U.S.C. 70102(3). The change affects this rulemaking's definition of launch by both confirming the more narrow application proposed in the NPRM and expanding the scope of launch to encompass launch vehicle preparatory activities occurring at any launch site in the United States, even when those activities take place at a launch site from which flight of the launch vehicle does not take place.

#### Launch License

The amendments to the FAA's launch licensing regulations address the definition of "launch," licensing

requirements, including payload determinations and policy reviews, and information required from an applicant proposing to launch a vehicle employing established technology and procedures from a federal launch range. The FAA here changes its interpretation of the definition of "launch" and thus changes the scope of a launch license. Additionally, in contrast to what was originally proposed in the NPRM, which was to define with particularity the beginning of launch for purposes of those taking place from a federal launch range, the FAA will apply its proposed definition of launch to a launch taking place at any launch site located in the United States, whether that launch site is a federal launch range or not. Through this rulemaking the FAA is formalizing its practice of issuing two different types of launch licenses, a launch operator license pursuant to which a licensee may conduct any launches that fall within the broad parameters described in its license, and a launch-specific license, which allows a licensee to conduct only those launches enumerated in the license.

#### *Scope of Launch License and Definition of "Launch"*

The Act requires a launch operator to obtain a license for the launch of a launch vehicle. Accordingly, the definition of "launch" controls the scope of a launch license. Greater certainty regarding this definition will allow a licensee to plan better regarding a number of issues. Because the FAA's financial responsibility requirements and eligibility for payment by the United States of excess claims for liability for damages to third parties are coextensive with a licensed launch, knowledge of the scope of a launch license allows a licensee to manage its risks appropriately and to make its own provisions for financial responsibility or insurance coverage in addition to that required under the statute. Through this rulemaking, the FAA defines launch to begin with the arrival of a launch vehicle at a federal launch range or other U.S. launch site.<sup>1</sup> Launch ends, for purposes of ground operations, when the launch vehicle leaves the ground, and, for purposes of flight, after the licensee's last exercise of control over the vehicle. The NPRM had proposed to include within the new definition "[t]he term launch includes the flight of a launch vehicle, and those hazardous pre-flight activities that are closely

<sup>1</sup> As discussed in greater detail in response to comments, the FAA does not define launch to commence with the arrival of a payload at a launch site.

proximate in time to flight and are unique to space flight." That sentence is now omitted as superfluous in light of the application of the launch license period to all U.S. launch sites, regardless of whether the launch site is located on a federal launch range or not. The concepts guided the creation of the definition for this rulemaking, and will still guide the FAA in defining the beginning of launch outside the United States.

In its NPRM, the FAA considered three options to defining launch and the scope of a launch license and, by necessary implication, possible "indemnification" for government property and third party damages arising out of a launch. The FAA noted that its approach of licensing the activities of a launch operator within the gates of a federal launch range, commonly referred to as "gate to gate," had been criticized as too broad. The criticism came from Congress through non-binding report language; however, because Congress would ultimately prove the source of funding for any possible "indemnification," the FAA was concerned that "gate to gate" might eventually mislead industry into inappropriately relying on the government for money that was not available. Congress might deny funding on the grounds that pre-flight preparation did not constitute part of launch under 49 U.S.C. Subtitle IX, ch. 701.<sup>2</sup> Accordingly, the FAA considered two approaches to narrowing its definition of launch. It considered, but rejected, defining launch as commencing with ignition. Instead, it proposed to define launch as commencing with the arrival of a launch vehicle at a federal launch range from which flight would occur. The FAA also proposed in its NPRM to clarify when launch ended. With flight, launch ends when the last action over which a licensee has direct control is performed. As proposed in the NPRM, ground operations would no longer be deemed part of launch when an expendable launch vehicle left the ground. With the changes to the definition brought about by the Commercial Space Act of 1998, the FAA revises the definition 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. The FAA now adopts those changes.

In reaching its final decision regarding its interpretation of launch,

the FAA considered a number of factors. The statutory definition provided the first line of inquiry. The FAA also took into account the commenters' desire for a consistent and broad interpretation. Ease of administration played a role as well. In the end, the change in the level of risk proved determinative as to where in the course of preparation for flight the FAA would deem launch to commence.

The FAA received comments on its proposed revisions. Boeing Commercial Space Company (Boeing) voiced its concern with the FAA's proposed definition of launch, opposing the inclusion of ground operations out of concern for the precedent such a definition might establish for launches conducted by Sea Launch, which proposes to launch from the ocean, and in which Boeing participates as a partner. Boeing believes that although some hazardous activities are part of launch preparation, these activities do not "in themselves constitute uniquely hazardous events which should be covered in the scope of a launch license. Such activities should [be] and are regulated by existing hazardous material and operations regulations that are applicable to industry at large." *Boeing* at 1. According to Boeing, the purpose of the Act was to define the scope of launch "so as to cover those operations which directly placed the general public at risk." *Boeing* at 1. Where more innovative launch technologies are employed, such as that contemplated by Sea Launch, Boeing expects that launch will be defined consistently with this purpose.

Hughes Electronics (Hughes) requested that the FAA clarify whether a launch vehicle's payload is part of launch site activities in order for Hughes to determine when the possible indemnification provisions of the Act apply. Hughes proposed that indemnification provisions of the FAA's rules be clarified to apply to a payload and its components, or that a payload be included within the definition of launch vehicle. Hughes asked, in essence, that the FAA define launch, for purposes of including payload activities, to commence with the arrival of a payload at the launch site. Launch would end, under Hughes' proposal, either after a defined period of time or after such time as a launch vehicle could cause a payload accident, whichever came later. Hughes did not elaborate on the implementation of its proposals.

Kistler Aerospace Corporation (Kistler), concerned that the proposed regulations governing expendable launch vehicles (ELVs) might serve as a model for rules governing reusable

launch vehicles (RLVs), argued against including ground operations within a launch license. Kistler recommended, instead, that, for a liquid-fueled vehicle, launch be defined to commence with the fueling of a vehicle. In support of this position Kistler first noted that defining launch as commencing with the arrival of a launch vehicle at a federal launch range, may not or should not apply to the launch of an RLV, pointing out that although an "RLV may "arrive" at the launch range initially, it thereafter returns directly and repeatedly to the launch range. Clearly, however, the RLV is not constantly in a "launch" state." *Kistler* at 7. Kistler also argued against the FAA position that pre-flight activities constitute uniquely hazardous activities. "Many of these activities are entirely routine industrial activity and pose no unique hazards." *Kistler* at 7. Kistler maintained that subjecting all these activities to FAA review and prohibiting them without the issuance of a license would constitute an unnecessary and costly regulatory burden. Moreover, if the FAA were to require a license for ground activities, Kistler and its customers would have to sign cross-waivers with its contractor and subcontractors, its customers and the contractors and subcontractors of its customers. This, Kistler maintained, "would distort the normal commercial allocation of risk and legal remedies for fault and, consequently, would increase insurance costs to the licensee." *Kistler* at 7-8.

Kistler recommended, for a liquid fueled vehicle, that launch commence with fueling. This is because fueling is closely proximate in time to flight and may be directly attributable to space flight, unlike other activities, which Kistler characterized as routine industrial activities not directly attributable to space flight. *Kistler* at 8. Kistler did not describe the other "routine industrial" activities. Nor did it describe its basis for distinguishing between routine industrial activities and those that are directly attributable to space flight. Nonetheless, its point of view is interesting, indicating as it does, that there is an insurance market for ground operations, and one apparently affordable to a start up company such as Kistler.

Kistler also advised that it believes that an RLV launch ends with the landing of the RLV, and would include any "proximate consequences" of the landing. *Kistler* at 9. Kistler was silent with respect to what it considers a proximate consequence. Kistler would not include post-launch ground activities within the definition of launch.

<sup>2</sup> Although originally prompted to revisit the scope of launch out of concern for the availability of funding, the FAA's revision derives from its interpretation of the Act as a whole.

Lockheed Martin also filed comments, which included correspondence from Marsh & McLellan, an aviation underwriter. Lockheed Martin stated that it "views with serious reservations the Office's proposed definition of "launch" that would narrow the scope of a license issued by the Office and effectively standardize the treatment of all launch systems from federal ranges, without regard for the[ir] unique attributes \* \* \*." *Lockheed Martin* at 1. Lockheed Martin supported the FAA's proposal to dispense with gate to gate as a means of defining launch, agreeing that it resulted in illogical exclusions. *Lockheed Martin* at 3. It maintained, however, that "vehicle at the gate" achieves the same illogical exclusions of hazardous activities depending on whether they take place before or after a vehicle's major components arrive at a federal launch range. *Lockheed Martin* at 3. Lockheed Martin also believes that the FAA's concerns regarding congressional report language were groundless. *Lockheed Martin* at 3-4.

Lockheed Martin proposed that the FAA adopt an activity test to determine what may be included within the scope of a launch license. *Lockheed Martin* at 6. The FAA should "address hazardous risks associated with a particular launch campaign," presumably on a case-by-case basis for each license it issues. *Lockheed Martin* at 6. Lockheed Martin believed it would be instructive for the FAA, in considering hazardous risks, to consider the Public Law 85-804<sup>3</sup> indemnification that the Department of Defense contractually offers its contractors. *Lockheed Martin* at 5. It noted that DoD contracts for Atlas, Titan and Delta launch services provide government indemnification for "unusually hazardous risks," which include, in part, the burning, explosion or detonation of propellants, liquid fueled rocket engines or solid fueled rocket motors, or launch vehicles or their components during testing, transporting, launch preparation or launch. *Lockheed Martin* at 5. "Unusually hazardous risks" also include, according to Lockheed Martin's list, the toxic or other unusually hazardous properties of propellants or inert gases, their constituent ingredients, or their degradation products and the flight or surface impact of launch vehicles or components or fragments thereof. *Lockheed Martin* at 5.

The former McDonnell Douglas Aerospace filed draft comments with a request for an extension of time. In its draft comments, McDonnell Douglas asked that the FAA continue to employ gate to gate as the scope of a launch license, with certain modifications. Specifically, McDonnell Douglas sought to extend license coverage off of a federal launch range, for activity that "is consistent with standard commercial space industry practice." McDonnell Douglas does not elaborate on what it envisions as consistent with standard commercial space industry practice. The main thrust of its argument appears to be that it favors centralizing questions of liability and insurance within the FAA and removing them as subjects of Air Force launch support agreements.

Orbital Sciences Corporation (Orbital) opposed that portion of the proposed definition of launch that confined a licensed launch to the launch site from which flight would occur. According to Orbital, the FAA's proposed approach was illogical because it meant that identical activities might in some instances be licensed and in others not. Also, the proposed approach would discriminate against modern launch vehicle technologies, so that they would be "penalized by the denial of license coverage." *Orbital* at 2. Orbital, relying on 1997 report language, also argued that the House Science Committee opposed the FAA's narrowing of the definition of launch. See Civilian Space Authorization Act, Fiscal Years 1998 and 1999, H.R. 1275, H. Rep. 65, 51, 105th Cong., 1st Sess. (Apr. 21, 1997).

Orbital proposed that the FAA adopt an activity test to determine what activities might be included in the definition of launch. It recommended that the FAA "identify pre-launch activities generally common to launch systems and cover them for all launch systems if they are sufficiently hazardous and integral to a licensed launch, regardless of where or when they occur." *Orbital* at 4. Orbital provides a list of those of its pre-flight activities it considers hazardous. *Orbital*, Attachment 2.

Space Access, which intends to operate a reusable launch vehicle, also filed comments. Space Access' comments focused on the impact on future developments, such as reusable launch vehicles, of the FAA's proposed definition of launch. Space Access opposed defining launch to encompass a vehicle's entire time at a launch site, and believes that there is no way to consistently and fairly apply the FAA's proposed definition of launch. Space Access noted that the FAA "does not regulate the development, testing, or

transportation of solid rocket boosters at a manufacturer's facility, even though this [is a] significant hazardous activity, so it should not license nor should the government offer to indemnify that activity just because it occurs on a Federal Launch Range." *Space Access* at 6. Furthermore, defining a vehicle's "major components" may ultimately prove a burdensome task for the FAA. *Space Access* at 4. Space Access also questioned the FAA's legal authority for its proposed definition, and does not believe that the Act supports the "gate to gate" approach. In support of this, Space Access pointed out that under the Act, as the NPRM also notes, launch does not start with launch services.

After reviewing a number of conceptual approaches, Space Access recommended that the FAA define launch to begin with "an intentional self propelled change in the state of equilibrium of the launch vehicle and any payload toward Earth orbit or outer space [that] continues until the launch vehicle and payload achieve[] a new state of equilibrium or exit[] the Earth's dominant gravitational influence." *Space Access* at 5. By this, Space Access intended "vertical or horizontal takeoff." *Id.* For the end of launch, this would mean that once a vehicle completes its propellant expulsion and no other changes in equilibrium are planned, the launch process is over. *Space Access* at 5. A change in equilibrium to reach other places in earth orbit or outer space would not be part of launch.

The Spaceport Florida Authority (SFA) supported the proposed definition of launch as including those hazardous pre-flight activities that are closely proximate in time to flight and are unique to space flight. *SFA* at 1. SFA also supported the FAA's proposal to define the beginning of launch as commencing with the arrival of a vehicle's major components at a federal range. SFA opposed limiting the scope of a licensed launch to those activities that occur at the federal launch range from which flight would occur because this approach would result in some of the current pre-flight activity of at least two launch companies not being licensed. *SFA* at 2. SFA accordingly viewed this approach as discriminatory. SFA also maintained that the proposal was contrary to the statute, which requires consistency with public health and safety. SFA pointed out that in some situations the FAA would review certain pre-flight activities and in others it would not, thus resulting in no FAA safety oversight and no possibility of indemnification by the federal government. *SFA* at 2. On a separate

<sup>3</sup> P.L. 85-804, 50 U.S.C.A. §§ 1431-1435 (1991 and West Supp. 1997), is effective only during a national emergency. 50 U.S.C. § 1435. It does not define launch.

note. SFA stated its support for excluding the storage of solid rocket motors from the definition of "launch." SFA at 3. SFA notes that such storage is not extremely hazardous and that commercial insurance for storage is available at a reasonable premium.

The FAA considered three possible options in defining "launch" for purposes of developing proposed regulations. The FAA considered codifying its "gate to gate" definition but was concerned that "gate to gate" created a false impression that indemnification would be available for all commercial activities taking place within the confines of a federal range. The FAA also weighed the most narrow approach, which would employ the ordinary definition of "launch" as only those flight activities beginning at "T minus zero (T-0)," or intentional first stage ignition; but the FAA initially determined in its NPRM that this approach failed to provide regulatory oversight of certain hazardous activities and that concerns regarding international competition weighed against this formulation. In light of the 1998 change to the Act, the FAA must reject this narrow definition as inconsistent with the new law. A less expansive approach than "gate to gate," one within the scope of the FAA's mandate, will include within a launch license those activities that are part of a launch as contemplated by the new directive to license 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 satisfies the requirements of the statutory change and the wishes of commenters such as Orbital and the Spaceport Florida Authority. Under the approach the FAA now adopts, because of the 1998 changes and because risks change shortly after the launch vehicle or its components enter the gate of a launch site, launch begins, for purposes of licensing, upon the arrival of that vehicle to be prepared for flight at a U.S. launch site.

#### *Vehicle at the Gate*

By this rulemaking, the FAA will license as launch those preparatory activities that may be considered part of a launch. As noted in the NPRM, the FAA's licensing authority derives from the Act, which states that a license is required "to launch a launch vehicle." 49 U.S.C. § 70104(a). The word "launch" is commonly understood to mean ignition, lift-off and flight of a launch vehicle, as well as, perhaps only in popular parlance, certain immediately preliminary activities such as countdown and other final steps

necessary to effectuate flight. The Act defines "launch" to mean "to place or try to place a launch vehicle or reentry vehicle<sup>4</sup> and any payload from Earth—(A) in a suborbital trajectory; (B) in Earth orbit in outer space; or (C) otherwise in outer space, including 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).

The recently enacted change to the definition of launch in the Act establishes which pre-flight activities are part of a launch. There are certain pre-flight activities so integral to the launch of a launch vehicle that they should be considered part of the launch itself even though they do not constitute flight. Additionally, there are hazards associated with pre-flight activity that are proximate in time to flight and unique to space flight. Because the changes to the Act dictate that launch include preparation of a launch vehicle and payload for flight, the FAA defines the commencement of launch as the moment at which hazardous activities related to the assembly and ultimate flight of the launch vehicle begin, which, for purposes of consistency and clarity, the FAA deems to be when the major components of a licensee's launch vehicle enter, for purposes of preparing for flight, the gate of a U.S. launch site, whether situated on a federal launch range or not, and regardless of whether flight occurs from there or not.

In its NPRM, the FAA determined that defining "launch" as the arrival of the launch vehicle at the gate of a launch site accorded with the proposals of a number of earlier commenters, who suggested that the FAA define "launch" to begin when hazardous activities start. The FAA is charged by statute with protecting the public, and a definition that recognizes hazards will address concerns regarding public health and safety. Only if an activity is so hazardous as to pose a threat to third parties should regulatory oversight by the FAA be exercised, and "indemnification" to recompense third parties be available. Because shortly after vehicle components arrive, hazardous activities related to the assembly and ultimate flight of the launch vehicle begin, the arrival of the vehicle or its parts is a logical point at which the FAA should ensure that a launch operator is exercising safe practices and is financially responsible

for any damage it may cause. These hazardous activities include, but are not limited to, fuel tank wet testing, ordnance installation, spin balancing and the stacking of motors. They are hazardous because they expose third parties and government property to risk of damage or loss. The FAA believes that this test is well within the new licensing authority conferred by the Congress' 1998 revision to the Act. Also it both broadly incorporates the activity test advocated by commenters such as Lockheed Martin and Orbital and accommodates the FAA's need for simplicity in administration. A launch license will encompass hazardous activities without requiring numerous decisions regarding individual hazardous activities on a piecemeal basis.

Moreover, with the expansion of the definition as originally proposed to encompass the ground operations of a launch operator at a commercial launch site not situated on a federal launch range, the advisability of this approach is further evident. The FAA believes that a launch operator contracting with a licensed launch site operator should be the licensee responsible for activities in preparation for flight. To the extent that the government may hope to achieve seamless safety and financial responsibility coverage, the FAA would rather look to a launch operator, who has control and authority over its employees, contractor and subcontractors, including any launch site operator providing services as well as a location from which to launch, for regulatory responsibility. Otherwise, the FAA might have to attempt to apportion responsibility for ground operations between a launch operator and a launch site operator and develop additional criteria for doing so. In this regard, commenters such as Kistler and Space Access should note that were a launch license for ground operations not required a license to operate a launch site might be.

For purposes of ascertaining the start of launch, and particularly with the 1998 addition to the definition of launch, the FAA reviewed the hazardous activities associated with the launch of a launch vehicle to determine when those hazardous activities started. The FAA's experience shows that commercial launch vehicles share a number of hazardous procedures, and that most of those procedures take place once the vehicle is at a launch site in order to minimize hazardous transport and exposure time. The DOT Office of Commercial Space Transportation prepared a study in 1994, available in draft, titled "Prelaunch Hazardous

<sup>4</sup> The Commercial Space Act of 1998 also amends the definition of launch to add "reentry vehicle and any payload from Earth—." Because reentry will be the subject of a separate rulemaking it will not be addressed here.

Operations for the Delta, Atlas, Titan at Cape Canaveral Air Station, Pegasus at Vandenberg Air Force Base, Conestoga at Wallops Flight Facility and Black Brant at White Sands Missile Range." The study analyzed similarities in the risk profiles for pre-flight processing of these vehicles, and compared the pre-flight processing timelines for the various vehicles. The results complement information available in a DOT "Hazard Analysis of Commercial Space Transportation," May 1988. The amount of damage that a vehicle may cause varies from vehicle to vehicle, depending upon such factors as the mass of the vehicle, the number of stages, the presence and number of solid rocket motors, and the type and quantity of propellants. The launch vehicles studied and their pre-flight processing procedures are similar in that each has a similar hazardous potential.

The study showed that even though pre-flight processing procedures and the sequence of those procedures may vary among vehicles, the vehicles studied share such pre-flight processing procedures as solid rocket motor handling and processing, flight termination system or separation ordnance installation and checkout, and fueling. These activities occur at different times for different vehicles. The likelihood of a mishap<sup>5</sup> resulting from these procedures is similar for each vehicle. These procedures constitute hazardous operations that have an identifiable or otherwise quantifiable probability of occurrence ( $P_o$ ) of a mishap. The probabilities that these operations will result in a mishap are approximately  $P_o=10^{-4}$  to  $10^{-5}$  for solid rocket motor handling and processing;  $P_o=10^{-5}$  for flight termination system or separation ordnance installation and checkout, and  $P_o=10^{-3}$  to  $10^{-6}$  for fueling. "Eastern Launch Site Safety Programs," Louis J. Ullian, Commercial Space Risk and Insurance Symposium, Cocoa Beach, Florida (Oct. 26, 1988). These probabilities are relied upon by launch companies, federal agencies and federal launch ranges for their analyses of hazardous operation risks, and reflect the rigorous safety standards, analysis and review process required at federal launch ranges for hazardous ground operations.

<sup>5</sup>The term "mishap" means a launch accident, a launch incident, failure to complete a launch as planned, or an unplanned event or series of events resulting in a fatality or serious injury (as defined in 49 CFR § 830.2) or resulting in greater than \$25,000.00 worth of damage to a payload, a launch vehicle, a launch support facility or government property located on the launch site.

