U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable John Thune
Chairman, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

The Federal Aviation Administration, U.S. Air Force, and NASA have partnered together on launch safety at Federal ranges for over 15 years. As part of this partnership, the agencies jointly established a Common Standards Working Group in an effort to further improve efficiency, reduce unnecessary requirements and costs, resolve inconsistencies, and preclude unnecessary duplication among the agencies. The study finds that progress to date toward streamlining requirements at Federal ranges has been significant. The agencies look forward to continued work on this task as commercial activities at Federal launch ranges expand.

I have sent a similar letter to Ranking Member Nelson, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Committee on Transportation and Infrastructure; the House Armed Services Committee; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Bill Nelson
Ranking Member, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, DC 20510

Dear Senator Nelson:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Lamar Smith
Chairman, Committee on Science,
Space, and Technology
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Ranking Member Johnson, and to the Chairmen and Ranking Members of the House Committee on Transportation and Infrastructure; the House Armed Services Committee; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

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Michael P. Huerta
Administrator

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**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Eddie Bernice Johnson
Ranking Member, Committee on Science,
Space, and Technology
House of Representatives
Washington, DC 20515

Dear Congresswoman Johnson:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Chairman Smith, and to the Chairmen and Ranking Members of the House Committee on Transportation and Infrastructure; the House Armed Services Committee; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

Sincerely,

Michael P. Huerta
Administrator

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U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Bill Shuster
Chairman, Committee on Transportation
and Infrastructure
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Ranking Member DeFazio, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Armed Services Committee; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

Sincerely,

Michael P. Huerta
Administrator

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U.S. Department
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**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Peter DeFazio
Ranking Member, Committee on Transportation
and Infrastructure
House of Representatives
Washington, DC 20515

Dear Congressman DeFazio:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Chairman Shuster, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Armed Services Committee; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

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800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable John McCain
Chairman, Armed Services Committee
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Ranking Member Reed, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Committee on Transportation and Infrastructure; the House Armed Services Committee; and the Senate Committee on Commerce, Science, and Transportation.

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Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Jack Reed
Ranking Member, Armed Services Committee
United States Senate
Washington, DC 20510

Dear Senator Reed:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Chairman McCain, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Committee on Transportation and Infrastructure; the House Armed Services Committee; and the Senate Committee on Commerce, Science, and Transportation.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

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Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Mac Thornberry
Chairman, Armed Services Committee
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Ranking Member Smith, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Committee on Transportation and Infrastructure; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

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Administrator

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800 Independence Ave., S.W.
Washington, D.C. 20591

October 20, 2017

The Honorable Adam Smith
Ranking Member, Armed Services Committee
House of Representatives
Washington, DC 20515

Dear Congressman Smith:

I am pleased to submit the enclosed report on the Federal Aviation Administration's joint efforts with the Air Force and National Aeronautics and Space Administration to streamline safety requirements for commercial launches at Federal launch ranges, as required by Section 113 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90), and Section 1617 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92).

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I have sent a similar letter to Chairman Thornberry, and to the Chairmen and Ranking Members of the House Committee on Science, Space and Technology; the House Committee on Transportation and Infrastructure; the Senate Committee on Commerce, Science, and Transportation; and the Senate Armed Services Committee.

If I can be of further assistance, please contact me or Chris Brown, Assistant Administrator for Government and Industry Affairs, at 202-267-3277.

Sincerely,

Michael P. Huerta
Administrator

Enclosure

REPORT ON STREAMLINING OF COMMERCIAL SPACE LAUNCH ACTIVITIES

In reply to

Public Law No. 114-90, "U.S. Commercial Space Launch Competitiveness Act."

Title I, "Spurring Private Aerospace Competitiveness and Entrepreneurship."

Section 113, "Streamline Commercial Space Launch Activities."

August 2017

Lead Agency:
Department of Transportation

In Consultation with:
Department of Defense
National Aeronautics and Space Administration

Table of Contents

1.0 Executive Summary

For more than 15 years, the Federal Aviation Administration (FAA), U.S. Air Force (USAF), and National Aeronautics and Space Administration (NASA) have worked together in partnership for launch safety at Federal ranges. In that time, the nature and number of commercial operations at Federal ranges has changed substantially. Today commercial companies have agreements in place with the U.S. Government to use more than 260 U.S. Government facilities and 17 launch/landing pads. Additionally, the number of FAA-licensed launches from Federal ranges surpassed the number of Government launches for the first time in 2015. With industry growth expected to continue at a rapid pace, this report reviews past and current Government efforts to streamline Federal range requirements and identifies potential areas for improvement.