The FAA considers these operations hazardous because their processes may lead to identifiable mishaps and dangerous consequences.<sup>6</sup> Solid rocket motor handling and processing may result in ignition of the propellant, either explosively or otherwise. This may be caused by the unconstrained burning or explosion of a major portion of the propellant if circumstances prevented proper venting of the propellant. Casualties and property damage may result if an installed igniter initiates and causes an engine or solid rocket motor to become fully propulsive, as during flight. Casualties or damage may result from fire, explosion or toxic fumes that may be a by-product of combustion. These events may result in direct damage or casualties as the consequence of blast and debris effects. These events may also lead to secondary effects such as fires, explosions or unintended motor stage flight that may be caused by the direct blast and debris effects.

Flight termination system or separation ordnance installation and checkout may result in lethal or damaging releases of energy. The inadvertent ignition of installed or uninstalled ordnance, including that of the flight termination system and explosive bolts installed on various separation systems could result in explosion and debris. Fueling may result in a range of consequences, including fires, either pool fires or fireballs, or the release of vapor clouds, which may be toxic or which may ignite. These events may occur because of leakage during fueling or spills during an accident. If such a mishap involves toxic propellants, toxic components of the fuels may be released into the atmosphere or spilled on the ground. If a vehicle releases its hazardous materials into the atmosphere, it could expose people at a launch site or in the public at large to those hazards.

As a general rule, hazardous operations begin as soon as, or shortly after, a launch vehicle's major systems arrive at a launch site. The FAA relies on the new 1998 definition to employ a geographic element in defining launch by using entry of a launch vehicle onto a launch site in the United States as part of its definition of "launch." This ensures consistency and clarity of interpretation. Consistency is

<sup>6</sup>These findings are based on the DOT Office of Commercial Space Transportation's 1994 review of launch vehicle manufacturers' data, FAA commercial launch baseline assessments, past FAA maximum probable loss determination analyses and Ullian's 1988 presentation at the Commercial Space Risk and Insurance Symposium.

guaranteed by the fact that regardless of vehicle type, each vehicle will receive the same regulatory coverage within the United States. Although some commenters maintain that launch begins at different points for different vehicles, because the FAA wishes to treat launch operators in an equivalent fashion, the FAA will not define "launch" on the basis of the launch vehicle. Moreover, reliance on a geographic element provides clarity of interpretation even for a launch operator of a new vehicle using different technology. An applicant seeking a license for a new vehicle will know to plan for license coverage at the time its vehicle enters a U.S. launch site.

Some commenters dispute this conclusion, arguing that defining a launch to commence with a vehicle's arrival results in different licensing treatment of different activities. The FAA recognizes this dilemma. It believes, however, that a single test such as a vehicle's arrival will avoid an administrative burden on both the FAA and its licensees. Rather than creating an activity test, as recommended by some, which would result in a series of tests, the FAA will face only questions attendant to a single activity. Many of the questions that will plague determining when a vehicle arrives at a federal launch range" launch vehicles show up in parts, a lot of them would also bedevil any particular hazardous activity related to the preparation of any particular vehicle for flight. Additionally, the FAA considers it outside of its statutory mandate to license pre-flight activities located outside of a launch site in light of the new definition of launch. That definition limits launch to activities taking place at a U.S. launch site. In any event, that commercial operations exist outside of federal launch ranges to manufacture and process vehicle components and payloads indicates to the FAA that the hazards are not so extreme as to stifle the development of facilities and services off of a federal launch range. Additionally, as some of the comments indicate, insurance does appear to be available.

Another aspect of the FAA's definition attempts to capture those activities that constitute preparation for flight. For example, fueling for liquid-fueled vehicles usually takes place not long before flight to minimize the risks attendant to the exposure to a fueled vehicle, and the FAA would consider that activity to be a component of launch under the Act. On the other hand, the FAA does not intend a launch license to encompass components stored at a launch site for a considerable

period of time prior to flight. The FAA is aware that the definition of launch may be construed to encompass motor storage as well. However, if motors arrive at a launch site for purposes of storage rather than as part of a launch campaign in preparation for flight, the FAA does not consider that storage part of a launch. SFA's comments support this interpretation.

Orbital questioned one element of the FAA's proposed definition. Orbital disputed that part of the FAA's definition that included within the definition of launch only those activities that take place at the launch site from which flight will occur. Orbital's concern is addressed in the 1998 amendment to the definition of launch. The statutory revision expands launch to include preparatory activities that "take place at a launch site in the United States." 49 U.S.C. 70102(3) (emphasis added). This provision includes preparatory activities at any U.S. launch site. The FAA notes that the revision excludes preparatory activities outside of a U.S. launch site.

Hughes asked for clarification regarding the commencement of launch with respect to payloads. Hughes suggested that launch be defined to commence with the arrival of a payload. Under current conditions, a payload tends to arrive after a launch vehicle, and its integration to a launch vehicle has been included within the definition of launch. The FAA does not consider payload processing absent launch vehicle integration to constitute part of launch or part of a licensee's licensed activities. Although the 1998 amendment appears to provide that preparation of a payload for launch at a U.S. launch site is part of launch, the revision does not require the definition of launch to encompass payload processing at a launch site until the payload is being integrated with a launch vehicle. The revision itself provides for activities involved in the preparation of a launch vehicle or payload for flight to ensure that launch may begin with a launch vehicle's arrival alone at a launch site, regardless of the presence of a payload. Read in the context of existing statutory provisions and requirements, the revised definition does not encompass payload activities that are not otherwise associated with a launch vehicle. The original and still unchanged definition of launch means, in relevant part, the launch of a launch vehicle and any payload. 49 U.S.C. 70102(3). Section 70104 further confirms the inadvisability of commencing launch with the arrival of a payload. Section 70104 requires a license for the launch of a launch

vehicle, not for the launch of a payload or for the launch of a launch vehicle and a payload. Moreover, were launch to begin with the arrival of a payload it would constitute unlicensed launch, and a payload operator is not required to obtain a launch license in any event. Additionally, the launch operator, who is the licensee, is not necessarily participating in the payload processing until integration of the payload with the vehicle. For all these reasons, the FAA will not change its definition.

#### *"T Minus Zero (T-0)" or Intentional First Stage Ignition*

The FAA also considered defining "launch" as the word is ordinarily understood. This would have limited the scope of a launch license to activities commencing at intentional first stage ignition. Were a launch license to cover only those activities, the launch industry would no longer have been eligible for so-called indemnification for damages arising out of any preparatory activities. The regulatory burden, however, would be correspondingly less. Such a licensee would not, for instance, be required to obtain a license as early in the process as it must for gate to gate, nor would it be required to provide the FAA as much information. Likewise, this approach would have resulted in similar treatment of licensees regardless of the type of vehicle employed or the timing or location of hazardous activities. The FAA carefully weighed this approach, especially in light of those comments advocating a more narrow definition of launch. With the changes brought about by the 1998 revision to the Act, which expands the scope of launch, defining launch as commencing with intentional first stage ignition is no longer an option.

#### *"Gate to Gate"*

The FAA's practice of licensing ground operations associated with the conduct of a launch, commonly referred to as "gate to gate," was to license all commercial, launch related activities by a launch operator operating within the gates of a federal range. Through this rulemaking the FAA abandons this approach. Under this view, a launch operator's operations were licensed, even if ignition and flight were not imminent and even if the launch vehicle itself was not present at the range. The 1998 amendment to the definition of launch confirms the FAA's intent to abandon this approach. A launch vehicle must be present for preparatory activities to constitute part of launch.

The "gate to gate" approach constituted an attempt to treat different

launch vehicles similarly. Whether a launch vehicle undergoes hazardous integration significantly in advance of flight, as the Delta and Pegasus do, or closer in time as an Atlas does, a license covered the same pre-launch activities: all launch related activities performed by a launch operator within the gates of a federal range. Additionally, "gate to gate" licensing ensured that the FAA required launch operators to demonstrate financial responsibility through the purchase of insurance coverage or other appropriate measures for possible damage arising out of commercial activities to government property. "Gate to gate" licensing received support because of the belief that a launch operator would be indemnified for damage to third parties caused by pre-flight and post-flight ground operations.

The FAA does not define "launch" to encompass all pre-flight activities by a launch operator at a launch site because not all activities are part of the launch of a launch vehicle. A launch operator may be present on the range, and engaged in preparatory activities, but not be working on a launch vehicle or its component parts in preparation for flight. A licensed launch operator may be present at a federal range between launches. The FAA is aware of launch operators who perform construction activities within the gates of a federal range months or years prior to any anticipated flight of a launch vehicle. At that point, the launch operator may or may not be engaged in the type of hazardous activities warranting FAA oversight or indemnification because construction activity, however hazardous, is not part of the process of preparing the vehicle itself for flight.

In support of "gate to gate" licensing it has been suggested that pre-launch licensing authority arises out of the Act's directive to license "operation of a launch site." See 49 U.S.C. 70104(a). In the case of a launch taking place from a federal launch range, the launch operator is not, in fact, operating a launch site. The site is operated by the federal range. Moreover, it is the FAA's opinion that a person requires a license to operate a launch site only if offering the site to customers for their launch. Otherwise, activities related to preparation for flight are part of a launch license rather than a license to operate a launch site.

As noted in the NPRM, "gate to gate" evolved out of an industry desire for broad license coverage, and this approach was the FAA's official position with respect to the scope of its licenses. Other government sectors, including NASA, have criticized this

approach as overly broad. Civilian Space Authorization Act, Fiscal Years 1998 and 1999, H. Rep. 65, 51 105th Cong., 1st Sess. (Apr. 21, 1997). In 1995, House Science Committee Report No. 104-233, accompanying H.R. 2043, the NASA Authorization Act for Fiscal Year 1996, noted that members of Congress view with concern this approach to covering all licensee activities within the gates of a federal range, and considered it too broad.<sup>7</sup> Although recognizing that the report language does not carry the force and effect of law, the FAA is concerned that launch operators might be pursuing their pre-launch activities in reliance on an indemnification that must be enacted by Congress and that may or may not be available from Congress. This prompted the FAA in its NPRM to revisit the issue of the scope of a license and, thus, necessarily, of the definition of "launch."

Lockheed Martin questioned the FAA's concern over the possibility that Congress would refuse to vote for indemnification for all of a launch operator's activities at a federal launch range. As stated in the NPRM, while the FAA recognizes that the report language of concern does not have the effect of law, *see, e.g., Public Employees Retirement Systems of Ohio v. Betts*, 492 U.S. 158, 168, 109 S. Ct. 2854, 2862 (1989), it nonetheless remains a fact that Congress does play a role in deciding whether to provide "coverage" for damages in excess of the FAA's financial responsibility requirements. In *Betts*, the Court noted that it "has observed on more than one occasion that the interpretation given by one Congress (or a committee or Member thereof) to an earlier statute is of little assistance in discerning the meaning of that statute." *Id.* However, in this funding context, the FAA does not believe that it behooves either the FAA or licensed launch operators to ignore these warnings. That is the source of the FAA's concern. Additionally, the fact that 1997 also produced report language recommending a more narrow definition indicates to the FAA, as it should to industry, that the better course is to rely on a definition grounded in the Act rather than on fluctuating Congressional report language.

#### End of Launch

The FAA notes that the end of launch may be expressed both in terms of flight activity and ground operations. For

purposes of flight, the FAA will continue to define the end of a launch as the point after payload separation when the last action occurs over which a licensee has direct or indirect control over the launch vehicle. For a liquid-fueled stage, that point may be when any remaining fuel is emptied from the upper stage, the vehicle propellant and gas tanks are vented and other stored energy is released. For solid rocket motors, that point may arrive when the upper stage fuel is expended or the stage is inert, and the payload is released. For purposes of ground operations, launch no longer ends with the cessation of supporting ground operations but when the vehicle leaves the surface.

With respect to flight, others apply different definitions to the end of launch. The most recent House Committee Report, H.R. Rep. No. 347, 105th Cong., 1st Sess., 22 (1997), suggests that launch ends when a payload is placed into orbit or in its planned trajectory in outer space. The 45th Space Wing considers a launch complete when all hazardous activities are secured and, for purposes of flight safety, upon orbital insertion. NPRM, 62 FR at 13223. Orbital insertion takes place when a launch vehicle achieves orbital velocity or when its instantaneous impact point leaves the earth. In other words, orbital insertion is achieved when a launch vehicle is moving horizontally to the earth's surface sufficiently fast enough, given its altitude, to counteract the effects of the earth's gravity. The FAA believes that although defining launch to end at orbital insertion may make sense from a federal range "flight termination" perspective, such a definition would halt FAA oversight of certain aspects of launch too soon for safety. For example, damage to other orbiting material may still ensue as the result of activities subsequent to orbital insertion. Absent a licensee taking appropriate measures, risk exists of the possible collision of a launch vehicle or its components with other objects in space. Additionally, dangerous orbital debris might be generated. Accordingly, in the interests of safety, the FAA will retain its current practice of defining the cessation of launch.

With respect to ground operations, the FAA now changes its current practice of including post-flight ground operations for expendable launch vehicles in a launch license and thus as part of launch. Instead, ground operations are no longer part of launch once the vehicle leaves the ground. The FAA considered several options as to when ground operations were no longer considered part of a launch. Under the

chosen option, ground operations would not be considered part of launch once the launch vehicle left the ground. Reentry activities aside, it has not been the FAA's experience that post-flight activities involve the same levels of public safety risk as pre-flight handling, integration and fueling of a vehicle. The FAA reviewed another option. Ground operations for launch could end with the end of launch in the context of flight, namely, when the last action occurs over which a licensee has direct or indirect control over the launch vehicle. This alternative would have allowed for at least part of the post-flight ground operations to be covered by the license. The end of launch for purposes of flight is not, however, related to activities on the ground. The FAA is concerned that attempting to create such a connection would be arbitrary and might inappropriately influence a licensee's post-flight ground operation procedures. The third option the FAA considered was to define the end of ground operations for launch as that point at which all personnel may resume operations at the launch pad and related environs. This approach recognized that hazardous operations do occur subsequent to ignition and lift off. These operations include such activities as securing ground propellant and pneumatic systems and inspecting the launch pad to verify that no post-flight hazards exist. With this option, ground operations would no longer have been part of launch when the launch pad and other launch related facilities no longer endangered personnel. Because, however, the hazards associated with ground operations subsequent to lift off are not related to the preparation of the vehicle for flight, the FAA defines the end of launch for purposes of ground operations as the point at which the launch vehicle leaves the ground. This analysis applies to expendable launch vehicles. For the time being, judgment is reserved with respect to reusable launch vehicles.

#### Formalizing Launch and Launch Operator Licenses

This rulemaking, through section 415.3, codifies the FAA practice of issuing two types of launch licenses, the launch-specific and the launch operator, and amends the duration of a launch operator license from two to five years. In order to enable the FAA to issue a license for a single mission or for multiple missions, the FAA's licensing structure provides for two types of launch licenses, the launch-specific and the launch operator license. A launch specific license authorizes a licensee to conduct a single launch, or a specified

<sup>7</sup> In 1994, a House Space, Science and Technology Committee Report expressed the same sentiments. The report accompanied H.R. 4489, the NASA Authorization Act for Fiscal Year 1995, a bill that was not enacted into law.

number of identical launches, from a single launch site. The launch vehicle for each authorized launch must be the same and launch parameters must present no unique public safety issues or other issues affecting U.S. national interests. The licensee's authorization to conduct launches terminates upon completion of all launches authorized by the license or the expiration date set forth in the license, whichever comes first. A launch operator license authorizes a licensee to conduct launches from a specified launch site, using the same family of launch vehicles, carrying specified classes of payloads, within the range of launch parameters defined by the license.

Initially, the FAA's launch operator license allowed a launch operator to conduct launches authorized by its license for a period of two years. Under the new section 415.3(b), a launch operator license authorizes the conduct of launches for five years from the date of issuance.

The option of issuing a launch operator license, as opposed to requiring a launch-specific license for every launch, provides advantages both to the licensee and to the FAA. Although the application preparation for and review of a launch operator license will be more extensive than for a launch specific license, use of this class of license will ultimately result in cost reductions and efficiency gains for licensees by reducing the number of applications that a company with an active launch schedule must submit, and that the FAA must review. The FAA's increase of the term of a launch operator license from the current practice of two years to five years reflects the FAA's experience with its licensees during the past few years. During that time, the FAA has encountered very few serious safety problems with launch operator licensees.

On the basis of this record, the FAA proposed in the NPRM that a launch operator with a safe launch record should not be required to apply for a new license every two years. The FAA will continue to verify, through compliance monitoring, that a licensee is operating in accordance with the terms and conditions of its license. In this regard, the longer the license term, the more important the role compliance monitoring plays in enabling the FAA to provide safety oversight regarding how a licensee implements its procedures.

The FAA received comments regarding the duration of a launch operator license. Several launch operators supported the proposed increase from two to five years. Boeing

at 1; Lockheed Martin at 7; Orbital Sciences at 6; Rotary Rocket Company at 4-5 (while emphasizing its need for a launch operator license for a reusable flight test program); Space Access at 6. Kistler Aerospace Corporation requested that the FAA consider issuing launch operator licenses of indefinite duration. Kistler at 4. Kistler maintains that the choice of five years is arbitrary and of little utility in regulating a licensee. *Id.* Kistler notes that the proposed regulations vest the FAA with continuing oversight powers, require a licensee to ensure the continuing accuracy of its application representations and allow the FAA to amend the terms and conditions of a license at any time. *Id.* Kistler claims that renewing a license every five years poses an unnecessary burden and creates an uncertainty that adversely affects a licensee's ability to enter into contracts, attract capital and otherwise make long term plans. *Id.*

Although the FAA appreciates the issues raised by Kistler, the FAA will increase the duration of a launch operator license from two to five years as originally proposed rather than creating a license of indefinite duration. This is because an increase in duration from two to five years already place greater reliance on the FAA's compliance monitoring program. A license renewal application has the benefit of compelling the FAA and a licensee to perform a comprehensive review of a licensee's operations. Experience has shown that a renewal process ensures that oversight is performed.

Space Access raises a separate issue, namely the question of how the FAA will determine who is qualified for a launch operator license as opposed to a launch-specific license. Space Access asks what constitutes a safe launch record. To this, the FAA is able to respond with some guidance culled from its past practices. The FAA licensed the first launch of a Pegasus launch vehicle on a launch-specific basis. It is currently contemplating a launch-specific license for Sea Launch's proposed first launch from the Pacific Ocean. Other examples of launch-specific licenses include the first launches of Lockheed Martin's LMLV-1 and 2, EER's Conestoga launch and AMROC's hybrid launch vehicle launch. To date, the FAA has not considered a new launch operator one with a safe launch record. A new launch operator has no record.

Although a launch-specific license might be required for a new vehicle, an established operator may apply for a launch operator license after the first

launch, but a newer entity may have a greater showing to make. A first launch may be safe without being successful. A first launch LMLV-1 failure that demonstrated that a safety system worked led to a launch operator license for Lockheed Martin. Historically, launch operators who received launch operator licenses had already demonstrated some level of capability in conducting launches, either by conducting launches for the government or with other launch vehicles.

The FAA policy of considering an applicant for a launch operator license after a safe launch conducted under a launch-specific license has, to date, applied to launches from federal launch ranges. This policy may not always be appropriate under other circumstances. The complexity of the proposed operations, whether a vehicle is reusable and the potential for endangering the public may also play a role in whether the FAA decides a launch operator license is appropriate for subsequent launches.

Space Access also asks whether an overall accident history of approximately ten to fifteen percent is acceptable. The FAA has not made a determination regarding an acceptable mishap rate at this point, and is hesitant to prejudge the question. The answer may turn more on the facts underlying a mishap rather than on a particular rate. The FAA would also like to stress what it defines as a launch accident. By definition, a launch accident is an unplanned event occurring during the flight of a launch vehicle resulting in the known impact of a launch vehicle, its payload or any component thereof outside designated impact limit lines, or a fatality or serious injury to any person who is not associated with the flight, or resulting in damage estimated to exceed \$25,000 to property not associated with the flight. This has rarely, if ever, happened in the history of the U.S. space program. Space Access appears to be referring to other mishaps such as mission failures that are not launch accidents. An unsuccessful mission is not necessarily an un-safe flight. In fact, a successful mission may not even be a safe one, as recognized by the FAA's definition of "launch incident," which is an unplanned event occurring during the flight of a launch vehicle, other than a launch accident, involving a malfunction of a flight safety system or failure of the licensee's safety organization, design or operations. Because the FAA is concerned with public safety, a safe launch record is judged based on whether an applicant's launches have placed the public at risk,

not whether the launches have placed payloads in space.

Space Access contends that any launch accident, incident or mishap should result in a license amendment reflecting changes made to prevent a reoccurrence. If circumstances warrant, this may prove a likely result. Space Access also asks whether a launch operator accident that is not covered by an FAA license, that is, perhaps, a government launch, is considered part of a licensee's accident history, and whether an accident would result in a license revocation. An un-licensed launch resulting in a mission failure may certainly raise safety concerns for future licensed launches, but need not necessarily lead to license revocation. When a mishap occurred with McDonnell Douglas' Delta vehicle in January 1997, during a government launch, the FAA did not revoke, suspend or modify McDonnell Douglas' launch operator license. This was because McDonnell Douglas' license specified that it comply with the requirements of the federal launch range from which it was authorized to launch, and the FAA knew that the Air Force would not allow additional Delta launches to take place until the problem was identified and resolved. Space Access' inquiry arises, perhaps, out of contemplating launch activity that is not governed by federal launch range oversight. To avoid prejudging a hypothetical situation, the FAA will not address that situation until confronted with it.

#### *Relationship Between FAA and Federal Government Launch Ranges*

The FAA's launch requirements as promulgated through part 415, subpart C, of this rulemaking apply to launches as they currently take place from Department of Defense (DOD) or NASA launch ranges. Public meeting comments strongly supported avoidance of duplication of launch safety oversight for launches that take place from a federal launch range. The rules are consistent with that desire. Although the FAA requires information and analyses not required by federal launch ranges to ensure that all flight safety issues are addressed, and imposes certain additional requirements derived from a National Transportation Safety Board investigation, the FAA will not duplicate the safety assessments performed by federal launch ranges.