The FAA and the USAF codified their first set of common safety standards in the mid-2000s. These changes helped streamline safety requirements while retaining the respective authorities of each agency. Additionally, FAA, NASA, and the USAF jointly established the Common Standards Working Group (CSWG) in an effort to further improve efficiency, reduce unnecessary requirements and costs, resolve inconsistencies, and preclude unnecessary duplication among the agencies. The CSWG led to a stable framework of safety requirements and also had the added benefit of acting as a system of coordination and balancing for the agencies involved. For example, the FAA learned of changes to their counterparts' expected casualty risk requirement that exceeded FAA's, resulting in the FAA issuing waivers after extensive safety analyses on several occasions where a proposed launch exceeded FAA's requirements but met those of the other agencies. Additionally, this collaboration produced the FAA's launch site safety assessments (LSSAs), which allow commercial companies to comply with FAA site safety requirements by utilizing NASA or USAF facilities and practices the FAA has already evaluated as meeting or exceeding FAA requirements. The CSWG also created a Memorandum of Understanding (MOU) which allows launch operators to submit a single relief request to the FAA, NASA, and USAF, and receive a single Government response.

This report examines current issues around the development of NASA's Kennedy Space Center (KSC) in Florida as a multi-user spaceport, and the applicability of USAF safety requirements during Government or FAA-licensed operations there. Additionally, the report includes input received from three active commercial space companies and one state development agency that use Federal ranges, and also considers some preliminary steps that could be taken by the Government to further streamline range requirements and address industry concerns. The progress to date toward streamlining requirements at Federal ranges has been significant.

2.0 Report Requirement

Congress passed, and on November 25, 2015 the President signed into law, the U.S. Commercial Space Launch Competitiveness Act (CSLCA) (Public Law 114-90) and the National Defense Authorization Act for Fiscal Year 2016 (NDAA) (Public Law 114-92). In addition to amending Title 51 of the United States Code, the CSLCA requires FAA to develop a number of key reports on relevant commercial space matters. This report completes the requirement from CSLCA Section 113 and NDAA Section 1617, Streamline Commercial Space Launch Activities, which requires the following:

> *Not later than 180 days after the date of enactment of this Act, and annually thereafter until the Secretary of Transportation determines no outmoded or duplicative requirements or approvals of the Federal Government exist, the Secretary of Transportation, in consultation with the Secretary of Defense, the Administrator of the National Aeronautics and Space Administration, the commercial space sector, and the heads of other executive agencies, as appropriate, shall submit to the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, and the congressional defense committees a report that includes the following:*
>
> > *(A) A description of the process for the application for and approval of a permit or license under chapter 509 of title 51, United States Code, for the commercial launch of a launch vehicle or commercial reentry of a reentry vehicle, including the identification of—*
> >
> > *(i) any unique requirements for operating on a United States Government launch site, reentry site, or launch property and*
> >
> > *(ii) any inconsistent, outmoded, or duplicative requirements or approvals.*
> >
> > *(B) A description of current efforts, if any, to coordinate and work across executive agencies to define interagency processes and procedures for sharing information, avoiding duplication of effort, and resolving common agency requirements.*
> >
> > *(C) Recommendations for legislation that may further—*
> >
> > *(i) streamline requirements in order to improve efficiency, reduce unnecessary costs, resolve inconsistencies, remove duplication, and minimize unwarranted constraints; and*
> >
> > *(ii) consolidate or modify requirements across affected agencies into a single application set that satisfies the requirements identified in paragraph (1)(A).*

In addition to a discussion on the current streamlining efforts among the FAA, USAF and NASA as required by the CSLCA section 113 and NDAA section 1617, this report will discuss past accomplishments in streamlining for additional context and understanding.

3.0 Input from the Commercial Space Sector

The FAA requested input from the membership of the Operations Working Group of the FAA Commercial Space Transportation Advisory Committee (COMSTAC). FAA received input from three commercial space companies in the timeframe required for this report, in addition to a letter from Space Florida.[1]

In summary, Space Florida and the three companies that responded all believe there are areas where Federal range requirements can be streamlined. Issues with inconsistent property use procedures were identified, along with uncertainties about which agency has the lead role for public safety when two sets of requirements seem to apply. The scenario of a vehicle landing at Vandenberg Air Force Base (VAFB) requiring an FAA reentry license in addition to compliance with Air Force Space Command Manual (AFSPCMAN) 91-710 was noted as an example. Additional areas for improvement included updating the FAA's expected casualty, aggregate risk, and cross-waiver requirements with respect to customers of customers,[2] and modernizing FAA regulations to be more performance-based to support innovation. The FAA recently completed rulemakings on cross-waivers[3] and aggregate risk,[4] and has published a notice of proposed rulemaking to address expanding the option to use equivalent level of safety to bring greater consistency between range requirements and FAA regulations, and to promote more efficient practices with industry.[5]

One company suggested deferring to the requirements of the lead agency responsible for the whole mission or a specific aspect of a mission, or creating a common standard that can be utilized in the absence of a lead agency for detailed technical requirements. The same company suggested adapting the regulatory regime as the industry matures, and tailoring requirements to the experience level of the company in question for each specific mission. Additionally, this company advised that industry consensus standards and a fundamental level of regulatory control be established to guarantee an adequate level of safety to support healthy new enterprise. The FAA agrees with the development of industry consensus standards and will work to support such activities. However, FAA does not support the recommendation to tailor requirements because doing so risks equating safety only with operator experience levels. Operator experience is only