Federal launch ranges manage the launch facilities from which the great majority of commercial launches now take place. The federal ranges act, in effect, both as landlords and as providers of launch facilities and

services. The ranges require compliance with their safety rules as a condition of using their facilities and services. Because different federal launch ranges confront different safety issues, practices are not always standardized; the Air Force ranges did, however, produce a joint set of documentation requirements and procedures, "Eastern and Western Range Requirements 127-1" (Mar. 1995).<sup>8</sup> In addition to providing for public safety, the federal launch range procedures protect government property and launch capability, and are designed, to some extent, to ensure mission success.

The FAA fully recognizes the comprehensive and responsible safety oversight that DOD and NASA have exercised at their ranges for over forty years. The FAA communicates on an ongoing basis with the federal launch ranges regarding standards and launch activities. The FAA also recognizes the scope of information that a launch operator employing federal range services must submit for approval over a two to three year period in order to conduct launch operations. Therefore, for launches that take place from DOD or NASA launch ranges, the FAA's regulatory program makes maximum use of information provided by an applicant to the federal launch range and of federal launch range analyses and approvals. This means that the FAA relies on the processes of the federal launch range and does not duplicate those safety analyses conducted by a federal launch range.

A federal launch range requires a launch operator to provide data regarding its proposed launch. The range evaluates the data to ascertain whether the launch operator will comply with range requirements. The range also uses the data to prepare range support for the mission. DOD ranges require that a launch operator apply for and obtain specific mandatory approvals from the range in order to conduct certain specified operations. For example, the Air Force's Eastern and Western Range Requirements 127-1 require a launch operator to obtain approvals for hazardous and safety critical procedures before the range will allow those operations to proceed. In the event that a launch operator's proposal does not fully comply with range requirements, a range may issue a deviation or a waiver if the mission objectives of the launch operator could not otherwise be achieved. A range may

issue a deviation to allow a launch even when a launch operator's designs or proposed operations do not comply with range requirements. A range may issue a waiver when it is discovered after production that hardware does not satisfy range requirements or when it is discovered that operations do not meet range requirements after operations have begun at a federal range. A range will allow a deviation or grant a waiver only under unique and compelling circumstances, or when the intent of the range requirements is met.

The FAA's baseline assessments<sup>9</sup> of various federal launch ranges found their safety services adequate. The FAA will not require an applicant to demonstrate the adequacy of the range services it proposes to employ if the applicable baseline assessment included those services and if those services remain adequate. Certain showings regarding the applicant's own capabilities are still required. The FAA requires specific information regarding the interface between the safety organizations of a federal launch range and of an applicant. In the event that a service or procedure upon which an applicant proposed to rely was not within the documented experience of the federal launch range that the applicant proposed to utilize, the applicant would have to demonstrate the safety of that particular aspect of its launch. This is also true if a documented range safety service has changed significantly or has experienced a recent failure. In those cases, the burden of demonstrating safety shifts to the applicant.

The revisions also codify FAA guidelines containing National Transportation Safety Board (NTSB) recommendations concerning launch readiness and countdown procedures. The FAA's guidelines implement NTSB recommendations made following an investigation of a commercial launch anomaly occurring during a launch from a federal launch range. These guidelines are designed to ensure that a launch licensee has clear lines of authority and communication during launch, and has specific procedures governing other safety aspects of its launch operations. The NTSB filed comments to the docket stating that the regulations proposed in the NPRM would, if implemented, satisfy the intent of the NTSB's

<sup>8</sup> The latest version of these requirements may be found at <http://www.pafb.af.mil/45SW/rangesafety/ewr97.htm>. The Air Force up-dates its requirements on an ongoing basis.

<sup>9</sup> "Commercial Launch Baseline Assessment, NASA Goddard Space Flight Center, Wallops Flight," DOT (Oct. 1989); "Commercial Launch Baseline Assessment, U.S. Air Force Western Space and Missile Center," DOT (Jul. 1989); "Commercial Launch Baseline Assessment, U.S. Air Force Eastern Space and Missile Center," DOT (Sept. 1988).

recommendations. Accordingly, the NTSB supports their adoption.

## Discussion of Parts Affected by the Rule

### Part 401—Organization and Definitions

Section 401.5 contains definitions of significant terms used in the FAA's regulations. Proposed amendments include both changes to existing definitions and the addition of new terms. Certain changes are intended only to reflect changes resulting from the 1994 codification of the Act. Others are editorial.

#### Deletions

The FAA proposes to remove the terms "Director," "launch activity," "licensee," "mission," and "safety operations." "Director" no longer constitutes a title related to the FAA's Associate Administrator for Commercial Space Transportation and is therefore deleted. "Launch activity" refers to activities licensed by the FAA. The term is overly broad and lacking in specificity. "Licensee" is also deleted as a term whose meaning is self-evident. "Mission" is no longer necessary because the FAA is modifying and renaming the mission review contained in part 415, subpart C. "Safety operations" does not appear in the regulations and the FAA has therefore removed it.

#### Revisions

Some of the proposed revisions merely reflect the codification of the Act. These include "Act," "launch," "launch vehicle," "payload," and "person." The FAA revises the term "launch," however, not only to reflect the codification of Pub. L. 98-575 and the Commercial Space Act of 1998, but to clarify that launch, for purposes of licensing, includes the flight of a launch vehicle and preflight activities commencing with the arrival of a launch vehicle at a U.S. launch site as discussed earlier.

As noted in the NPRM, the FAA proposed to change the definition of "launch vehicle" to reflect the changes made to the Act when it was codified in 1994. This rulemaking implements that change. Space Access provides an interesting analysis of one of the constituent parts of a launch concerning an element that the NPRM did not address in detail, namely, that vehicle stages are part of launch. "Space Access believes anything that does not achieve orbit should be considered as part of launch, just like multiple stage boosters are today." *Space Access* at 5. Space Access points out that if the FAA's intent is to cover the hazardous

elements of launch, "the return of any boosters is pertinent." *Id.* at 5-6. For these reasons, the FAA's proposed definition of launch vehicle should clearly encompass "all physically connected parts used to propel or to otherwise place [a] launch vehicle and any payload into an Earth orbit or otherwise in outer space." *Id.* at 5. Space Access believes that its proposed definition would clearly encompass first stage boosters that fall back to earth and a carrier aircraft such as is used to launch a Pegasus. *Id.*

Under the Act, launch vehicle means "(A) a vehicle built to operate in, or place a payload in, outer space; and (B) a suborbital rocket." 49 U.S.C. § 70102(7). Congress chose this definition, and the FAA designed the new regulatory definition to match the congressional choice. Space Access fears that the definition could imply that only the parts of a launch vehicle that reach outer space are part of a launch vehicle, thus excluding both the carrier aircraft for an air launch and any vehicle stages that fall back to earth. *Space Access* at 5. The definition does not preclude the inclusion of carrier aircraft or vehicle stages as part of the definition of launch vehicle. The FAA agrees with Space Access that vehicle stages are included within the definition of a launch vehicle. It should be noted that because the definition includes a vehicle that either operates in or places a payload in outer space, the definition includes the entire vehicle necessary to accomplish that objective. This necessarily includes the first and intermediate stages of a launch vehicle. Therefore, the FAA will not change what it proposed as the new definition of "launch vehicle" with the exception that it will change "and" to "or" to clarify that a suborbital rocket is also a launch vehicle.

#### Additions

New terms include "Associate Administrator," "federal launch range," "hazardous materials," "launch accident," "launch incident," "launch operator," "launch site," and "mishap." Although the NPRM proposed "Office," that term is no longer included.

"Associate Administrator" reflects a change in title of the person in charge of Commercial Space Transportation within the FAA and arises out of the transfer of the Office of Commercial Space Transportation from the Office of the Secretary, DOT, to the Federal Aviation Administration. The term describes the FAA's Associate Administrator for Commercial Space Transportation.

"Federal launch range" means a launch site from which launches take place that is owned and operated by the government of the United States. Federal launch ranges include Cape Canaveral Air Station, Vandenberg Air Force Base, White Sands Missile Range and Wallops Flight Facility. In its comments, Kistler Aerospace Corporation recommended that the FAA clarify that only these four facilities constitute federal launch ranges. The FAA is not prepared to do this, but will reach a separate accommodation. The FAA agrees that the definition of a federal launch range should only encompass those federal launch facilities where the government facilities, services and organization routinely support launch activities. The four listed above, however, are not the only current ones, and others could emerge in the future.

The FAA assumes that Kistler's interest in this topic arises out of its proposed launch plans for the Nevada Test Site, which is not currently a federal launch range. The Nevada Test Site should not, in its current operational status, be considered a federal launch range because the U.S. government does not routinely oversee the launch of launch vehicles from the site. Although it is true that the U.S. government has conducted launches from the site, this does not mean that the Nevada Test Site is a federal launch range for purposes of this rule because the activities that have occurred there are not routine. No staff is dedicated to routinely supporting launch activity, and the FAA is not aware of any permanent launch infrastructure at the site. Nor is the Nevada Test Site a member of the Range Commander's Council. Accordingly, the FAA here clarifies its definition by adding "routinely."

"Hazardous materials" mean hazardous materials as defined in 49 CFR § 172.101.

"Launch accident," "launch incident," and "mishap" all address related issues. The term "mishap" is a general term for all unplanned events at a launch site or during a launch resulting in injury, occupational illness, or damage to or loss of equipment or property. Mishaps include but are not limited to launch accidents and launch incidents. Launch accidents and launch incidents are types of "mishaps." "Launch accident" and "launch incident" derive from the FAA's current definition of "accident" and "incident" as the terms appear in the FAA's accident investigation plan. Both terms encompass unplanned events occurring during flight. "Launch accident" is

defined by the seriousness of the results, and "launch incident" focuses on the failure of a safety system or process that may or may not have caused serious harm. Special reporting and investigation requirements attach if a launch accident or incident occurs. "Accident" is also defined in a Memorandum of Understanding with the National Transportation Safety Board (NTSB). A launch accident will entail NTSB involvement. A "launch incident" may or may not involve the NTSB, depending on the seriousness of the safety issues involved. Other mishaps, such as a mission failure, have fewer reporting and investigation requirements.

Orbital raised a concern regarding the reporting requirements for a mishap. *Orbital* at 5. It noted that, if read literally, section 415.41 would require FAA notification every time a piece of the licensee's own equipment was damaged. The FAA does not require this and now amends its definition of mishap from that originally proposed in the NPRM to include only a launch accident, a launch incident, failure to complete a launch as planned, or an unplanned event resulting in fatal or serious injury or greater than \$25,000 damage to a payload, a launch vehicle, a launch support facility, or government property located at the launch site. The notification requirement has also been modified for mishaps other than launch accidents and launch incidents. For a mishap that is not a launch accident or launch incident, or one that does not involve a fatality, a licensee must notify the FAA within 24 hours of the event. Such mishaps may involve insurance claims or may uncover flaws in a licensee's safety procedures.

"Launch operator" is defined as a person who launches or plans to launch a launch vehicle and any payload.

The definition of "launch site" reflects changes resulting from the codification of the Act and a subsequent revision. The definition of "launch site" in the original Commercial Space Launch Act includes "facilities located on a launch site which are necessary to conduct a launch." 49 U.S.C. App. 2603(5) (emphasis added). As noted in the NPRM, the codified definition of "launch site" merely included "necessary facilities" with no mention of their location. Now, Congress has remedied that oversight, and the definition of "launch site" means the location on Earth from which a launch takes place and necessary facilities at that location. 49 U.S.C. 70102(6) (emphasis added). The FAA correctly proposed to include only those facilities located at the launch site. In order,

however, to reflect accurately the new language of the codified statute, the FAA's definition of launch site will not, as proposed in the NPRM, include "necessary facilities located at the site," but "necessary facilities at that location."

The FAA will not include the term Office in its definitions as originally proposed in the NPRM. There is greater familiarity with the term "FAA" and the agency believes that its use will result in less confusion.

#### *Part 411—Policy*

The FAA deletes as unnecessary and reserves part 411, which establishes the policies of the FAA for licensing commercial launch activities. This part identified how the FAA addressed safety and mission reviews, which, pursuant to this rulemaking, are addressed in parts 413, 415 and 417.

#### *Part 413—License Application Procedures*

Part 413 continues to describe those license application procedures applicable to all license applications. As explained by section 413.1, which clarifies the former section of the same number, the procedures apply to any application for a license to launch a launch vehicle or to operate a launch site. These procedures should also be used by a payload owner or operator requesting a payload review. More specific requirements applicable to obtaining a launch license or a license to operate a launch site are set forth in parts 415 and 417, respectively. The majority of the revisions to this part are editorial or self-explanatory. A few bear individual mention.

Section 413.3, which renumbers the former section 415.3 and amends the provision by including operation of a launch site, identifies who must obtain a license to launch a launch vehicle or to operate a launch site. Any person proposing to launch a launch vehicle or to operate a launch site within the United States must obtain a license authorizing the launch or the operation of the launch site. 49 U.S.C. § 70104(a)(1). A U.S. citizen or entity proposing to launch outside the United States or to operate a launch site outside of the United States must obtain a license authorizing the launch or the operation of the launch site. 49 U.S.C. § 70104(a)(2). A foreign corporation, partnership, joint venture, association or other foreign entity controlled by a U.S. citizen and proposing to launch from, or to operate a launch site within, international territory or waters must obtain a license if the United States does not have an agreement with a foreign

nation providing that the foreign nation shall exercise jurisdiction. 49 U.S.C. § 70104(a)(3). A foreign corporation, partnership, joint venture, association or other foreign entity controlled by a U.S. citizen does not require an FAA license to launch from foreign territory, unless that foreign nation has agreed that the United States shall exercise jurisdiction over the launch. 49 U.S.C. § 70104(a)(4).

Section 413.5, which renumbers and amends the former section 413.3, requires a prospective applicant to consult with the FAA prior to submitting an application. Pre-application consultation is now mandatory in order to allow both an applicant and the FAA the opportunity to identify potential issues relevant to the FAA's licensing determination. Pre-application consultation does not possess a formal structure or timetable. Nor does it require personal meetings. For many proposals consultations may be made by telephone, electronic mail or other means.

Pre-application consultation is intended to provide an efficient and effective process leading to the development of a substantially complete application. It should also ensure that an applicant is aware of the responsibilities of a licensee. Pre-application consultation allows a prospective applicant to familiarize the FAA with its proposal and the FAA to familiarize the prospective applicant with the licensing process. It has been the FAA's experience that pre-application consultation helps speed the overall licensing process by ensuring that any unique safety issues are uncovered early. It also avoids potentially wasted efforts by a prospective applicant in preparation of an application. For new launch concepts, the pre-application process allows a prospective applicant and the FAA's Commercial Space Transportation Licensing and Safety Division to identify the most efficient process for the applicant to demonstrate the safety of any proposed launch. Experience shows that this often is best carried out through a series of meetings, and other interchanges, each focusing on different issues. The schedule and order of such discussions is nearly always driven by a prospective applicant's concept, issues and schedule. In all cases, the FAA encourages the proposed applicant to submit, as part of the process, application material in draft, and the FAA will review and provide feedback on the content.

Although the FAA will answer general questions regarding the licensing process at any time, the pre-

application process is best begun when a prospective applicant is ready to discuss specific application requirements or to begin preparation of an application. At this time, the Licensing and Safety Division will assign a primary staff engineer who will be responsible for working with the prospective applicant. Typically, a second engineer is also assigned to track the project and to be available should the primary engineer not be available. Other support staff may also be assigned to help in specialized areas such as environmental reviews.

Section 413.7, which renumbers and amends the former section 413.5, contains a change in the name of the entity regulating commercial space transportation. Effective November 15, 1995, the DOT Office of Commercial Space Transportation became a part of the Federal Aviation Administration, where it now operates as the FAA's seventh line of business. With that move, the name was changed from the Office of Commercial Space Transportation to that of the Associate Administrator for Commercial Space Transportation. Section 413.7(a), which directs an applicant where to file an application, reflects that change, as well as the new address. Section 413.7(b)(2) requires an applicant to provide the FAA with one or more points of contact to receive notices from the FAA.

Section 413.9, which renumbers the former section 413.7, describes how an applicant may request confidential treatment for trade secrets or proprietary commercial or financial data. The treatment of confidential information is governed by applicable law, including the Freedom of Information Act.

Section 413.11, amending former section 413.9, describes the process by which an application is accepted or rejected. Section 413.11(a) provides for an initial screening of an application in order for the FAA to determine whether the application is sufficiently complete to allow the FAA to initiate the required reviews. The Act requires the FAA to complete its evaluation of an application within 180 days. The FAA determines when an application is sufficiently complete for the 180 days review period to commence and how those 180 days will be measured. If the FAA receives an application that fails to provide sufficient information for the FAA to commence a meaningful review, then a review cannot be performed. The FAA returns applications that are not substantially complete, noting the areas of deficiency. Accordingly, the 180-day review period will start to run only upon receipt of an acceptable application.

The FAA considered the option of not commencing any review of an application and thus of not starting to count the 180-day statutory time limit until the application was complete in order to ensure that the FAA did not receive piecemeal applications. The FAA also considered rejecting or denying an incomplete application, which would also prevent the 180-day review period from commencing. Instead, the FAA determined that if an applicant presented sufficient material to allow at least some meaningful review to commence, the FAA would do so in the interests of the applicant. Commencing the review of even an incomplete application should allow for earlier identification of required information not addressed, hasten the process and increase efficiency.

In order for the FAA to review an application, however, the application must be sufficiently complete to allow review to commence. Accordingly, under section 413.13, the FAA's acceptance of an application does not constitute a determination that the application is complete. That section now contains an additional provision that was not explicit in the NPRM. The new provision clarifies that the FAA may ask for additional information in the course of the licensing process. It states that if, in addition to the information required by the applicable parts of 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 activity, an applicant shall submit the additional information required to show compliance with this chapter. The FAA anticipates that there will be situations where an applicant's proposal contemplates activities, vehicle configurations or technologies not envisioned in the course of this rulemaking. In that case, it is necessary for the regulations to reflect clearly the FAA's authority to request additional information prior to issuing a license.

Although review of an incomplete application may commence, section 413.13 requires an applicant to complete an incomplete application, and section 413.15 allows for tolling in the event an applicant does not submit the remaining material in sufficient time to avoid affecting the evaluation process. Section 413.15, a new provision, tolls, or stops the clock of, the review period of 180 days when an applicant fails to provide information required for the FAA to complete its review. Although the FAA will

commence its application review once it receives a substantially complete application, the fact that an application is only substantially complete means that more information may be required before the application is entirely complete. If an application does not address requests for required information in sufficient detail, or if the application contains inconsistencies, the FAA will advise the applicant and provide a time by which the requested information must be provided. Once the deadline has passed, and while the FAA waits for any information necessary to complete its review, the 180-day time limit on the FAA does not run. The FAA considered the option of denying a license and returning the application for resubmission if the requested information were not submitted within the time provided. Because of the new submission of the application, a new 180-day review period would commence. This course would provide the applicant a strong incentive to respond to the FAA's information request in a timely fashion, and, perhaps, result in the processing of only those applications where the applicant possesses the actual capacity to respond. This would discourage frivolous applications. The FAA determined, however, that most applicants, provided with information regarding how soon the FAA would require information necessary to complete a review, would respond in the time allotted. Thus, so extreme an incentive would not be required. However, it has been the FAA's experience that applicants do not always respond in a timely fashion to requests from the FAA for clarification or additional information. Accordingly, some incentive to respond promptly is necessary, and in the event an applicant fails to respond within the time provided, the FAA will toll the 180-day statutory review period.

Both *Orbital* and *Rotary Rocket* objected to this provision. *Orbital* at 5; *Rotary Rocket* at 5. Neither, however, proposed a different solution for addressing the problem of an applicant not supplying requested information in a timely fashion. For the reasons discussed above, the FAA adopts the tolling provision.

Section 413.17, which renumbers and amends former section 413.19, describes an applicant's responsibility for the continuing accuracy and completeness of the information contained in the applicant's license application. *Orbital* objects to requiring that an applicant update its application any time it is no longer accurate and complete in all respects, and recommends retaining the

language of former section 413.19, *Orbital* at 6. The FAA agrees that it need not be advised of any and all changes, and will therefore incorporate a materiality standard. An applicant should note, however, that the FAA considers a great majority of the information required for an application to be material. Otherwise, the FAA would not require that information. An applicant must advise the FAA in a timely manner of any proposed material change in any representation contained in its application, including, without being limited to, its launch plans or operations, launch procedures, classes of payloads, orbital destinations, safety requirements, the type of launch vehicle, flight path, launch site, and launch point, or any safety related system, policy, procedure, requirement, criteria or standard, related to commercial space launch or launch site operation activities, that may affect public health and safety, the safety of property, including government property, or hazards to the environment. Because the FAA proposes to rely upon federal launch ranges for launches from those sites, an applicant must also notify the FAA in a timely manner in the event the applicant applies to the federal range for a waiver to, or deviates from the federal range's safety requirements or procedures.

Changes to an application may lengthen the time that the FAA requires to complete its reviews in support of a license determination. The FAA will reserve to itself the right to toll the 180-day review period in the event that any amendment to an application so radically changes the applicant's proposal that the change, in effect, constitutes a new application. The FAA's experience, however, has been that most amendments, while important, have a relatively minor impact on the processing time, particularly if these amendments are submitted in a timely manner.

Section 413.19 addresses issuance of a license.

Section 413.21 contains the procedures employed by the FAA when it denies an applicant a license, and describes the recourse available to that applicant. An applicant may attempt to correct the deficiencies that resulted in the denial of its application and request reconsideration of its application, or it may request a hearing to show why the application should not be denied.

Section 413.23 allows a licensee to apply for renewal of an expiring license. A licensee seeking authorization to conduct activities that are substantially different from those authorized under the expiring license is not eligible for

renewal of the license and must apply for a new license.

#### Part 415—Launch License

Part 415 establishes requirements applicable to obtaining a license to launch a launch vehicle and establishes post-licensing requirements. The provisions of this part apply to prospective and licensed launch operators and to prospective payload owners and operators, and should be read in conjunction with the general application requirements of part 413. This part replaces and amends the former part 415. A flow chart of the launch license application process is provided in Figure 1.

Subpart A describes the scope and types of launch licenses, required approvals or determinations, and procedures governing issuance or transfer of a launch license. Like the former section 415.1, the new section 415.1 explains that part 415 prescribes requirements for obtaining a launch license and adds that it prescribes post-licensing requirements. Section 415.3, a new provision arising out of this rulemaking, addresses the types of launch licenses issued, as discussed previously.

Sections 415.5 and 415.7 identify the approvals and determinations required to qualify for a launch license. These sections require a license applicant to obtain policy and safety approvals from the FAA. Section 415.7 constitutes an administrative change, although the FAA has conducted payload reviews in the past. This provision requires an applicant to obtain a payload determination unless the payload is otherwise exempt from FAA consideration. The owner or operator of the proposed payload may also apply for a payload determination. Only a launch license applicant may apply for safety and policy approvals, and, as with former section 415.5, may apply for either approval separately and in advance of submitting a complete license application. An applicant applying for a separate approval should note, however, that some of the information described as required for one approval may be necessary for a different approval. In order to avoid duplication, the FAA is requesting only once material that is relevant to more than one review. For example, the information required by section 415.25 is germane to an FAA safety review, although it is also pertinent to a policy review.

In addition to the approvals and determinations that the FAA requires of an applicant for a launch license, an applicant should bear in mind that the

National Environmental Policy Act (NEPA) requires the FAA, prior to considering a license application, to perform environmental reviews of major federal actions such as issuing a launch license. Accordingly, if a proposed launch vehicle is not otherwise already encompassed by a 1986 Programmatic Environmental Assessment of Commercial Expendable Launch Vehicle Programs, then NEPA may direct the FAA to perform an additional environmental review. No other approvals or determinations are required from the FAA in order for an applicant to obtain a license for launch of a launch vehicle.

This subpart also contains new provisions for issuance and transfer of a launch license. Once an applicant has obtained all required approvals, the FAA will issue a launch license under section 415.9.

Section 415.11, a new provision, allows the FAA to modify a launch license at any time by modifying or adding terms and conditions to the license to ensure compliance with the Act and regulations. Although standard license terms and conditions, contained in subpart E, apply to all licensees, it is the experience of the FAA that a particular licensee's launch may present unique circumstances which apply only to that licensee. In that event, the FAA may issue or modify a license with terms and conditions not identified in subpart E to protect public health and safety, safety of property, U.S. national security and foreign policy interests, or international obligations of the United States. A licensee may also initiate license modification.<sup>10</sup>

Under section 415.13, a new provision, only the FAA may transfer a license, and only upon application by the transferee. The prospective transferee must satisfy all requirements for obtaining a license as specified in parts 413 and 415.

Subpart B describes the requirements for a policy review. To date a policy review has been known as a mission review under former sections 415.21–415.25. Because the FAA now separates a payload determination from any mission review, it is changing the name of the review to policy review to more accurately identify its purpose. Under sections 415.21 and 415.23, a policy

<sup>10</sup> Should a licensee wish to protest an FAA modification of its license, it is entitled to a hearing pursuant to section 406.1(a)(3) of part 406. In the event safety requires that additional terms and conditions be applied to all licensees, the FAA would revise part 415 by rulemaking to implement any such standardized license. As provided in part 415, a licensee may request modification of its license to reflect changes in its proposed launches.

review addresses whether some aspect of a proposed launch presents any issues affecting U.S. national security or foreign policy interests or is inconsistent with international obligations of the United States. Specific launch safety issues will be addressed only in a safety review although the FAA will address payload safety issues in the course of a payload determination. Only a launch license applicant may request a policy approval. An applicant must provide the information required by subpart B so that the FAA may review those aspects of an applicant's launch proposal that are not related to safety. The FAA coordinates this review with other government agencies, including the Departments of Defense, State, and Commerce, the National Aeronautics and Space Administration and the Federal Communications Commission. Space Access questioned the inclusion of NASA in the policy review. *Space Access* at 12. Space Access states that NASA does not determine U.S. national security, foreign policy or questions of international obligations. *Id.* The FAA's experience has been that NASA, as the primary civilian government launch operator, often offers insights of value with respect to issues of concern. The FAA plans to continue to consult with NASA for a number of reasons. NASA has a long history of launching expendable launch vehicles, and currently operates the Space Shuttle. NASA also operates a federal launch range. NASA procures launch services from the private sector for a wide range of satellites and space probes. Also, NASA has programs and assets that it may wish to bring to the FAA's attention in the context of a particular launch. Accordingly, NASA will remain one of the agencies regularly consulted regarding any launch license application.

An applicant may choose to submit an application for policy review separately from its license application, or, as do most applicants, it may submit a complete license application. The FAA will allow separate submission of a request for a policy review because of the possibility that an applicant might be uncertain about policy issues surrounding its proposal, and might wish to allay concerns over reactions to any proposed launch. An applicant might then request only a policy review prior to undertaking the additional effort necessary to prepare a complete license application. Past experience indicates that the FAA accomplishes these reviews relatively quickly in comparison with a safety review.

Section 415.25, a new provision, describes the information an applicant must provide to obtain a policy approval. As described in the NPRM, the information required reflects current FAA information requests. The FAA requires this information in order to inform it and other agencies of what is being launched, by whom, for what purpose, and where a vehicle and its payload are going. The State Department, for example, may identify overflight issues regarding particular countries.

Accordingly, the FAA requires that an applicant supply sufficient information to describe a proposed launch vehicle and its mission. The information requested by paragraph 415.25(b) is required in the event there are any policy issues surrounding the launch vehicle itself. The FAA requires a brief description of the launch vehicle, including the propellants used and the vehicle's major systems, such as its structural, pneumatic, propulsion, electrical or avionics systems. Policy questions may arise, for example, over the use of nuclear power, or the Department of Defense may have concerns over the allocation of resources to a commercial launch if a sole source manufacturer is involved.

The information requested by paragraph 415.25(c)(2), that an applicant identify any foreign ownership interests of 10% or more means that an applicant must identify any foreign owner possessing a ten percent or greater interest in a license applicant. This provision is intended to provide the FAA and the Departments of State and Defense the identities of foreign interests involved in a licensed launch. The Departments of State and Defense have interests in foreign involvement in the U.S. launch industry, including, for example, issues surrounding technology transfer and national security. The FAA believes that a ten percent ownership interest is sufficiently high for a foreign owner to be able to influence a prospective licensee. The FAA is aware that a publicly traded corporation will not always know the identity of each of its smaller shareholders. However, such an applicant should be aware of any shareholders possessing that significant an interest in the corporation. Reporting requirements of the Securities and Exchange Commission and the Department of Defense are often triggered by an ownership interest of ten percent or even less, and the FAA believes that this constitutes a reasonable threshold.

Through the comment process, Kistler Aerospace Corporation and Lockheed Martin Corporation requested that the

FAA not require an applicant to identify its foreign ownership interests. *Kistler at 10; Lockheed Martin at 7.* Kistler recommended that the FAA require, instead, a statement from the applicant that it is in compliance with all federal requirements governing foreign ownership in certain sensitive industries under 50 U.S.C. §§ 1701 et seq. and 31 CFR Part 800. Kistler notes that the Treasury Department examines and passes upon foreign involvement in sensitive industries such as the launch industry. Thus, according to Kistler, the FAA's information requirements concerning foreign ownership would be duplicative. Lockheed Martin maintains that the FAA offers an insufficient explanation regarding the purposes of obtaining the information.

The statutory and regulatory provisions upon which Kistler relies for its argument do address certain elements of foreign ownership, but address a more narrow area of concern than identified in the Act. The provisions of 50 U.S.C. ch. 35—International Emergency Economic Powers, §§ 1701–1706, apply to the President's exercise of authority in a national emergency. The FAA, on the other hand, may apply the information on a more routine basis, and for its own purposes. For example, the FAA has occasion, as with Sea Launch, to determine whether a U.S. citizen controls a license applicant for purposes of ascertaining whether the launch operator requires a license. Nor do the regulations Kistler cites address all forms of foreign ownership. On its face, part 800 only applies to mergers, acquisitions and takeovers by foreign persons. 31 CFR Part 800. There are transactions that are not acquisitions under part 800. See 31 CFR § 800.302 and examples provided. In light of the fact that not all foreign ownership receives scrutiny under part 800, the FAA finds that its information requirements concerning foreign ownership will not duplicate those of the Treasury. The FAA also takes note of the fact that part 800 does not alter or affect any other reviews. Accordingly, because the FAA itself may require the information regarding foreign ownership in order to determine whether a U.S. citizen exercises control over an applicant, because the Departments of State and Defense have interests in foreign ownership issues, and because the Treasury regulations do not address all forms of foreign ownership, the FAA adopts paragraph 415.25(c)(2) as proposed.

Section 415.25(d)(2) requires an applicant to identify proposed vehicle flight profiles. Space Access maintains

that compliance may be difficult when planning large numbers of launches. To date, it has been the experience of the FAA that compliance is possible. An applicant may satisfy this requirement by providing a range of proposed flight azimuths, trajectories, ground tracks, and instantaneous impact points. Launch frequency should not affect an accurately identified range of flight profiles. In any event, this same information is also used by the FAA in its safety review and is critical to assessing public risk.

Section 415.25(d)(3) requires information regarding the sequence of major launch events during flight. In this regard, the FAA expects to be informed of events such as approximate engine burn times of all stages, stage separation events, pitch and yaw

maneuvers and engine cutoff. An applicant may provide this information through a text explanation or through diagrams and charts.

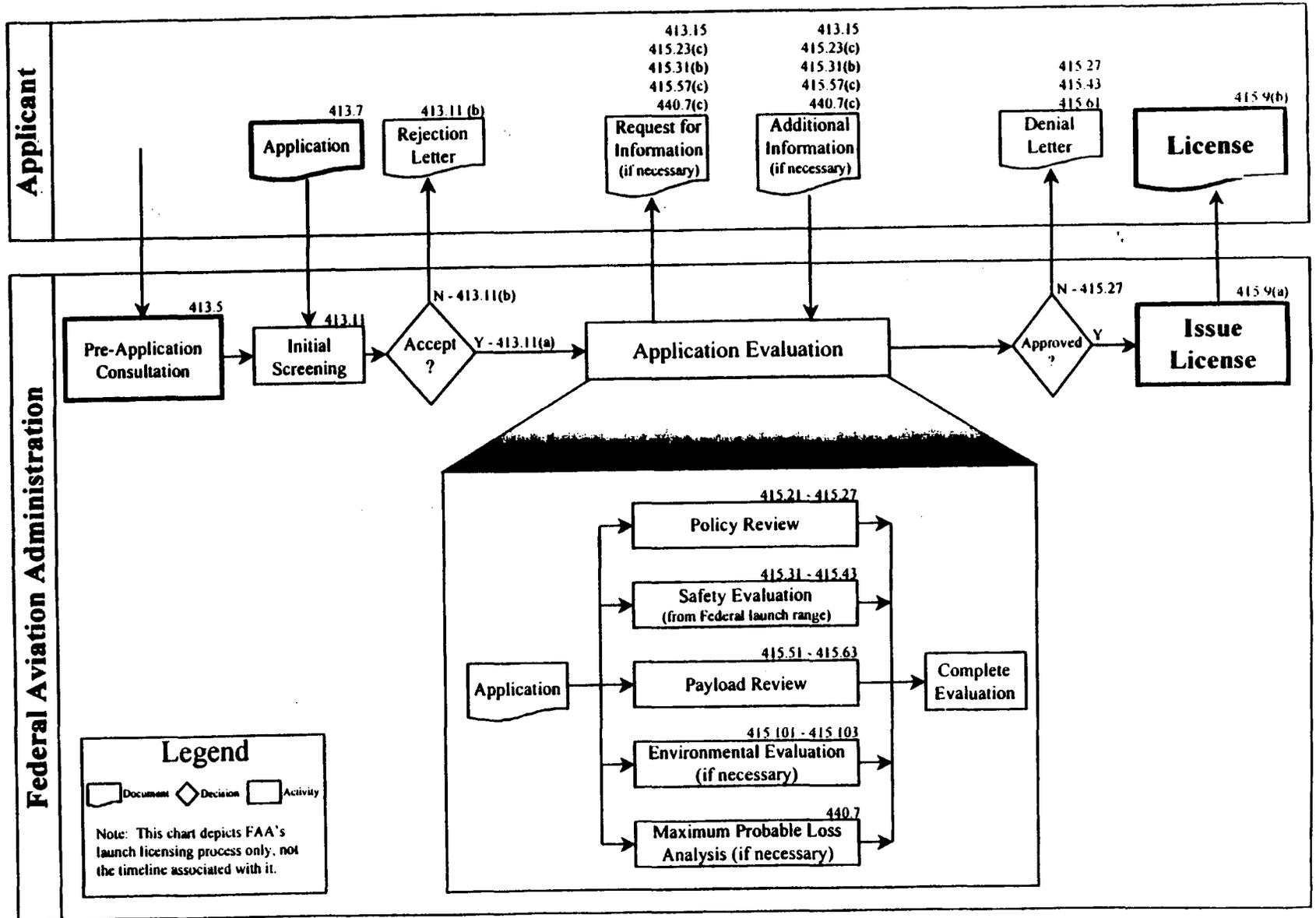
Section 415.25(d)(4) requests a description of the range of nominal impact areas for all spent motors and other discarded mission hardware. The area identified for each impacting component shall include that area within three standard deviations of the nominal impact point, a calculation otherwise known as a 3-sigma footprint.

Section 415.27 contains procedures employed by the FAA when it denies an applicant a policy approval and describes the recourse available to that applicant. If an applicant fails to obtain a policy approval, the applicant may attempt to correct the deficiencies which resulted in the denial and request

reconsideration of the denial, or, upon denial of a license, it may request a hearing. The final version of this provision differs slightly from what the NPRM proposed. The NPRM stated that an applicant who was denied a policy approval could reapply. In order to avoid confusion, the provision now permits an applicant to request the FAA's reconsideration of its denial. This makes clear that the FAA need only reconsider an issue once rather than an unlimited number of times. The particular issue in controversy may serve as one of the reasons for requesting a hearing before an administrative law judge after denial of a license.

**BILLING CODE 4910-13-P**

Figure 1. FAA Launch License Process



Subpart C addresses the FAA's safety evaluation process for license applications for launch from a federal launch range. This subpart is new and replaces the former subpart B—Safety Review, 14 CFR 415.11–415.17. Because of the history and safety record of the federal launch ranges, and because the FAA's baseline assessments provide a written record of the federal launch range's experience relevant to commercial space transportation, the FAA accepts that a federal launch range will perform its safety role. Accordingly, the FAA's information requirements are directed more toward an applicant's own safety capabilities and its integration with a federal launch range's safety organization. The FAA requires information regarding an applicant's safety organization, vehicle design and operational safety practices. This subpart includes standards regarding acceptable flight risk and requires an applicant to submit procedures and plans that demonstrate that it will satisfy certain other safety requirements if it obtains a license.

The FAA recognizes that federal launch ranges provide a number of safety services for launch operators, and that these sites have an historically good record of safety. Section 415.31 explains that the FAA will issue a license to an applicant proposing to launch from a federal launch range if the applicant satisfies the requirements of subpart C and has contracted with the federal launch range for the range to provide 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. All other safety services and property associated with an applicant's proposal are evaluated on an individual, case by case basis.

The FAA has assessed the four federal launch ranges which provide launch services and facilities. The federal ranges assessed include Cape Canaveral Air Station, Vandenberg Air Force Base, Wallops Flight Facility and White Sands Missile Range. The FAA does not duplicate federal launch range analyses or routinely review those analyses during the launch safety review conducted by the FAA. Instead, the FAA relies on its knowledge of the range processes as documented in the FAA's baseline assessments. The FAA's assessments provide a basis for the FAA's reliance on the adequacy of the services provided by each of the federal launch ranges. Some safety issues, however, may not be adequately addressed by a federal launch range. The failure of federal launch range safety systems or procedures may, for

example, affect the FAA's ability to rely on a federal launch range. The FAA may ascertain this during the course of a pre-application consultation or once an applicant submits its application, or through its communications regarding launch activities with the federal ranges. The FAA may then require the applicant to demonstrate safety with respect to those specific areas of concern on an individual or 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.

The FAA also makes maximum use of the information an applicant must provide a federal launch range. The applicant, to save paperwork, may submit to the FAA either entire, or appropriate sections of, documents it prepares and submits to a federal launch range that are relevant to the applicant's launch application. It has been the FAA's experience that because information requested by federal launch ranges provides greater detail than the FAA requires, the FAA's requirements may be satisfied by this material.

Section 415.33 requires an applicant to document its safety organization. An applicant must possess a functioning safety organization because an applicant cannot ensure safety without someone designated as responsible for safety issues. The FAA will evaluate whether the structure, lines of communication, and approval authority an applicant establishes will enable the applicant to identify and address safety issues and to ensure compliance with the requirements of range safety and the FAA's regulations. How a federal launch range's safety services are integrated with the licensee is also relevant. The FAA expects that for launches from federal launch ranges an applicant will structure its safety organization to ensure compliance with federal launch range requirements, such as, for example, Eastern and Western Range Regulation 127-1 for Air Force launch ranges. The FAA believes that charts are the most efficient way to depict much of the required information, and encourages applicants to include one or more, as appropriate, organizational charts that will delineate the lines of communication and the internal decision making process. The lines of communication must depict the lines of communication within the applicant's organizational structure, and between the applicant and any federal launch range providing launch services. In providing this information, the applicant should include those services

of the federal launch range upon which the applicant proposes to rely, and those of any other organization providing flight safety services. The applicant's description must include interfaces with the federal launch range and should explain how the safety policies and procedures of all segments of the safety organization identified above will be implemented.

Section 415.33(b) requires an applicant to have a safety official possessing authority to examine launch safety operations and to monitor independently personnel compliance with safety policies and procedures. In order to keep safety concerns separate from mission goals, the person responsible for safety should have the ability to perform independently of those parts of the applicant's organization responsible for mission assurance, and should also have the authority to report directly to the licensee's personnel in charge of licensed launches. The safety official should be identified by name, title or position, and by qualifications.

Orbital suggests that a safety official should not be required to report to someone who has a vested interest in the outcome of the launch. *Orbital* at 7. According to *Orbital*, such a person might be in a position to exert undue influence or pressure on the safety official. *Id.* When it proposed this requirement, the FAA intended just the opposite. The FAA intended that the safety official have authority to report directly to the person in charge of licensed launches in order to ensure that safety decisions were made at appropriately elevated levels, rather than becoming low priority issues buried in the lower levels of an organization. As noted in the NPRM, the FAA intends the reporting to ensure that the person responsible for the licensed launch ensure that all of a safety official's concerns are addressed prior to launch. Accordingly, because both the safety official and the person responsible for licensed launch possess safety obligations, no conflict of interest should exist. The FAA also believes that this decision reflects a reality within industry, namely, that the person in charge of mission success may well make final decisions regarding safety. The regulations impose safety obligations on that individual as well.

Space Access also questioned this provision, querying the value of an applicant identifying the qualifications of a safety official's position. Space Access believes that this could result in an applicant identifying the qualifications of the position even though the individual performing the

job is not qualified. In order to clarify the FAA's intent, section 415.33(b) now states that an applicant shall identify the safety official by name, title, and qualifications. An applicant must show that there is a relationship between the individual's experience and responsibilities. The FAA agrees with Space Access that a safety official's experience be provided. The FAA will not at this time impose requirements governing the particulars of a person's education and years of experience. Instead, it will rely on the performance standard articulated in 415.33(b).

Although risk is inherent in the launch of a launch vehicle, section 415.35, which is promulgated through this rulemaking, establishes limits on how much risk the FAA will allow for a licensed launch. The FAA has clarified this section from that originally proposed in the NPRM to better describe the FAA's expected casualty ( $E_c$ ) measure of risk by deleting "the probability of occurrence" and including mention of suborbital launch vehicles. The FAA is also classifying the scope of the hazards addressed. An  $E_c$  measure reflects risk from debris, not from toxic releases or blast overpressure, which the federal launch ranges handle through other means. Additionally, the proposed term "collective risk" in the second sentence is now deleted to state more specifically that an applicant's proposed launch shall not exceed an expected average number of 30 casualties in one million launches. This phrasing still describes collective risk, but with more precision. With these clarifying editorial changes, the FAA now adopts its measure of acceptable risk of  $E_c \leq 30 \times 10^{-6}$  per launch.

The FAA received comments regarding its proposed risk threshold. Boeing supported the FAA's proposal. Boeing at 1. Space Access argued that the  $E_c$  was insufficiently strict, and should be compared to involuntary rather than voluntary risk. Space Access recommended an individual risk threshold of  $E_c \leq 1 \times 10^{-7}$ . Space Access at 11. The FAA anticipates that a better explanation of what  $E_c$  measures and the differences between individual and collective risk will respond to Space Access' arguments against an  $E_c$  of  $30 \times 10^{-6}$ . In short, when expressed in terms of individual risk, the FAA's collective risk measure satisfies the concerns voiced by Space Access. Space Access also maintains that a comparison to voluntary risk is inappropriate and that involuntary risk provides the better measure. The FAA, however, like the Air Force, defines background risk as the risk voluntarily accepted in the

course of day to day activities, and finds that voluntary risk provides an acceptable basis of comparison for determining acceptable risk. Moreover, even when compared to involuntary risk, as Space Access recommends, if the FAA's collective risk measure is described in terms of its individual risk counterpart, the measure compares favorably.

Section 415.35(a) requires that acceptable flight risk through orbital insertion for an orbital launch vehicle, and through impact for a suborbital launch vehicle, be measured in terms of collective risk. Pursuant to section 415.35(a), the collective risk associated with debris from an applicant's proposed launch, measured by casualty expectancy, shall not exceed 0.00003 ( $30 \times 10^{-6}$ ) casualties per launch.  $E_c$  represents the FAA's measure of the collective risk to the population exposed to the launch of a launch vehicle. The measure represents the expected average number of casualties for a specific launch mission. In other words, if there were thousands of the same mission conducted and all the casualties were added up and the sum divided by the number of missions, the answer and the mission's expected casualty should statistically be the same. This  $E_c$  value defines acceptable collective risk.<sup>11</sup>

<sup>11</sup> The  $E_c$  value adopted originated with the Air Force's stated measure of acceptable risk. "Eastern and Western Range 127-1 Range Safety Requirements," Sec. 1.4(d), 1-12 (Mar. 31, 1995). Space Access brought a number of risk levels to the FAA's attention, requesting that the FAA reconcile the apparent discrepancies between those risk levels, including the agency's own past descriptions of risk levels, and the FAA's proposed risk measure. A rulemaking is the appropriate mechanism for the FAA to adopt new standards. Thus, although the FAA now adopts a standard different than those its earlier reviews described, this rulemaking provides the forum for doing so. The conflicts Space Access identifies stem, in relevant part, from the fact that the risk figures Space Access cites pre-date the Eastern and Western Ranges' publication of an acceptable risk threshold of  $E_c \leq 30 \times 10^{-6}$ . For example, although it is true that DOT's "Hazard Analysis of Commercial Space Transportation" (1988) ("DOT Hazard Analysis") states that the Department of Defense (DOD) ranges do not have published standards for acceptable levels of public risk, DOD's Eastern and Western Ranges have since published the risk criteria on which the FAA now bases its own measure. Likewise, "Financial Responsibility for Reentry Vehicle Operations," DOT, 27 (May 1995) describes general background risk as  $1 \times 10^{-6}$  per year. Prior to 1990, a collective risk of  $E_c \leq 1 \times 10^{-6}$  was thought to be the typical safety level at the DOD ranges. However, studies using the most up to date models for predicting risk, undertaken to support the effort by the Eastern and Western Ranges to adopt a common standard showed that this was not always the case. The Air Force eventually published an  $E_c \leq 30 \times 10^{-6}$  in 1995 instead. Again, the "Commercial Launch Baseline Assessment for US Air Force Western Space and Missile Center" DOT, 79, Sec. D.7.e (Jul. 1989) states that  $E_c$  should lie between  $1.9 \times 10^{-7}$  and  $4.6 \times 10^{-7}$ . The referenced passage was a

Collective risk is estimated prior to launch, and constitutes the sum total launch related risk to that part of the public exposed to the hazards of a launch. The public includes everyone except launch personnel. Government personnel who are not essential to a launch are defined as the public for purposes of measuring acceptable risk.

The FAA's standard derives from launch risk guidance employed by the Air Force at its Eastern Range, Cape Canaveral Air Station, and its Western Range, Vandenberg Air Force Base, to define acceptable risk. The FAA adopts this standard because the FAA believes that commercial launches should not expose the public to risk greater than normal background risk, which the FAA defined in its NPRM as those risks voluntarily accepted in the course of normal day-to-day activities. The FAA is using the Air Force standard because it reflects the standard already in place for the majority of commercial U.S. launches, and for the majority of government launches of vehicles of a comparable size. No casualties arising out of a government or commercial launch have occurred to the public under this standard. It is the FAA's understanding that although the Air Force published this figure in 1995, it did so because it found that this figure best represented historical launch risk levels.

The FAA is aware that the Air Force implements this standard as "acceptable launch risk without high management (Range Commander) review." "Eastern and Western Range 127-1 Range Safety Requirements," Sec. 1.4.1, 1-12. This means that based on national need and the approval of a range or wing commander the Air Force may allow a launch with a predicted expected casualty risk of greater than  $30 \times 10^{-6}$ . *Id.* As mentioned in the NPRM, the FAA recognizes that many commercial launches carry government payloads, and that there may be a national need to launch a critical national payload with a predicted launch risk of greater than  $30 \times 10^{-6}$ . An applicant proposing to launch a government payload, where the launch would not meet the FAA's risk requirement, would have to request a waiver from the FAA and show that national need warranted waiver of this standard. The FAA would work with any government payload owner or operator to resolve such an issue. The FAA establishes this standard, however, for all commercial launches, so that the

relatively simple calculation of risk in the launch area for a representative launch, and provides an example of the risks rather than a worst case limit. This estimate today proves low with the availability of more accurate data.

general public will not be exposed to a higher than normal risk from a commercial activity.

The FAA also recognizes that the federal launch ranges may perform separate  $E_c$  analyses for three different hazard categories, including debris, toxic releases and blast overpressure. When the FAA relies on a federal launch range's  $E_c$  analysis to determine whether the FAA  $E_c$  requirement is met, the FAA is interested only in the debris analysis performed by a range, and this provision makes that clear. For toxic releases and blast overpressure, the federal launch ranges implement specific safety requirements designed to keep toxic releases and the effects of blast from reaching the public. For example, if more than a given number of parts per million of a toxic release would reach people, a launch will be delayed until conditions improve. Likewise, if atmospheric effects threaten to carry overpressure impact to persons outside the federal launch site, a launch will be delayed. Because these measures achieve safety, the FAA will rely on them rather than implementing an  $E_c$  analysis requirement for toxic releases and blast overpressure.

Space Access raised the question of whether an  $E_c$  of  $30 \times 10^{-6}$  meant that if an accident occurred and 100,000 people were exposed then 3 deaths would occur. *Space Access* at 8. The FAA wishes to take advantage of this opportunity to clarify the concepts involved.  $E_c$  is the expected average number of casualties per launch of a launch vehicle. The consequence measured is casualties, which includes serious injury as well as deaths, and the measure is per event, namely, launch. Space Access based its question on the assumption that  $30 \times 10^{-6}$  is "3 per 100,000" persons. That  $E_c$  is a measure of casualties rather than deaths aside, expected casualty is measured for each event, which, in this case is a single launch. Although Space Access is, of course, correct that an  $E_c$  of  $30 \times 10^{-6}$  is equivalent to 3 per 100,000, the 100,000 refers not to exposed persons, but to the number of launches that would have to be conducted before one would expect statistically that total number of casualties. One would have to launch 100,000 times to statistically reach 3 casualties.

Space Access sought clarification on the differences between individual and collective risk. In contrast to the more familiar measure of risk, namely, individual risk, which describes the probability of serious injury or death to a single person, the launch industry's common measure of risk is collective risk. Collective risk constitutes the sum

total launch related risk, that is, the probability of injury or death to that part of the public exposed to a launch. Collective risk is analogous to an estimate of the average number of people hit by lightning each year, while individual annual risk would be an individual's likelihood of being hit by lightning in any given year. Collective risk may be expressed in terms of individual risk if certain factors associated with any given launch are taken into account. Also, individual risk may be—and will be, in most instances—less than collective risk, depending on the size of the population exposed. For example, a collective risk of  $E_c$  of  $30 \times 10^{-6}$  for a defined population of one hundred thousand people exposed to a particular launch results (assuming the risk is spread equally throughout the defined population) in a probability of injury or death to any one individual exposed of  $3 \times 10^{-10}$  (three per ten billion).

In its comments, Space Access argued for a stricter standard on the basis of what it understood to be other measures of risk. Space Access analyzed the FAA's proposed measure in terms of two categories: background risk, which may be further categorized as a combination of voluntary and involuntary risk, and other launch risk thresholds. Contrary to the contentions of Space Access, the FAA finds that the comparison to voluntary risks is appropriate. Even, however, when compared to involuntary risk, if the risks of launch are expressed in terms of individual risk, launch risk usually compares favorably. In fact, it is possible to have an unacceptably high expected casualty value while still having an extremely low individual risk level.

Space Access inquired whether the proposed standard appropriately reflects risk levels voluntarily accepted by the public in normal daily activity. Voluntary risk provides an appropriate comparison. The FAA defines background risk in the context of its statutory mandate to regulate and facilitate the commercial launch industry. Congress has chosen to accept the risk of launch in order to reap the benefits attendant to the activity. Recognizing that this country has decided to accept these risks, the FAA believes, as the federal launch ranges do (see "Eastern and Western Range 127-1 Range Safety Requirements", Sec. 1.4(d), 1-12), that it is appropriate to compare launch risks to other measures of voluntary risk. A recent study proves helpful for making that comparison. See *Acceptable Risk Criteria for Launches from National Ranges: Rationale, Rep.*

No. 97/350-2.1-01, ACTA, for the Department of the Air Force, 30th and 45th Space Wings (Sept. 1997)<sup>12</sup>. ACTA estimated the average annual accidental fatality probability for any individual, which is defined as all accidental causes of death. ACTA estimated the fatality probability by adding the estimated annual individual fatality probability from accidents outside the home and the reported annual individual fatality probability from accidents in the home. This excludes risk of disease. ACTA estimated a total risk of  $2 \times 10^{-4}$ . *Id.* at 18. The FAA's measure of acceptable risk for casualties may be as much as four orders of magnitude lower than this accident death risk. The comparison may only be made, of course, by translating the FAA's collective risk measure into individual risk and by employing the same time scale for both. If the comparison is made on an annual basis, and the example of an exposed population of 100,000 persons continues to be employed, then individual risk for a launch is, as mentioned earlier,  $3 \times 10^{-10}$ . Assuming 100 launches per year, then the individual annual risk results in a figure of  $3 \times 10^{-8}$ , which is four orders of magnitude lower than the risks, both voluntary and involuntary, of day to day activity.

Space Access also makes the point that the FAA would have to assign a maximum number of launches per launch site if the agency intends acceptable risk to remain below background risk. In the NPRM, the FAA acknowledged that its standard is based on present launch rates, and it still finds that this threshold is appropriate for the scope and frequency of launch operations planned over the next several years. Even if launch rates increase by an order of magnitude, individual annual risk will still compare favorably with other voluntary and involuntary risks. An exponential rise in launch rates may require a reassessment, although the FAA does not foresee an exponential increase in launch rates in the near term.

Space Access also suggests that other launch risk standards provide the proper measure of acceptable risk. Space Access notes that the 1988 DOT Hazard Analysis states that "acceptable risk criteria" for NASA's Wallops Flight Facility (WFF) is  $E_c \leq 1 \times 10^{-7}$ . *Space Access* at 10. As noted in its NPRM the FAA recognizes that WFF does not use an expected casualty standard of  $E_c \leq 30$

<sup>12</sup> ACTA prepared this study in support of Range Commander's Council Standard 321-97, which articulates federal launch range policies and criteria for protection of personnel, aircraft, ships, and spacecraft.

$\times 10^{-6}$ . Although at the time of the publication of DOT's Hazard Analysis WFF may have reported  $E_c \leq 1 \times 10^{-7}$ , since that time, NASA has stated that WFF uses an  $E_c$  of less than or equal to  $1 \times 10^{-6}$ . "Range Safety Manual for Goddard Space Flight Center (GSFC)/Wallops Flight Facility," 24 (Jun. 23, 1993); Beyma, "Flight Safety Range Safety Officer Training Manual, NASA/Wallops Flight Facility," 2 (Sept. 1993). The FAA must choose one standard. The level of safety at the Eastern and Western Ranges, represented by the collective risk standard of  $E_c \leq 30 \times 10^{-6}$  has resulted in no harm to the public. The vast majority of U.S. commercial launches take place from CCAS and VAFB. The FAA therefore finds that this accepted standard is appropriate for all licensed launches.

Space Access also maintains that in order to adopt an  $E_c$  standard of  $E_c \leq 30 \times 10^{-6}$ , the FAA would have to obtain NASA's acceptance. This is not in fact the case. NASA and the FAA have different roles. Commercial launches are regulated by the FAA, not NASA. As the operator of a launch site, NASA is free to require a different measure of acceptable risk than that required by the FAA. Any FAA licensed commercial launch, regardless of where it takes place, must, however, at least meet FAA standards, even were a particular federal launch range to impose less stringent requirements. In this case, the more stringent NASA standard with which a user of WFF would have to comply does not conflict with the FAA standard.

Paragraph 415.35(b), which the NPRM proposed as paragraph 415.35(c), requires an applicant to submit an analysis that identifies the hazards and assesses the risks for flight under nominal and non-nominal conditions.<sup>13</sup> This requirement has been modified to clarify that the risk assessment serves the purpose of demonstrating compliance with paragraphs 415.35(a). A federal launch range will sometimes perform a quantitative analysis for flight until orbital insertion, or for a suborbital mission until impact. A range may determine that an analysis of previously approved missions applies or may serve as a basis for a comparative analysis. If an applicant's previously submitted application contains a risk assessment, the applicant need not submit additional analyses for similar launches. In such cases, a comparative analysis may be supplied.

<sup>13</sup> This section is renumbered in order to accommodate the move of the NPRM's proposed paragraph 415.35(b) into section 415.39, which addresses safety at the end of launch.

As an alternative to relying on federal launch range procedures, an applicant may perform its own quantitative risk analysis. Pursuant to section 415.35(b), although an applicant may submit a federal launch range risk analysis, the applicant bears the burden of demonstrating that predicted risk does not exceed an expected casualty of  $30 \times 10^{-6}$ . To assist applicants, the FAA has documented the range safety process for each of the federal launch ranges. A launch hazard event tree, such as the one described in the DOT Hazard Analysis of Commercial Space Transportation, page 10-29, provides an acceptable method for identifying hazards and assessing risks.

Section 415.35(c), which was proposed in the NPRM as section 415.37(a), ensures that an applicant identify the design of its launch vehicle. In its application, an applicant shall identify and describe its launch vehicle's design, including its structure and the vehicle's hazardous and safety-critical systems, and provide drawings and schematics for each system identified. Because federal launch ranges require an applicant to provide a detailed description of the applicant's launch vehicle and its systems, including drawings and schematics, an applicant may satisfy the requirements of this paragraph by providing the FAA with a copy of all or appropriate portions of the documentation provided to a federal launch range. The FAA will not use the data to duplicate the federal launch range's design approval process, but to document the characteristics of the launch vehicle being licensed and upon which the hazard identification and risk assessment are based.

Section 415.35(d) requires that an applicant's launch vehicle be operated in a manner that meets the criteria of paragraph 415.35(a). To that end, an applicant must describe the launch operations and procedures that the applicant will employ to mitigate risks for flight. The applicant should eliminate or control by design and operations all identified hazards to the levels specified in paragraph (a). Typical hazard controls for flight until orbital insertion used at current federal launch ranges include flight termination systems, and, for suborbital launches, azimuth and elevation adjustments based on a wind weighting analysis. Other hazard controls may involve modifying a vehicle trajectory to avoid high risk areas, and delaying launch until more favorable conditions exist. An applicant for a license to launch from a federal launch range may rely on the methods used by federal launch ranges to identify hazard controls and to

ensure that the hazard controls will be effective.

Section 415.37(a), which was originally proposed as section 415.37(c), implements the FAA's current flight readiness guidelines. As noted in the NPRM, the requirements arise out of recommendations from a National Transportation Safety Board (NTSB) investigation<sup>14</sup> of an anomaly that occurred during a commercial launch from a federal launch range. Requirements intended to ensure the readiness of a launch team include designation of an individual responsible for flight readiness, launch readiness reviews, rules and abort procedures and, countdown checklists, dress rehearsals procedures, and procedures for crew rest.

The FAA recognizes that there are many reviews conducted of a launch system from its initial design up to flight. However, in section 415.37(a)(1), the FAA places special emphasis on a flight readiness review, or its equivalent. A review is typically conducted not more than one or two days prior to scheduled flight. In most cases a flight readiness review is standard practice at federal launch ranges, but the FAA considers the review, and the topics required in this section, to be so important that the applicant must, in its application, commit to a meeting and identify the topics to be addressed. This review must ensure that all system and personnel readiness problems are identified and are associated with a plan to resolve them, that all systems needed for flight have been checked out and are ready, and that each participant is cognizant of his or her role on the day of flight. If this review reveals unresolved issues, the licensee will be able to assess its ability to resolve those issues before the intended launch time or to delay the flight, as appropriate.

Section 415.37(a)(2) requires an applicant to possess procedures that ensure mission constraints, rules and abort procedures are contained in a single document approved by licensee flight safety and federal launch range personnel.

Section 415.37(a)(3) requires an applicant to employ procedures that ensure that all launch countdown checklists are current and consistent. Past inconsistencies in critical countdown checklists and procedures have raised serious safety concerns. The FAA recognizes that it may be

<sup>14</sup> "Special Investigation Report, Commercial Space Launch Incident, Launch Procedure Anomaly, Orbital Sciences Corporation Pegasus/SCD-1 80 Nautical Miles East of Cape Canaveral, Florida," NTSB (Feb. 9, 1993).

impractical for all launch participants to have identical checklists due to differences in the roles of launch participants. The applicant should, however, have some process, such as a master countdown manual, to ensure the currency and consistency of all participants' checklists during countdown to flight. This will ensure that confusion and uncertainties on launch day are minimized, that flight safety critical procedures are completed successfully, and that those individuals with launch decision authority know what is going on and are able to make sound decisions.

Section 415.37(a)(4) requires an applicant to have procedures for the conduct of dress rehearsals. As demonstrated in the past, poor performance at a dress rehearsal may indicate a lack of readiness of individuals or systems responsible for safety. An applicant's procedures should include criteria for determining when dress rehearsals are not necessary. A number of launch companies, for example, have been conducting routine launches of the same vehicle for many years. The FAA recognizes that although dress rehearsals may not be necessary in every case, they may be critical to those launch companies that are new to a launch site, to those that have significant changes in personnel, or to those launching a new launch vehicle.

Even those launch operators that routinely conduct launches typically have certain criteria and procedures in place to verify that a launch team is ready for launch, especially if a considerable period of time has elapsed since the last launch took place. In this regard, Space Access recommends that the FAA impose a currency requirement of 45 days. Space Access at 11. The FAA will take the recommendation into account in future rulemakings, but for the time being declines to impose a currency requirement of 45 days. The need for dress rehearsals is driven by issues specific to particular vehicles, including the number of personnel required to launch the vehicle, the complexity of their tasks, and the amount of communication required among team members to launch safely.

For those situations where dress rehearsals are necessary, the dress rehearsal should simulate both nominal and non-nominal conditions, induced not only by the launch vehicle or payload, but by the range safety system as well. Anomalies introduced during the rehearsal should exercise and prove the abilities of all launch participants, including federal launch range personnel, to recognize an event that compels a launch hold, delay or flight

termination decision. In the NPRM, the FAA noted its interest in views as to any need for future standards relating to rehearsals and the criteria for deciding, based on performance during the rehearsal, that it is acceptable to proceed with the launch. In response, Space Access suggested that no discrepancies be permitted for a nominal profile, and only minor discrepancies be permitted for failure profiles, if the discrepancies involve non-critical actions. Space Access at 11. The FAA agrees, and will interpret section 415.37(a)(4)(i) according to Space Access' recommendation.

Section 415.37(a)(5) responds to another NTSB recommendation, and requires that an applicant ensure that its flight safety personnel adhere to federal launch range crew rest rules. Experience has shown that launch crew rest criteria for all those involved in supporting launch operations are extremely important and can have a significant impact on public health and safety. Federal launch ranges typically have such requirements. Based on current knowledge and the demonstrated safety history of the federal ranges, the FAA would consider adequate adherence to these requirements. Other rest criteria proposed by an applicant may be acceptable if the applicant requests a waiver of the FAA's rules and demonstrates that the criteria would be adequate.

Section 415.37(b) and (c), originally proposed as a separate section, 415.39, require an applicant to submit a communications plan that ensures that licensee and federal launch range personnel receive safety-critical information during countdown and flight. The NTSB, after its investigation of a launch anomaly, concluded that effective communications are critical to the conduct of a safe flight. Everyone involved in a launch needs to know not only what channel has been assigned for particular communications, but also the proper protocol for communicating on that channel. The FAA recognizes that a number of different individuals typically have input and decision authority with respect to the readiness of various launch and safety systems. Past experience has shown that serious mishaps could result if these relationships are not clearly defined and understood by all parties. These relationships must therefore be identified by the applicant. Identifying persons with authority to make "hold" and "go/no-go" decisions is critical to ensuring that on launch day, everyone knows who can call a "hold" and, more importantly, who has the authority to authorize the resumption of the

countdown or a recycle procedure, and under what specific conditions. This will help eliminate confusion and cross-talk that could cause a miscommunication leading to an unsafe condition. In addition, the FAA requires that everyone who has a decision-making role, or who, by action or inaction can either prevent or allow a launch to take place, be on the same predetermined channel during countdown and flight.

Under section 415.39, which was included in the NPRM as paragraph 415.35(b), an applicant must demonstrate that for any proposed launch that for all launch vehicle stages or components that reach earth orbit that there will be no unintended physical contact of the vehicle or its components with its payload after payload separation. The applicant's proposal must also ensure that debris generation will not result from the conversion of energy sources into energy that fragments the vehicle or its components. In addition, although not specifically proposed in the NPRM, the FAA now adds paragraph (c) to specify required measures that prevent the conversion of energy sources into energy that fragments a vehicle or its components, unless other measures are approved in the course of the licensing process. The FAA discussed the new measures in the NPRM.

Those involved in commercial, defense and scientific uses of space have been voicing a growing space safety concern due to the increasing number of objects being placed in orbit, which increases the potential for collisions between objects in space. Collisions in turn create additional objects, increasing the potential for harm or damage. The operation of launch vehicles in space affects and is affected by hazards associated with space debris. Accordingly, the requirements of this section serve to mitigate hazards associated with space debris. Federal launch ranges perform a collision avoidance analysis, or conjunction on launch assessment, commonly referred to as a COLA, prior to launch only to ensure that manned or potentially manned spacecraft will not be affected through orbital insertion. The FAA has elected to adopt only selected debris mitigation practices that are of almost universal applicability. It has not, for example, opted for requiring collision avoidance measures or post-mission disposal, or for specifying a minimum lifetime on orbit.

Orbital noted in its comments that preventing unplanned contact is a primary goal of each launch because it "represents sound technical,

operational, safety and financial business practice," rendering a regulation prohibiting such contact unnecessary. *Orbital at 10.* Orbital recommends that the prohibition on unintended contact be deleted or modified so that rather than ensuring there be no contact, such contact be prevented "to the fullest extent feasible." *Id.* For the reasons stated in the NPRM the FAA now implements this requirement. In light of the fact that preventing unplanned contact is already a primary goal of a launch operator, the FAA does not consider the requirement unduly burdensome. At the time of the NPRM, the FAA intended that the original requirement constitute a performance standard that could be implemented in any manner that achieved the goal, thus avoiding an overly intrusive degree of regulation.

Orbital's recommendation that a licensee ensure against unplanned contact "to the fullest extent feasible" cannot be adopted because it only adds ambiguity to what is required. Ensuring against an event is a clear requirement. It means that the event must not occur. Ensuring against that event to the fullest extent feasible raises questions regarding whether something need not be done if it is technically not feasible, too expensive or for some other reason. The FAA does not discern a reason for making such distinctions that outweigh the safety benefits of requiring a licensee to prevent unplanned contact.

Orbital also maintains that it is impossible to ensure that debris generation will not result from the conversion of energy sources into energy that fragments the vehicle as required by paragraph (b). Although Orbital is correct that it is impossible to ensure with utter certainty that energy will not fragment the vehicle, or, indeed that any given event could be prevented with utter certainty, there are practices that have been shown to prevent this occurrence. As noted in the NPRM, the FAA is aware of a number of standard industry practices designed to prevent or reduce this on-orbit risk. These practices include depleting residual fuels and leaving fuel lines valves open, venting pressurized systems, and leaving batteries in a permanent discharge state. These practices are routine. The NPRM intended to require that these practices be employed for all commercial launches, rather than ignored for reasons of cost or otherwise. The FAA recently uncovered ambiguity in the proposed requirements. Therefore, the FAA now clarifies the requirement by specifying that a licensee must remove stored energy by depleting residual fuels and leaving fuel

line valves open, venting pressurized systems, leaving batteries in a permanent discharge state, and removing any remaining sources of stored energy, or other equivalent procedures. The practices enumerated in paragraph (c) should satisfy the requirement in paragraph (b).

A number of standard industry practices reduce potential on-orbit risks arising out of flight following orbital insertion. A launch operator may maneuver its launch vehicle orbital stage after payload separation to minimize the likelihood that the orbital stage will recontact the payload. This avoids the consequences of either a malfunctioning payload or orbital debris. In order to reduce the possibility of future explosions that could create orbital debris, a launch operator must render liquid fueled orbital stages as inert as possible by expelling all propellants and pressurants and protecting batteries from spontaneous explosion. A launch operator may keep stage-to-stage separation devices and other potential debris sources captive to a stage with lanyards or other means. Also, a launch operator may choose launch times to geosynchronous transfer orbit designed to align the final orbit of the orbital stage so as to lower the perigee of the stage more quickly than other orbits.

Section 415.41 requires an applicant to submit an accident investigation plan. The accident investigation plan must comply with the reporting requirements identified in section 415.41 (b), and must contain procedures for responding to a launch accident, incident or other mishap. As noted in the discussion of the definition of "mishap," the proposed rules have been modified to require notification of mishaps only above a threshold severity level.

Section 415.43 contains the procedures employed by the FAA when it denies an applicant a safety approval and describes the recourse available to that applicant. If an applicant fails to obtain a safety approval, the applicant may attempt to correct the deficiencies which resulted in the denial and request reconsideration of the denial, or, upon denial of a license, it may request a hearing. The final version of this provision differs slightly from what the NPRM proposed. The NPRM stated that an applicant who was denied a safety approval could reapply. In order to avoid confusion, the provision now permits an applicant to request the FAA's reconsideration of its denial. This makes clear that the FAA need only reconsider an issue once rather than an unlimited number of times.

Under subpart D, the FAA conducts a payload review and determination pursuant to 49 U.S.C. § 70104(c). The Act provides that the Secretary of Transportation may prevent the launch of a particular payload if the Secretary determines that the payload's launch would jeopardize the public health and safety, safety of property, or national security or foreign policy interests, or international obligations of the United States. Subpart D explains when a payload review and determination are required and the elements of that review. Addition of this subpart constitutes a change from the FAA's current practice because the payload review will no longer be performed as part of the policy review. This subpart allows either a launch license applicant or a payload owner or operator to apply for a payload determination separately from a launch license application, as was also provided under the former section 415.23 of a mission review. A launch license applicant's decision to seek a payload determination separately from a license application might be based on uncertainty with respect to payload issues and a desire to gain a payload determination before undertaking the additional effort required to prepare a complete launch license application.

Although a payload determination is required for a license, it is not necessarily a requirement imposed on a license applicant. An applicant need not itself apply for a payload determination if a determination has otherwise been issued to a payload owner or operator. In addition to the fact that many payloads are exempt from FAA consideration, an applicant may incorporate by reference a payload determination issued earlier to the applicant or to a payload owner or operator. Alternatively, an applicant may reference a separate application submitted by another launch license applicant for a payload determination and request that the FAA incorporate its earlier determination.

The FAA does not believe that this flexible approach affects the statutory requirement that the FAA complete its license application review within 180 days. Submission of a request for a payload determination does not constitute the filing of a complete application, and a license application is not complete without a request for a payload determination. The FAA stated in its NPRM that it was considering issuing conditional licenses on those occasions when a request for a payload determination had yet to be completed. This would mean that a license would be issued subject to or conditional upon

issuance of a payload determination. The FAA once issued a conditional license to an applicant who proposed to launch a reentry vehicle as its payload. The reentry vehicle was still under development, but the FAA issued a launch license conditioned upon eventual submission of all required payload information and a final determination by the FAA regarding the payload. The FAA has decided, however, that with these rules it will not adopt such a course. A license will be issued only for a complete application.

The FAA also addresses payload safety issues because payload safety is not otherwise part of the safety evaluation of a launch. Payload issues considered during the review include, but are not limited to, safety issues associated with the launch of the payload and its intended operation and design, the payload owner(s), and the payload function. For example, a past payload issue included the nature of the cargo. In that case the payload cargo consisted of cremains, which are human remains reduced to small pellets. A safety issue addressed was whether the pellets would be dispersed while in orbit.

Section 415.51 describes the scope of an FAA payload review, clarifying part of the former section 415.21. Pursuant to proposed section 415.53, the FAA will not review payloads owned and operated by the government of the United States or those that are subject to the regulation of the Federal Communications Commission or the Department of Commerce, National Oceanic and Atmospheric Administration.

As explained in the NPRM, new section 415.55 allows the FAA to make a determination regarding a proposed class of payloads, including, for example, communications, remote sensing or navigation satellites. When an applicant requests an operator license to conduct unspecified but similar launches over a period of five years, the applicant will not always be able to identify specifically each payload to be launched. The applicant must describe the class or classes of payloads proposed for launch under the license and general characteristics of those payloads. In these cases, the licensee must later provide additional descriptive information regarding the specific payload prior to flight as described in section 415.79(a). That section refers a licensee to the information requirements of section 415.59, which specify the information required for a payload review.

The FAA must take this opportunity to clarify an issue raised by the comments of Kistler Aerospace Corporation. Kistler expressed concern that the launch reporting requirement under section 415.79 amounted to an additional payload review by the FAA for each payload within the class encompassed by a launch operator license. *Kistler* at 5-6. In point of fact, the information submitted sixty days prior to launch would not trigger additional policy and safety reviews. It would merely identify the characteristics of what is being launched for compliance monitoring purposes. Kistler recommends that a licensee whose class of payload has been approved and is proposing to launch a payload within that approved class merely submit a copy of a launch manifest "describing the payload, the payload owner, pertinent details about the launch, etc." *Kistler* at 6. By requiring the information described in section 415.59, the FAA intends just that.

Section 415.57 provides procedures an applicant must follow to obtain a payload determination. The FAA coordinates a payload review with other government agencies such as the Departments of Defense, State, and Commerce, the National Aeronautics and Space Administration and the Federal Communications Commission.

The information requested under section 415.59 for a payload review is required to identify and address possible safety and policy issues related to the payload, and to conduct any necessary interagency review. In most instances, the information submitted may be brief, but in cases which present potential unique safety concerns considerable detail may be necessary regarding the physical characteristics, functional description and operations of the payload.

Section 415.61(a), which reflects certain requirements of former section 415.21, explains that the FAA will issue a payload determination unless policy or safety considerations prevent launch of the payload. Section 415.61(b) contains the procedures employed to deny an applicant a payload determination and describes the recourse available to that applicant. If an applicant fails to obtain a payload determination, the applicant may attempt to correct the deficiencies which resulted in a denial and request reconsideration of the denial, or, upon denial of a license, it may request a hearing. The final version of this provision differs slightly from what the NPRM proposed. The NPRM stated that an applicant who was denied a payload

determination could reapply. In order to avoid confusion, the provision now permits an applicant to request the FAA's reconsideration of its denial. This makes clear that the FAA need only reconsider an issue once rather than an unlimited number of times.

Section 415.63 addresses incorporation of a payload determination into subsequent license reviews. It also explains that any change in information provided to the FAA must be reported in accordance with applicable rules.

Subpart E addresses post-licensing requirements, including license terms and conditions. This subpart describes a licensee's public safety responsibilities under section 415.71.

Section 415.73 describes the circumstances that require a licensee to apply for a modification to its license. This section modifies and builds upon the former section 413.19. That provision required an applicant or a licensee to notify the FAA whenever the information that formed the basis for any approval, determination or license action was no longer substantially accurate and complete in all significant respects, or whenever there has been a substantial change as to any matter of decisional significance. The FAA has required licensees to report material changes in order for the FAA to determine their significance. In the NPRM, the FAA proposed requiring that it be notified of all changes regardless of materiality, but now adopts a materiality standard in response to comments. A launch licensee must ensure the continuing accuracy of representations contained in its application for the term of its license, and must conduct its licensed launches as it has represented that it will. This means that if any information a licensee provides pursuant to part 415 will no longer be accurate, a licensee must apply for a modification to its license in advance of instituting the proposed change. For example, if a licensee intends to alter its accident investigation plan, it must obtain authorization in advance through a license modification to do so. *Orbital* describes this requirement as overly broad and undefined. *Orbital* at 9. *Orbital* recommends that the FAA incorporate a materiality standard, so that an applicant or licensee would only notify the FAA of any significant changes. *Id.* The FAA agrees in part. It does not wish to be advised of any and all changes, only of those material to public health and safety or safety of property. The FAA wishes to be advised of any material changes so that it may determine whether to modify a license.

The FAA also wishes to draw attention to an editorial change from the provision as originally proposed. In its NPRM, the regulations required a licensee to "amend" its application even after its license was issued. Now, the same provisions require a license "modification." This results in no substantive change. It does clarify, however, that an application is part of any ensuing license and that a licensee must obtain advance authorization from the FAA for any material changes.

The remainder of subpart E contains license terms and conditions applicable to all licensees. Section 415.75 requires a licensee to enter into an agreement with the federal launch range from which it proposes to launch. Orbital recommends that rather than require the range agreement to remain in effect for the term of the license, that the FAA require that it be in effect during the conduct of licensed launches. *Orbital* at 9. The FAA sees no practical difference, but agrees, and revises the regulation accordingly. A licensee should bear in mind, however, that "launch" begins with the arrival of a vehicle at the launch site. Accordingly, any agreement must be in place at the time of the vehicle's arrival.

Section 415.77 requires a licensee to maintain those records that pertain to activities carried out under a license issued by the FAA. These records must be retained for at least three years after the completion of all launches conducted under the license.

Section 415.79, as proposed in the NPRM, required a licensee to report certain information before each launch. Because launch begins with the arrival of a launch vehicle at the gate, this section is now clarified to require reporting 60 days prior to flight. Section 415.79(b) regarding provision of the FAA's Launch Notification Form has also been clarified from the FAA's original proposal. The FAA files the Launch Notification Form with U.S. Space Command 15 days prior to flight. Accordingly, the form is now due at noon, Eastern Standard Time, 15 days prior to flight so that the FAA may provide the form to U.S. Space Command in a timely manner. The Federal Aviation Administration/ U.S. Space Command Launch Notification Form is provided in this notice. See Appendix A. Section 415.79(c) is now modified from what was proposed in the NPRM to add a requirement for immediate notification of any mishap involving a fatality or serious injury.

Section 415.81, which replaces former section 415.10, contains requirements for registration of space objects, including a new provision that a

licensee need not provide registration information concerning objects owned and registered by the government of the United States. The former version of this requirement provided that a licensee need not provide registration information for objects it placed in space that were owned by a foreign entity. The new provision contains the same proviso. It has, however, come to the attention of the FAA that this requires clarification. The Act requires that a foreign entity controlled by a U.S. citizen which launches outside the territory of any nation obtain an FAA license to launch. 49 U.S.C. 70104(a)(3). Applying these principles to an actual case, the FAA found that Sea Launch, a Cayman Islands partnership, which intends to launch from international waters, required a launch license on account of the control Boeing Commercial Space Company, a U.S. company, exercised over the partnership. 49 U.S.C. 70104(a)(3), 70102(1)(C); 14 CFR 401.5. Because Sea Launch is a U.S. citizen for licensing purposes, the FAA requires data pertinent to registration for Sea Launch's upper stage.

Section 415.83 requires a licensee to comply with financial responsibility requirements as specified in a license or license order.

Section 415.85 explains that a licensee is required to cooperate with the compliance monitoring responsibilities of the FAA.

Subpart F describes the FAA's safety review for a proposed launch from a launch site not operated by a federal launch range. The FAA will conduct a review on an individual, case by case basis until it issues regulations of general applicability. The FAA will take this opportunity to advise applicants to bear in mind that a case by case review still must conform to existing standards and precedent. For example, part of the reason that the FAA relies on federal launch range safety reviews is because of the testing and reviews the ranges conduct of a launch operator's flight safety system, which, in most cases, contain a flight termination system. Accordingly, when a federal launch range is not assessing the adequacy of a launch operator's flight safety system, it is incumbent upon the FAA to do so.

Subpart G incorporates the FAA's environmental review requirements, the former sections 415.31 and 415.33, which require the FAA to comply with applicable environmental laws and regulations, and state that an applicant must provide the FAA with the information required for doing so. The renumbering of these provisions represents no substantive change from

the current regulations. In response to the NPRM relocation proposal, the Environmental Protection Agency (EPA) commented that the environmental review process for licensing commercial launch activities should reference FAA Order 1050.1D. This change is incorporated here. Additionally, the EPA requested that section 415.101 reference other informal FAA guidance documents. The FAA notes that informal guidance documents are available, and will confer with a license applicant regarding the applicability of the guidance. The FAA also notes that the NPRM text omitted the proposed section revisions. They are now included in the regulatory text.

#### *Part 417—License To Operate a Launch Site*

Because the FAA is removing and reserving part 411, which contains section 411.3 regarding the operation of a launch site, the FAA now creates part 417 to govern licensing the operation of a launch site. The FAA will license the operation of a launch site on an individual, case by case basis until it issues regulations of general applicability. Until then, an applicant for a license to operate a launch site should refer to the FAA's draft guidelines and pre-application consultation for assistance. This part also now contains the requirements governing an environmental review for licensing the operation of a launch site previously located in 14 CFR 415.31–33.

#### **Paperwork Reduction Act**

Section 441 of this rule contains information collection requirements. In accordance with the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.*, the information collection requirements associated with this rule and titled, Commercial Space Transportation Licensing Regulations, were submitted to the Office of Management and Budget for review. The collection of information was approved and assigned OMB control number 2120–0608. Information collected includes: data to support both policy and payload reviews; evidence that supports launch safety requirements, and submitted environmental impact statement (EIS) materials. The required information will be used to determine if applicant proposals for conducting commercial space launches can be done in a safe manner as set forth in regulations and in the licenses and the license orders issued by the FAA. Comments received on the reporting requirements associated with this rule have been discussed earlier in the preamble. Respondents are license

applicants and licensees. The estimated number of respondents on an annual basis is six. The estimated annual burden is 2914 hours.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection of information is 2120-0608.

### Regulatory Evaluation Summary

This section summarizes the full regulatory evaluation prepared by the FAA that provides more detailed estimates of the economic consequences of this regulatory action. This summary and the full evaluation quantify, to the extent practicable, estimated costs to the private sector, consumers, Federal, State and local governments, as well as anticipated benefits. This evaluation was conducted in accordance with Executive Order 12866, which directs that each Federal agency can propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify the costs. This document also includes an initial regulatory flexibility determination, required by the Regulatory Flexibility Act of 1980, and an international trade impact assessment, required by the Office of Management and Budget. This rule is considered a significant regulatory action under section 3 (f) of Executive Order 12866 and, therefore, was reviewed by the Office of Management and Budget. The rule is considered significant under Department of Transportation Policies and Procedures, 44 FR 11034 (Feb. 26, 1979). In addition, for the reasons stated under the "Trade Impact Statement" and the "Regulatory Flexibility Determination," the FAA certifies that this rule will not have a significant economic impact on a substantial number of small entities.

### Economic Impacts

The Federal Aviation Administration (FAA) is modifying its commercial space licensing regulations to streamline its licensing process while continuing to ensure safety and continuing to preserve the flexibility required to address multiple launch technologies and associated issues. With this rulemaking, the FAA is clarifying its license application procedures, codifying its practice of issuing launch-specific licenses and launch operator licenses, increasing the duration of launch operator licenses from two years to five years, and defining the launch period so that the scope of a launch license is

narrower than it has been under current practice.

This rulemaking is expected to result in quantifiable cost savings compared to current practice because of the increased duration of the launch operator license. Increasing the duration of the launch operator license will decrease paperwork and administrative costs both to government and to industry.

The cost savings to industry over ten years resulting from the administrative and paperwork impacts are estimated to be \$305,000, undiscounted and \$185,000, discounted. These savings are primarily due to the fewer number of license renewal applications that are likely to be submitted. The cost savings reflect primarily the fewer number of hours necessary for both submitting the license applications to the FAA and for complying with the financial responsibility requirements when there are fewer licenses covering the same number of launches. No added costs from the paperwork and administrative impacts are expected.

The FAA is expected to receive some cost savings, as well, because of reduced paperwork and administrative costs that result from processing and issuing fewer applications and licenses. Cost savings to the FAA over ten years is estimated to be \$424,000, undiscounted and \$256,000, discounted. The FAA is expected to incur no costs resulting from the paperwork and administrative impacts. Over the ten-year time horizon of this analysis, the total cost savings to both industry and the FAA is expected to be approximately \$729,000, undiscounted and \$441,000, discounted.

There are numerous non-quantifiable impacts associated with this final rulemaking. The information coding requirements are expected to increase clarity to both industry and government. Probably more importantly, however, is the fact that firms will be better able to plan future operations because this rulemaking extends the time period of the launch operator license to five years.

The narrower scope of launch licenses under this rulemaking is expected to slightly increase the launch operator's risk of having to pay for any damages to third parties or government property. The activities that will no longer be covered under the narrower scope of the launch license are of low risk (such as ground activities prior to the arrival of the hazardous components of the launch vehicle). The higher burden of risk borne by the licensee should be considered low and inconsequential.

There is also a slightly lower risk to the U.S. Treasury that it will be called

upon to indemnify for third-party damages under the "indemnification" provisions of the statute, because the launch phase is now more limited. The change in risk to the U.S. Treasury is expected to be minimal. This risk has not been quantified.

### Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principal, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis (RFA) as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 act provides that the head of the agency must so certify and an RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The FAA conducted the required review of this final rulemaking and determined that it would not have a significant economic impact on a substantial number of small entities. Accordingly, pursuant to the regulatory Flexibility Act, U.S.C. 605(b), the Federal Aviation Administration certifies that this rule will not have a significant economic impact on a substantial number of small entities.

### Potentially Affected Entities

The Small Business Administration has defined small business entities relating to space vehicles [SIC codes 3761, 3764, and 3769] as entities comprising fewer than 1000 employees. The potentially affected entities are Lockheed-Martin, Boeing, Orbital Sciences Corporation, Sea Launch, Beal Aerospace Technologies and Universal Space Lines, Lockheed-Martin, Boeing and Orbital Sciences Corporation all

have more than 1,000 employees and are therefore not small entities. Sea Launch is a partnership of various entities that includes Boeing and therefore would not be considered a small entity. Beal and Universal Space Lines each have under 1,000 employees and can therefore be considered small entities. According to an FAA forecast, Beal Aerospace Technologies will be issued a launch operator license in 2000 and Universal Space Lines will be issued a launch operator license in 2002.

This final rulemaking will result in a cost savings to the launch operator. It primarily results from renewing a license every five years instead of two years. To calculate the annualized cost savings, the FAA discounted the costs or cost savings for the appropriate year. The net total cost savings for Beal Aerospace is \$13,204 and the net total cost savings for Universal Space Lines is \$8,442. The net total cost savings for the period 1999–2008 is then annualized by multiplying the net total cost savings for each of the affected firms by the 10 year, 7 percent annualization factor (.142378). The FAA estimates that the annualized cost savings for Beal Aerospace is \$1,880 ( $\$13,204 \times .142378 = \$1,880$ ) and the annualized cost savings for Universal Space Lines is \$1,202 ( $\$8,442 \times .142378 = \$1,202$ ).

The FAA has little financial information to calculate whether the projected cost savings represents a significant amount to these two firms. However, according to the Beal Aerospace website, over 70 people currently work for Beal Aerospace. They project that the firm will grow to more than 200 people over the next ten years. Moreover, the same source states that: "Beal Aerospace is fully financed, up to \$250M." The FAA concludes that the annualized cost savings of \$1,880 does not represent a significant amount for this firm. Even less information is available on Universal Space Lines. However, one article quotes John Grady, Universal's chief financial officer by stating that: "Initially the company will hire about 40 people—mostly in technological and engineering positions. In three years, employment is expected to rise to 100." The same article states that: "The initial plan is to manufacture low-cost, two-stage orbital launch vehicles capable of launching 3,000-pound and greater satellite payloads." If 40 people each hypothetically earned \$50,000 annually, then the annual cost to employ these individuals would be at least \$2 million. Comparing the hypothetical annual cost of employing these individuals against the net cost savings of this final rulemaking, the

FAA again concludes that the annualized cost savings of \$1,202 does not represent a significant amount for this firm.

#### International Trade Impact Assessment

This final rulemaking will not constitute a barrier to international trade. This rulemaking affects launch activities located within the United States and launch activities abroad that have substantial U.S. involvement. In fact, if the anticipated cost savings result and are passed along to launch service customers in the form of reduced prices, it is possible that the international competitiveness of U.S. commercial launch services will be enhanced.

#### Federalism Implications

The regulations herein will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

#### Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (the UMRA), enacted as Pub. L. 104-4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that will impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of \$100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice

to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This final rule does not contain a Federal intergovernmental or private sector mandate that exceeds \$100 million a year. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

#### List of Subjects

##### 14 CFR Part 411

Space transportation and exploration.

##### 14 CFR Part 413

Confidential business information, Space transportation and exploration.

##### 14 CFR Part 415

Aviation safety, Environmental protection, Space transportation and exploration.

##### 14 CFR Part 417

Environmental protections, Reporting and recordkeeping requirements, Rockets, Space transportation and exploration.

#### The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends Chapter III of Title 14 of the Code of Federal Regulations as follows:

#### SUBCHAPTER A—GENERAL

#### PART 401—ORGANIZATION AND DEFINITIONS

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

Authority: 49 U.S.C. 70102.

2. Section 401.5 is revised to read as follows:

##### § 401.5 Definitions.

As used in this chapter—  
*Act* means 49 U.S.C. Subtitle IX, Commercial Space Transportation, ch. 701—Commercial Space Launch Activities, 49 U.S.C. 70101–70121.  
*Amateur rocket activities* means 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—i.e., gross weight in pounds divided by frontal area of rocket vehicle—less than 12 pounds per square inch.

*Associate Administrator* means the Associate Administrator for Commercial Space Transportation, Federal Aviation

Administration, or any person designated by the Associate Administrator to exercise the authority or discharge the responsibilities of the Associate Administrator.

*Federal launch range* means a launch site, from which launches routinely take place, that is owned and operated by the government of the United States.

*Hazardous materials* means hazardous materials as defined in 49 CFR 172.101.

*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 activities involved in the preparation of a launch vehicle for flight, when those activities take place at a launch site in the United States. The term launch includes the flight of a launch vehicle and pre-flight ground operations beginning with the arrival of a launch vehicle or payload at a U.S. launch site. Flight ends after the licensee's last exercise of control over its launch vehicle.

*Launch accident* means an unplanned event occurring during the flight of a launch vehicle resulting in the known impact of a launch vehicle, its payload or any component thereof outside designated impact limit lines; or a fatality or serious injury (as defined in 49 CFR 830.2) to any person who is not associated with the flight; or any damage estimated to exceed \$25,000 to property not associated with the flight that is not located at the launch site or designated recovery area.

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

*Launch operator* means a person who conducts or who will conduct the launch of a launch vehicle and any payload.

*Launch site* means the location on Earth from which a launch takes place (as defined in a license the Secretary issues or transfers under this chapter) and necessary facilities at that location.

*Launch vehicle* means a vehicle built to operate in, or place a payload in, outer space or a suborbital rocket.

*Mishap* means a launch accident, a launch incident, failure to complete a launch as planned, or an unplanned event or series of events resulting in a fatality or serious injury (as defined in 49 CFR 830.2) or resulting in greater than \$25,000 worth of damage to a payload, a launch vehicle, a launch

support facility or government property located on the launch site.

*Operation of a launch site* means the conduct of approved safety operations at a permanent site to support the launching of vehicles and payloads.

*Payload* means an object that a person undertakes to place in outer space by means of a launch vehicle, including components of the vehicle specifically designed or adapted for that object.

*Person* means an individual or an entity organized or existing under the laws of a state or country.

*State and United States* when used in a geographical sense, mean the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, The United States Virgin Islands, Guam, and any other commonwealth, territory, or possession of the United States; and

*United States citizen* means:

(1) Any individual who is a citizen of the United States;

(2) Any corporation, partnership, joint venture, association, or other entity organized or existing under the laws of the United States or any State; and

(3) Any corporation, partnership, joint venture, association, or other entity which is organized or exists under the laws of a foreign nation, if the controlling interest in such entity is held by an individual or entity described in paragraph (1) or (2) of this definition.

*Controlling interest* means ownership of an amount of equity in such entity sufficient to direct management of the entity or to void transactions entered into by management. Ownership of at least fifty-one percent of the equity in an entity by persons described in paragraph (1) or (2) of this definition creates a rebuttable presumption that such interest is controlling.

#### SUBCHAPTER C—LICENSING

##### PART 411—[REMOVED AND RESERVED]

3. Part 411 is removed and reserved.

4. Part 413 is revised to read as follows:

##### PART 413—LICENSE APPLICATION PROCEDURES.

Sec.

413.1 Scope.

413.3 Who must obtain a license.

413.5 Pre-application consultation.

413.7 Application.

413.9 Confidentiality.

413.11 Acceptance of an application.

413.13 Complete application.

413.15 Review period.

413.17 Continuing accuracy of application; supplemental information; amendment.

413.19 Issuance of a license.

413.21 Denial of a license application.

413.23 License renewal.

**Authority:** 49 U.S.C. 70101-70121.

#### § 413.1 Scope.

This part prescribes the procedures applicable to all applications submitted under this chapter to conduct licensed activities. These procedures apply to applications for issuance of a license, transfer of an existing license and renewal of an existing license. More specific requirements applicable to obtaining a launch license or a license to operate a launch site are contained in parts 415 and 417 of this chapter, respectively.

#### § 413.3 Who must obtain a license.

(a) Any person must obtain a license to launch a launch vehicle from the United States or a license to operate a launch site within the United States.

(b) An individual who is a United States citizen or an entity organized or existing under the laws of the United States or any state must obtain a license to launch a launch vehicle outside of the United States or a license to operate a launch site outside of the United States.

(c) A foreign entity in which a United States citizen has a controlling interest, as defined in section 401.5 of this chapter, must obtain a launch license to launch a launch vehicle from or a license to operate a launch site within—

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

#### § 413.5 Pre-application consultation.

A prospective applicant shall consult with the FAA before submitting an application to discuss the application process and potential issues relevant to the FAA's licensing decision. Early consultation enables an applicant to identify potential licensing issues at the planning stage when changes to a license application or to proposed licensed activities are less likely to result in significant delay or costs to the applicant.

#### § 413.7 Application.

(a) *Form.* An application must be in writing, in English and filed in

duplicate with the Federal Aviation Administration, Associate Administrator for Commercial Space Transportation, AST-200, Room 331, 800 Independence Avenue, S.W., Washington, D.C. 20591. Attention: Licensing and Safety Division, Application Review.

(b) *Administrative information.* An application must identify the following:

- (1) The name and address of the applicant;
- (2) The name, address, and telephone number of any person to whom inquiries and correspondence should be directed; and
- (3) The type of license for which the applicant is applying.

(c) *Signature and certification of accuracy.* An application must be legibly signed, dated, and certified as true, complete, and accurate by one of the following:

- (1) *For a corporation:* An officer authorized to act for the corporation in licensing matters.
- (2) *For a partnership or a sole proprietorship:* A general partner or proprietor, respectively.
- (3) *For a joint venture, association, or other entity:* An officer or other individual duly authorized to act for the joint venture, association, or other entity in licensing matters.

#### **§ 413.9 Confidentiality.**

(a) Any person furnishing information or data to the FAA may request in writing that trade secrets or proprietary commercial or financial data be treated as confidential. The request must be made at the time the information or data is submitted, and state the period of time for which confidential treatment is desired.

(b) Information or data for which any person or agency requests confidentiality must be clearly marked with an identifying legend, such as "Proprietary Information," "Proprietary Commercial Information," "Trade Secret," or "Confidential Treatment Requested." Where this marking proves impracticable, a cover sheet containing the identifying legend must be securely attached to the compilation of information or data for which confidential treatment is requested.

(c) If a person requests that previously submitted information or data be treated confidentially, the FAA will do so to the extent practicable in light of any prior distribution of the information or data.

(d) Information or data for which confidential treatment has been requested or information or data that qualifies for exemption under section 552(b)(4) of Title 5, United States Code, will not be disclosed to the public

unless the Associate Administrator determines that the withholding of the information or data is contrary to the public or national interest.

#### **§ 413.11 Acceptance of an application.**

The FAA will initially screen an application to determine whether the application is sufficiently complete to enable the FAA to initiate the reviews or evaluations required under any applicable part of this chapter. After completion of the initial screening, the FAA notifies the applicant, in writing, of one of the following:

- (a) The application is accepted and the FAA will initiate the reviews or evaluations required for a licensing determination under this chapter; or
- (b) The application is so incomplete or indefinite as to make initiation of the reviews or evaluations required for a licensing determination under this chapter inappropriate, and the application is rejected. The notice will state the reason(s) for rejection and corrective actions necessary for the application to be accepted. The FAA may return a rejected application to the applicant or may hold it pending additional submissions by the applicant.

#### **§ 413.13 Complete application.**

Acceptance by the FAA of an application does not constitute a determination that the application is complete. If, in addition to the information required by the applicable parts of 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 activity, an applicant shall submit the additional information required to show compliance with this chapter.

#### **§ 413.15 Review period.**

(a) *180-day review.* Unless otherwise specified in this chapter, the FAA reviews and makes a determination on a license application within 180 days of receipt of an accepted 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 determination, or an issue exists that would affect a licensing determination, the FAA notifies the applicant, in writing, and informs the applicant of any information required to complete the application. If further review is impracticable, the 180-day review period shall be tolled pending receipt by the FAA of the requested information.

(c) *120-day notice.* If the FAA has not made a licensing determination within 120 days of receipt of an accepted application, the FAA informs the applicant, in writing, of any outstanding information needed to complete the reviews or evaluations required by this chapter for a licensing determination, or of any pending issues that would affect the licensing determination.

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

(a) An applicant is responsible for the continuing accuracy and completeness of information furnished to the FAA as part of a pending license application. If at any time information provided by an applicant as part of a license application is no longer accurate and complete in all material respects, the applicant shall submit a statement furnishing the new or corrected information. As part of its submission, the applicant shall recertify the accuracy and completeness of the application in accordance with section 413.7. An applicant's failure to comply with any of the requirements set forth in this paragraph is a sufficient basis for denial of a license application.

(b) An applicant may amend or supplement a license application at any time prior to issuance or transfer of a license.

(c) Willful false statements made in any application or document relating to an application or license 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.

#### **§ 413.19 Issuance of a license.**

After the FAA completes its reviews and makes the approvals and determinations required by this chapter for a license, the FAA issues a license to an applicant in accordance with this chapter.

#### **§ 413.21 Denial of a license application.**

(a) The FAA informs a license applicant, in writing, if its application has been denied and states the reasons for denial.

(b) An applicant whose license application is denied may either:

- (1) Attempt to correct any deficiencies identified by the FAA and request reconsideration of the revised application. The FAA has 60 days or the number of days remaining in the 180-day review period, whichever is greater, within which to reconsider its licensing determination; or

- (2) Request a hearing in accordance with part 406 of this chapter, for the

purpose of showing why the application should not be denied.

(c) An applicant whose license application is denied after reconsideration under paragraph (b)(1) of this section may request a hearing in accordance with paragraph (b)(2) of this section.

#### § 413.23 License renewal.

(a) *Eligibility.* A licensee may apply to renew its license by submitting to the FAA a written application for renewal of the license at least 90 days before the expiration date of the license.

##### (b) *Application.*

(1) A license renewal application shall 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 any modification to that license.

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

(c) *Review of application.* The FAA conducts the reviews required under this chapter for a license to determine whether the applicant's license may be renewed for an additional term. The FAA may incorporate by reference any findings that are part of the record for the expiring license.

(d) *Grant of license renewal.* After completion by the FAA of the reviews required by this chapter for a license and issuance of the requisite approvals and determinations, the FAA issues an order amending the expiration date of the license. 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 renewal.* The FAA informs a licensee, in writing, if the licensee's application for renewal has been denied and states the reasons for denial. A licensee whose application for renewal is denied may follow the procedures set forth in section 413.21 of this part.

5. Part 415 is revised to read as follows:

## PART 415—LAUNCH LICENSE

### Subpart A—General

Sec.

- 415.1 Scope.
- 415.3 Types of launch licenses.
- 415.5 Policy and safety approvals.
- 415.7 Payload determination.
- 415.9 Issuance of a launch license.

- 415.11 Additional license terms and conditions.
- 415.13 Transfer of a launch license.
- 415.15 Rights not conferred by launch license.
- 415.16–415.20 [Reserved]

### Subpart B—Policy Review and Approval

- 415.21 General.
- 415.23 Policy review.
- 415.25 Application requirements for policy review.
- 415.27 Denial of policy approval.
- 415.28–415.30 [Reserved]

### Subpart C—Safety Review and Approval for Launch From a Federal Launch Range

- 415.31 General.
- 415.33 Safety organization.
- 415.35 Acceptable flight risk.
- 415.37 Flight readiness and communications plan.
- 415.39 Safety at end of launch.
- 415.41 Accident investigation plan.
- 415.43 Denial of safety approval.
- 415.44–415.50 [Reserved]

### Subpart D—Payload Review and Determination

- 415.51 General.
- 415.53 Payloads not subject to review.
- 415.55 Classes of payloads.
- 415.57 Payload review.
- 415.59 Information requirements for payload review.
- 415.61 Issuance of payload determination.
- 415.63 Incorporation of payload determination in license application.
- 415.64–415.70 [Reserved]

### Subpart E—Post-Licensing Requirements—Launch License Terms and Conditions

- 415.71 Public safety responsibility.
- 415.73 Continuing accuracy of license application; application for modification of license.
- 415.75 Agreement(s) with federal launch range.
- 415.77 Records.
- 415.79 Launch reporting requirements.
- 415.81 Registration of space objects.
- 415.83 Financial responsibility requirements.
- 415.85 Compliance monitoring.
- 415.86–415.90 [Reserved]

### Subpart F—Safety Review and Approval for Launch From a Launch Site not Operated by a Federal Launch Range

- 415.91 General.
- 415.93 Denial of safety approval.
- 415.94–415.100 [Reserved]

### Subpart G—Environmental Review

- 415.101 General
- 415.103 Environmental information

**Appendix A to Part 415—FAA/USSPACECOM Launch Notification Form**  
Authority: 49 U.S.C. 70101–70121.

### Subpart A—General

#### § 415.1 Scope.

This part prescribes requirements for obtaining a launch license and post-licensing requirements with which a

licensee shall comply to remain licensed. Requirements for preparing a license application are contained in part 413 of this subchapter.

#### § 415.3 Types of launch licenses.

(a) *Launch-specific license.* A launch-specific license authorizes a licensee to conduct one or more launches, having the same launch parameters, of one type of launch vehicle from one launch site. The license identifies, by name or mission, each launch authorized under the license. A licensee's authorization to launch terminates upon completion of all launches authorized by the license or the expiration date stated in the license, whichever occurs first.

(b) *Launch operator license.* A launch operator license authorizes a licensee to conduct launches from one launch site, within a range of launch parameters, of launch vehicles from the same family of vehicles transporting specified classes of payloads. A launch operator license remains in effect for five years from the date of issuance.

#### § 415.5 Policy and safety approvals.

To obtain a launch license, an applicant must obtain policy and safety approvals from the FAA. Requirements for obtaining these approvals are contained in subparts B, C and F of this part. Only a launch license applicant may apply for the approvals, and may apply for either approval separately and in advance of submitting a complete license application, using the application procedures contained in part 413 of this subchapter.

#### § 415.7 Payload determination.

A payload determination is required for a launch license unless the proposed payload is exempt from payload review under § 415.53 of this part. The FAA conducts a payload review, as described in subpart D of this part, to make the determination. Either a launch license applicant or a payload owner or operator may request a review of its proposed payload using the application procedures contained in part 413 of this subchapter. Upon receipt of an application, the FAA may conduct a payload review independently of a launch license application.

#### § 415.9 Issuance of a launch license.

(a) The FAA issues a launch license to an applicant who has obtained all approvals and determinations required under this chapter for a license.

(b) A launch license authorizes a licensee to conduct a launch or launches in accordance with the representations contained in the licensee's application, subject to the

licensee's compliance with terms and conditions contained in license orders accompanying the license, including financial responsibility requirements.

**§ 415.11 Additional license terms and conditions.**

The FAA may modify a launch license at any time by modifying or adding license terms and conditions to ensure compliance with the Act and regulations.

**§ 415.13 Transfer of a launch license.**

(a) Only the FAA may transfer a launch license.

(b) An applicant for transfer of a launch license shall submit a license application in accordance with part 413 of this subchapter and shall meet the requirements of part 415 of this subchapter. The FAA will transfer a license to an applicant who has obtained all of the approvals and determinations required under this chapter for a license. In conducting its reviews and issuing approvals and determinations, the FAA may incorporate by reference any findings made part of the record to support the initial licensing determination. The FAA may modify a license to reflect any changes necessary as a result of a license transfer.

**§ 415.15 Rights not conferred by launch license.**

Issuance of a launch license does not relieve a licensee of its obligation to comply with all applicable requirements of law or regulation that may apply to its activities, nor does issuance confer any proprietary, property or exclusive right in the use of any federal launch range or related facilities, airspace, or outer space.

**§§ 415.16–415.20 [Reserved]**

**Subpart B—Policy Review and Approval**

**§ 415.21 General.**

The FAA issues a policy approval to a license applicant unless the FAA determines that a proposed launch would jeopardize U.S. national security or foreign policy interests, or international obligations of the United States. A policy approval is part of the licensing record on which the FAA's licensing determination is based.

**§ 415.23 Policy review.**

(a) The FAA reviews a license application to determine whether it presents any issues affecting U.S. national security or foreign policy interests, or international obligations of the United States.

(b) Interagency consultation.

(1) The FAA consults with the Department of Defense to determine whether a license application presents any issues affecting U.S. national security.

(2) The FAA consults with the Department of State to determine whether a license application presents any issues affecting U.S. foreign policy interests or international obligations.

(3) The FAA consults with other federal agencies, including the National Aeronautics and Space Administration, authorized to address issues identified under paragraph (a) of this section, associated with an applicant's launch proposal.

(c) The FAA advises an applicant, in writing, of any issue raised during a policy review that would impede issuance of a policy approval. The applicant may respond, in writing, or revise its license application.

**§ 415.25 Application requirements for policy review.**

In its launch license application, an applicant shall—

(a) Identify the model and configuration of any launch vehicle proposed for launch by the applicant.

(b) Identify structural, pneumatic, propellant, propulsion, electrical and avionics systems used in the launch vehicle and all propellants.

(c) Identify 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.

(d) Identify proposed launch vehicle flight profile(s), including:

(1) Launch site;

(2) Flight azimuths, trajectories, and associated ground tracks and instantaneous impact points;

(3) Sequence of planned events or maneuvers during flight;

(4) Range of nominal impact areas for all spent motors and other discarded mission hardware, within three standard deviations of the mean impact point (a 3-sigma footprint); and

(5) For each orbital mission, the range of intermediate and final orbits of each vehicle upper stage, and their estimated orbital lifetimes.

**§ 415.27 Denial of policy approval.**

The FAA notifies an applicant, in writing, if it has denied policy approval for a license application. The notice

states the reasons for the FAA's determination. The applicant may respond to the reasons for the determination and request reconsideration.

**§§ 415.28–415.30 [Reserved]**

**Subpart C—Safety Review and Approval for Launch From a Federal Launch Range**

**§ 415.31 General.**

(a) The FAA conducts a safety review to determine whether an applicant is capable of launching a launch vehicle and its payload without jeopardizing public health and safety and safety of property. The FAA issues a safety approval to a license applicant proposing to launch from a federal launch range if the applicant satisfies the requirements of this subpart and has contracted with the federal launch range for the provision of safety-related launch services and property, as long as those launch services and the proposed use of launch property are within the federal launch range's experience. The FAA evaluates on an individual basis all other safety-related launch services and property associated with an applicant's proposal. A safety approval is part of the licensing record on which the FAA's licensing determination is based.

(b) The FAA advises an applicant, in writing, of any issue raised during a safety review that would impede issuance of a safety approval. The applicant may respond, in writing, or revise its license application.

**§ 415.33 Safety organization.**

(a) An applicant shall maintain a safety organization and document it by identifying lines of communication and approval authority for all launch safety decisions. Lines of communication, both within the applicant's organization and between the applicant and any federal launch range providing launch services, shall be employed to ensure that personnel perform launch safety operations in accordance with range safety requirements and with plans and procedures required by this subpart. Approval authority shall be employed to ensure compliance with range safety requirements and with plans and procedures required by this subpart.

(b) *Safety official.* An applicant shall identify by name, title, and qualifications, a qualified safety official authorized to examine all aspects of the applicant's launch safety operations and to monitor independently personnel compliance with the applicant's safety policies and procedures. The safety official shall report directly to the person responsible for an applicant's

licensed launches, who shall ensure that all of the safety official's concerns are addressed prior to launch.

#### § 415.35 Acceptable flight risk.

(a) *Flight risk through orbital insertion or impact.* Acceptable flight risk through orbital insertion for an orbital launch vehicle, and through impact for a suborbital launch vehicle, is measured in terms of the expected average number of casualties ( $E_c$ ) to the collective members of the public exposed to debris hazards from any one launch. To obtain safety approval, an applicant shall demonstrate that the risk level associated with debris from an applicant's proposed launch shall not exceed an expected average number of 0.00003 casualties per launch ( $E_c \leq 30 \times 10^{-6}$ ).

(b) *Hazard identification and risk assessment.* To demonstrate compliance with this section, an applicant shall submit an analysis that identifies hazards and assesses risks to public health and safety and safety of property associated with nominal and non-nominal flight under its launch proposal.

(c) A launch vehicle shall be designed to ensure that flight risks meet the criteria set forth in this section. An applicant shall identify and describe the following:

- (1) Launch vehicle structure, including physical dimensions and weight;
- (2) Hazardous and safety critical systems, including propulsion systems; and
- (3) Drawings and schematics for each system identified under paragraph (c)(2) of this section.

(d) A launch vehicle shall be operated in a manner that ensures that flight risks meet the criteria set forth in this section. An applicant shall identify all launch operations and procedures that must be performed to ensure acceptable flight risks.

#### § 415.37 Flight readiness and communications plan.

(a) *Flight readiness requirements.* An applicant shall designate an individual responsible for flight readiness. The applicant shall submit the following procedures for verifying readiness for safe flight:

- (1) Launch readiness review procedures involving the applicant's flight safety personnel and federal launch range personnel involved in the launch. The procedures shall ensure a launch readiness review is conducted during which the individual designated under paragraph (a) of this section is provided with the following information

to make a judgement as to flight readiness:

- (i) Flight-readiness of safety-related launch property and services to be provided by a federal launch range;
- (ii) Flight-readiness of launch vehicle and payload;
- (iii) Flight-readiness of flight safety systems;
- (iv) Mission rules and launch constraints;
- (v) Abort, hold and recycle procedures;
- (vi) Results of dress rehearsals and simulations conducted in accordance with paragraph (a)(4) of this section;
- (vii) Unresolved safety issues as of the launch readiness review and plans for addressing and resolving them; and
- (viii) Any additional safety information required by the individual designated under paragraph (a) of this section to determine flight readiness.

(2) Procedures that ensure mission constraints, rules and abort procedures are listed and consolidated in a safety directive or notebook approved by licensee flight safety and federal launch range personnel;

(3) Procedures that ensure currency and consistency of licensee and federal launch range countdown checklists;

(4) Dress rehearsal procedures that—

- (i) Ensure crew readiness under nominal and non-nominal flight conditions;
- (ii) Contain criteria for determining whether to dispense with one or more dress rehearsals; and
- (iii) Verify currency and consistency of licensee and federal launch range countdown checklists.

(5) Procedures for ensuring the licensee's flight safety personnel adhere to federal launch range crew rest rules.

(b) *Communications plan requirements.* An applicant shall submit a communications plan providing licensee and federal launch range personnel communications procedures during countdown and flight. Effective issuance and communication of safety-critical information during countdown shall include hold/resume, go/no go and abort commands by licensee and federal launch range personnel during countdown. The communications plan shall describe the authority of licensee and federal launch range personnel, by individual or position title, to issue these commands. The communications plan shall also ensure that—

- (1) Communication networks are assigned so that personnel identified under paragraph (b) of this section have direct access to real-time safety-critical information required for issuing hold/resume, go/no go and abort decisions and commands;

(2) Personnel identified under paragraph (b) of this section monitor common intercom channel(s) during countdown and flight; and

(3) A protocol is established for utilizing defined radio telephone communications terminology.

(c) An applicant shall submit procedures that ensure that licensee and federal launch range personnel receive a copy of the communications plan required by paragraph (b) of this section, and that the federal launch range concurs in the communications plan.

#### § 415.39 Safety at end of launch.

To obtain safety approval, an applicant must demonstrate for any proposed launch that for all launch vehicle stages or components that reach earth orbit—

(a) There will be no unplanned physical contact between the vehicle or its components and the payload after payload separation;

(b) Debris generation will not result from the conversion of energy sources into energy that fragments the vehicle or its components. Energy sources include chemical, pressure, and kinetic energy; and

(c) Stored energy will be removed by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy. Other equivalent procedures may be approved in the course of the licensing process.

#### § 415.41 Accident investigation plan.

(a) An applicant shall submit an accident investigation plan (AIP) containing the applicant's procedures for reporting and responding to launch accidents, launch incidents, or other mishaps, as defined in § 401.5 of this chapter. The AIP shall be signed by an individual authorized to sign and certify the application in accordance with § 413.7(c) of this chapter, and the safety official designated under § 415.33(b) of this subpart.

(b) *Reporting requirements.* An AIP shall provide for—

(1) Immediate notification to the Federal Aviation Administration (FAA) Washington Operations Center in case of a launch accident, a launch incident or a mishap that involves a fatality or serious injury (as defined in 49 CFR § 830.2).

(2) Notification within 24 hours to the Associate Administrator for Commercial Space Transportation or the Federal Aviation Administration (FAA) Washington Operations Center in the event of a mishap, other than those in

§ 415.41 (b) (1), that does not involve a fatality or serious injury (as defined in 49 CFR 830.2).

(3) Submission of a written preliminary report to the FAA, Associate Administrator for Commercial Space Transportation, in the event of a launch accident or launch incident, as defined in § 401.5 of this chapter, within five days of the event. The report shall identify the event as either a launch accident or launch incident, and shall include the following information:

- (i) Date and time of occurrence;
- (ii) Description of event;
- (iii) Location of launch;
- (iv) Launch vehicle;
- (v) Any payload;
- (vi) Vehicle impact points outside designated impact lines, if applicable;
- (vii) Number and general description of any injuries;
- (viii) Property damage, if any, and an estimate of its value;
- (ix) Identification of hazardous materials, as defined in § 401.5 of this chapter, involved in the event, whether on the launch vehicle, payload, or on the ground;
- (x) Action taken by any person to contain the consequences of the event; and
- (xi) Weather conditions at the time of the event.

(c) *Response plan.* An AIP shall contain procedures that—

- (1) Ensure the consequences of a launch accident, launch incident or other mishap are contained and minimized;
- (2) Ensure data and physical evidence is preserved;
- (3) Require the licensee to 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
- (4) Require the licensee to identify and adopt preventive measures for avoiding recurrence of the event.

(d) *Investigation plan.* An AIP shall contain—

- (1) Procedures for investigating the cause of a launch accident, launch incident or other mishap;
- (2) Procedures for reporting investigation results to the FAA; and
- (3) Delineated responsibilities, including reporting responsibilities for personnel assigned to conduct investigations and for any one retained by the licensee to conduct or participate in investigations.

#### § 415.43 Denial of safety approval.

The FAA notifies an applicant, in writing, if it has denied safety approval for a license application. The notice

states the reasons for the FAA's determination. The applicant may respond to the reasons for the determination and request reconsideration.

#### §§ 415.44–415.50 [Reserved]

### Subpart D—Payload Review and Determination

#### § 415.51 General.

The FAA reviews a payload proposed for launch to determine whether a license applicant or payload owner or operator has obtained all required licenses, authorization, and permits, unless the payload is exempt from review under § 415.53 of this subpart. If not otherwise exempt, the FAA reviews a payload proposed for launch to determine whether its launch would jeopardize public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States. A payload determination is part of the licensing record on which the FAA's licensing determination is based.

#### § 415.53 Payloads not subject to review.

The FAA does not review payloads that are—

- (a) Subject to regulation by the Federal Communications Commission (FCC) or the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA); or
- (b) Owned or operated by the U.S. Government.

#### § 415.55 Classes of payloads.

The FAA may review and issue findings regarding a proposed class of payload, e.g., communications, remote sensing or navigation. However, each payload is subject to compliance monitoring by the FAA before launch to determine whether its launch would jeopardize public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States. The licensee is responsible for providing current information, in accordance with § 415.79(a), regarding a payload proposed for launch not later than 60 days before a scheduled launch.

#### § 415.57 Payload review.

(a) *Timing.* A payload review may be conducted as part of a license application review or may be requested by a payload owner or operator in advance of or apart from a license application.

(b) *Interagency consultation.* The FAA consults with other agencies to determine whether launch of a proposed payload or payload class would present

any issues affecting public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States.

(1) The FAA consults with the Department of Defense to determine whether launch of a proposed payload or payload class would present any issues affecting U.S. national security.

(2) The FAA consults with the Department of State to determine whether launch of a proposed payload or payload class would present any issues affecting U.S. foreign policy interests or international obligations.

(3) The FAA consults with other federal agencies, including the National Aeronautics and Space Administration, authorized to address issues identified under paragraph (b) of this section associated with an applicant's launch proposal.

(c) The FAA advises a person requesting a payload determination, in writing, of any issue raised during a payload review that would impede issuance of a license to launch that payload or payload class. The person requesting payload review may respond, in writing, or revise its application.

#### § 415.59 Information requirements for payload review.

(a) A person requesting review of a particular payload or payload class shall identify the following:

- (1) Payload name;
- (2) Payload class;
- (3) Physical dimensions and weight of the payload;
- (4) Payload owner and operator, if different from the person requesting payload review;
- (5) Orbital parameters for parking, transfer and final orbits;
- (6) Hazardous materials, as defined in § 401.5 of this chapter, and radioactive materials, and the amounts of each;
- (7) Intended payload operations during the life of the payload; and
- (8) Delivery point in flight at which the payload will no longer be under the licensee's control.

(b) [Reserved]

#### § 415.61 Issuance of payload determination.

(a) The FAA issues a favorable payload determination unless it determines that launch of the proposed payload would jeopardize public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States. The FAA advises any person who has requested a payload review of its determination, in writing. The notice states the reasons for the

determination in the event of an unfavorable determination.

(b) Any person issued an unfavorable payload determination may respond to the reasons for the determination and request reconsideration.

**§ 415.63 Incorporation of payload determination in license application.**

A favorable payload determination issued for a payload or class of payload may be included by a license applicant as part of its application. However, any change in information provided under section 415.59 of this subpart must be reported in accordance with section 413.17 of this chapter. The FAA determines whether a favorable payload determination remains valid in light of reported changes and may conduct an additional payload review.

**§ 415.64–415.70 [Reserved]**

**Subpart E—Post-Licensing Requirements—Launch License Terms and Conditions**

**§ 415.71 Public safety responsibility.**

A launch licensee is responsible for ensuring the safe conduct of a licensed launch and for ensuring that public safety and safety of property are protected at all times during the conduct of a licensed launch.

**§ 415.73 Continuing accuracy of license application; application for modification of license.**

(a) A launch licensee is responsible for the continuing accuracy of representations contained in its application for the entire term of the license. A launch licensee must conduct a licensed launch and carry out launch safety procedures in accordance with its application. A licensee's failure to comply with the requirements of this paragraph is sufficient basis for suspension or revocation of a license.

(b) After a launch license has been issued, a licensee must apply to the FAA for modification of the license if:

(1) The launch licensee proposes to conduct a launch or carry out a launch safety procedure or operation in a manner that is not authorized by the license; or

(2) Any representation contained in the license application that is material to public health and safety or safety of property would no longer be accurate and complete or would not reflect the launch licensee's procedures governing the actual conduct of a launch. A change is material to public health and safety or safety of property if it alters or affects the licensee's launch plans or procedures submitted in accordance with subpart D of this part, class of

payload, orbital destination, type of launch vehicle, flight path, launch site, launch point, or any safety system, policy, procedure, requirement, criteria or standard.

(c) An application to modify a launch license shall be prepared and submitted in accordance with part 413 of this chapter. The launch licensee shall indicate any part of its license or license application that would be changed or affected by a proposed modification.

(d) The FAA reviews approvals and determinations required by this chapter to determine whether they remain valid in light of a proposed modification. The FAA approves a modification that satisfies the requirements set forth in this part.

(e) Upon approval of modification, the FAA issues either a written approval to the launch licensee or a license order modifying the license if a stated term or condition of the license is changed, added or deleted. A written approval has the full force and effect of a license order and is part of the licensing record.

**§ 415.75 Agreement(s) with federal launch range.**

Prior to conducting a licensed launch from a federal launch range, a launch licensee or applicant shall enter into an agreement with a federal launch range providing for access to and use of U.S. Government property and services required to support a licensed launch from the facility and for public safety related operations and support. The agreement shall be in effect for the conduct of any licensed launch. A launch licensee shall comply with any requirements of the agreement(s) that may affect public safety and safety of property during the conduct of a licensed launch, including flight safety procedures and requirements.

**§ 415.77 Records.**

(a) A launch licensee shall maintain all records necessary to verify that licensed launches are conducted in accordance with representations contained in the licensee's application. A launch licensee shall retain records for three years after completion of all launches conducted under the license.

(b) In the event of a launch accident or launch incident, as defined in § 405.1 of this chapter, a launch licensee shall preserve all records related to the event. Records shall be retained until completion of any federal investigation and until the FAA advises the licensee that the records need not be retained. The licensee shall make available to federal officials for inspection and copying all records required to be maintained under these regulations.

**§ 415.79 Launch reporting requirements.**

(a) Not later than 60 days before each flight conducted under a launch operator license, a licensee shall provide the FAA the following launch-specific information:

(1) Payload information contained in § 415.59 of this part;

(2) Flight information, including the launch vehicle, planned flight path, including staging and impact locations, and on-orbit activity of the launch vehicle including payload delivery point(s); and

(3) Mission specific launch waivers, approved or pending, from a federal launch range from which the launch will take place, that are unique to the launch and may affect public safety.

(b) Not later than noon, EST, 15 days before each licensed flight a licensee shall submit to the FAA a completed Federal Aviation Administration/U.S. Space Command (FAA/USSPACECOM) Launch Notification Form (OMB No. 2120-0608).

(c) A launch licensee shall report a launch accident, launch incident, or a mishap that involves a fatality or serious injury (as defined in 49 CFR 830.2) immediately to the Federal Aviation Administration (FAA) Washington Operations Center and provide a written preliminary report in the event of a launch accident or launch incident, in accordance with the accident investigation plan (AIP) submitted as part of its license application under § 415.41 of this part.

**§ 415.81 Registration of space objects.**

(a) To assist the U.S. Government in implementing Article IV of the 1975 Convention on Registration of Objects Launched into Outer Space, each licensee shall provide to the FAA the information required by paragraph (b) of this section for all objects placed in space by a licensed launch, including a launch vehicle and any components, except:

(1) Any object owned and registered by the U.S. Government; and

(2) Any object owned by a foreign entity.

(b) For each object that must be registered in accordance with this section, not later than thirty (30) days following the conduct of a licensed launch, a licensee shall submit the following information:

(1) The international designator of the space object(s);

(2) Date and location of launch;

(3) General function of the space object; and

(4) Final orbital parameters, including:

(i) Nodal period;

- (ii) Inclination;
- (iii) Apogee; and
- (iv) Perigee.

**§ 415.83 Financial responsibility requirements.**

A launch licensee shall comply with financial responsibility requirements specified in a license or license order.

**§ 415.85 Compliance monitoring.**

A launch licensee shall allow access by, and cooperate with, federal officers or employees or other individuals authorized by the FAA to observe any activities of the licensee, or of the licensee's contractors or subcontractors, associated with the conduct of a licensed launch.

**§ 415.86–415.90 [Reserved]**

**Subpart F—Safety Review and Approval for Launch From a Launch Site Not Operated by a Federal Launch Range**

**§ 415.91 General.**

The FAA evaluates on an individual basis the safety-related elements of an applicant's proposal to launch a launch vehicle from a launch site not operated by a federal launch range. The FAA issues a safety approval to a license

applicant proposing to launch from a launch site not operated by a federal launch range when the FAA determines that the launch demonstrates an equivalent level of safety to that provided by a launch from a federal launch range as set forth in subpart C of this part. A safety approval is part of the licensing record on which the FAA's licensing determination is based.

**§ 415.93 Denial of safety approval.**

The FAA notifies an applicant, in writing, if it has denied safety approval for a license application. The notice states the reasons for the FAA's determination. The applicant may respond to the reasons for the determination and request reconsideration.

**§§ 415.94–415.100 [Reserved]**

**Subpart G—Environmental Review**

**§ 415.101 General.**

An applicant shall provide the FAA with information for the FAA to analyze the environmental impacts associated with a proposed launch. The information provided by an applicant must be sufficient to enable the FAA to comply with the requirements of the

National Environment Policy Act, 42 U.S.C. 4321 *et seq.* (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR parts 1500–1508, and the FAA's Procedures for Considering Environmental Impacts, FAA Order 1050.1D.

**§ 415.103 Environmental information.**

An applicant shall submit environmental information concerning:

- (a) A proposed launch site not covered by existing environmental documentation;
- (b) A proposed launch vehicle with characteristics falling measurably outside the parameters of existing environmental documentation;
- (c) A proposed launch from an established launch site involving a vehicle with characteristics falling measurably outside the parameters of any existing environmental impact statement that applies to that site;
- (d) A proposed payload that may have significant environmental impacts in the event of a mishap; and
- (e) Other factors as determined by the FAA.

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Appendix A to Part 415—FAA/USSPACECOM Launch Notification Form

Form Approved OMB No. 2120-0608

 <small>U.S. Department of Transportation Federal Aviation Administration</small>	<h2 style="margin: 0;">FAA/USSPACECOM Launch Notification</h2>
1) Launch Site & Launch Date:	
2) Earliest and Latest possible Launch Time (GMT):	
3) List of objects to achieve orbit - to include payload description, Rocket bodies, and all other objects:	
4) Launch Booster, sustainer, and strap-on descriptions:	
5) Launch operator POC - to include name, address, & phone numbers:	
6) Orbital Parameters for all objects achieving orbit	
a) inertial launch azimuth at liftoff:	
b) inertial flight azimuth after liftoff:	
c) epoch time:	
d) nominal period (min):	
e) inclination (deg):	
f) eccentricity:	
g) semimajor axis (km):	
h) argument of perigee (deg):	
i) right ascension of ascending node (deg):	
j) mean anomaly (deg):	
k) start time of orbit (hh:mm:ss after launch):	
l) end time of orbit (hh:mm:ss after launch):	
7) Injection data	
a) injection point latitude (deg n or s) & longitude (deg e):	
b) inertial azimuth at injection point:	
c) height above earth (km):	

**FAA/USSPACECOM Launch Notification**

d) injection time (hh:mm:ss after liftoff):

8) Sequence of Events from liftoff to final injection. Give the times (hh:mm:ss after liftoff)  
a) separation of each motor:

b) ignition of each motor:

c) cutoff of each motor:

d) jettison of pieces:

e) maneuvers:

f) reorientations:

g) deorbit:

h) ejection of special packages or other experiments:

9) Optional - Schedule for events (not included in no. 8), such as ejection or experiments, maneuvering (unclassified missions), jettison of parts, extension of antenna and solar arrays, venting, spinning or despinning attitude changes, reorientation, or anything which may affect the orbital characteristics:

10) A brief narrative description of the mission:

11) Transmitting frequencies and power (required only if space surveillance is required), including device, band, power (watts), frequency (mhz), and emission scheduled by fixed program, command, or transponder tracking:

12) Orbital objects cataloging instructions (include all orbital objects listed in no. 3, including common name, international designation, and country:

6. Subchapter C of Chapter III, title 14, Code of Federal Regulations, is amended by adding a new part 417 to read as follows:

**PART 417—LICENSE TO OPERATE A LAUNCH SITE**

Sec.

417.101 General.

417.103 Issuance of a license to operate a launch site.

417.105 Environmental.

417.107 Environmental information.

Authority: 49 U.S.C. 70101–70121.

**§ 417.101 General.**

The FAA evaluates on an individual basis an applicant's proposal to operate a launch site.

**§ 417.103 Issuance of a license to operate a launch site.**

(a) The FAA issues a license to operate a launch site when it determines that an applicant's operation of the

launch site does not jeopardize public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States.

(b) A license to operate a launch site authorizes a licensee to operate a launch site in accordance with the representations contained in the licensee's application, subject to the licensee's compliance with terms and condition contained in any license order accompanying the license.

**§ 417.105 Environmental.**

An applicant shall provide the FAA with information for the FAA to analyze the environmental impacts associated with proposed operation of a launch site. The information provided by an applicant must be sufficient to enable the FAA to comply with the requirements of the National Environment Policy Act, 42 U.S.C. 4321

*et seq.* (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR Parts 1500–1508, and the FAA's Procedures for Considering Environmental Impacts, FAA Order 1050.1D.

**§ 417.107 Environmental information.**

An applicant shall submit environmental information concerning:

(a) A proposed launch site not covered by existing environmental documentation; and

(b) Other factors as determined by the FAA.

Issued in Washington, DC on April 13, 1999.

**Patricia G. Smith,**

*Associate Administrator for Commercial Space Transportation.*

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