[1] Space Florida is an Independent Special District of the State of Florida, created by Chapter 331, Part II, Florida Statutes for the purpose of fostering the growth and development of a sustainable and world-leading space industry in Florida.
[2] This refers to payload operators, owners, and others doing business with an FAA licensee or permittee for a given launch.
[3] Reciprocal Waivers of Claims for Licensed or Permitted Launch and Reentry Activities, 81 FR 55115 (Aug. 18, 2016) (final rule updating financial responsibility regulations, including cross-waiver requirement).
[4] Changing the Collective Risk Limits for Launches and Reentries and Clarifying the Risk Limit Used to Establish Hazard Areas for Ships and Aircraft, 81 FR 47017 (July 20, 2016).
[5] Updates to Rulemaking and Waiver Procedures and Expansion of the Equivalent Level of Safety Option, 81 FR 34919 (June 1, 2016) (notice of proposed rulemaking proposing updates to 14 CFR parts 404, 405, 420, 431, 435, 437, and 460).

one aspect, and other factors such as the type of vehicle and its operational environment may be more important during the safety assessment process.

4.0 Background

There are many United States Government launch and reentry sites around the country with varying facilities, user bases, and capabilities. The streamlining legislation in the CSLCA and NDAA purposefully focuses on areas of duplication among the FAA, USAF, and NASA. For that reason, this report will focus on United States Government launch and reentry sites in which these agencies are jointly involved. These properties include Cape Canaveral Air Force Station (CCAFS) in Florida, Vandenberg Air Force Base (VAFB) in California, Wallops Flight Facility (WFF) in Virginia, and Kennedy Space Center (KSC) in Florida. All of these locations host FAA-licensed commercial launch sites. Within these four Federal launch and reentry sites, there are three Federal ranges providing launch and reentry safety services: the Eastern and Western Ranges, administered by the USAF and headquartered at CCAFS and VAFB, respectively, and the Wallops Flight Facility Range administered by NASA. Bounding the scope of this report to these Federal launch and reentry sites and ranges allows focus on requirements, regulations, agreements, and procedures relevant to NASA, Air Force Space Command (AFSPC), and FAA.

4.1 Tri-Agency Common Standards

The FAA, USAF, and NASA have been working in partnership for launch safety for over 15 years. These agencies established this partnership to foster the development and implementation of common requirements and regulations for launch safety across the organizations. This approach for common requirements among the agencies involved was reflected in a recommendation from a report titled, “Future Management and Use of U.S. Space Launch Bases and Ranges,” dated February 8, 2000 (2000 IWG Report). This was the final report of the Interagency Working Group (IWG) co-chaired by the Assistant to the President for National Security Affairs and the Assistant to the President for Science and Technology, and comprising the Office of Management and Budget (OMB), U.S. Departments of Defense (DoD), Commerce, Transportation, as well as USAF, FAA, NASA, and National Reconnaissance Office. This report reviewed the future management and use of CCAFS and VAFB as those were the primary locations for launch activity at the time.

This previous review was undertaken as a result of the growing U.S. commercial space launch industry and the Federal Government’s increasing reliance on commercial launch services. The report contained several recommendations aimed at fostering an environment at CCAFS and VAFB that would allow the commercial space launch industry to continue to grow and be internationally competitive in the future.

One of the recommendations from this report was to develop common launch safety requirements for Government, civil, and commercial launches at Federal and non-Federal launch sites. This recommendation also cited the importance of ensuring FAA resources are commensurate with statutory requirements and safety responsibilities. Other recommendations included pursuing means of achieving improved efficiencies in range operations.

5.0 Past Accomplishments in Streamlining

5.1 USAF-FAA Partnership for Launch Safety

The FAA and USAF formed an interagency partnership for launch safety to satisfy the recommendation from the 2000 IWG Report for the creation of common launch safety requirements, solidifying this partnership with the establishment of the *Memorandum of Agreement between the Department of the Air Force and Federal Aviation Administration on Safety for Space Transportation and Range Activities*, dated January 16, 2001. The primary objectives of this agreement were the following:

- Continue cooperation between the USAF and FAA regarding licensed launch and reentry activities;
- Minimize the regulatory burden on the U.S. commercial space sector by clearly delineating Federal agency requirements, oversight responsibilities, and enabling the applicant to submit common materials to the USAF and FAA where possible, thereby precluding unnecessary overlap and duplication; and
- Provide an agreed to and stable framework for the U.S. space launch industry

This Memorandum of Agreement (MOA) further supported the interagency partnership between the USAF and FAA in the creation of common safety standards. The FAA initially codified these common requirements in the Code of Federal Regulations (14 CFR Part 417) in 2006 and the USAF implemented them in applicable USAF instructions and Air Force Space Command Manuals (AFSPCMAN 91-710 and 91-711) in 2004 and 2007, respectively. This was the first effort to streamline requirements on commercial space companies launching from Federal launch and reentry sites.

Furthermore, the FAA established in rule (14 CFR 417.1(c)) that for a launch from a Federal launch range, the applicant may leverage an alternative means of compliance to a requirement of Part 417 if the range had previously accepted that alternative. This alternative means could be a range waiver or “meets intent” certification, issued by the USAF, whereby the FAA would grandfather existing programs with previous approval. These would include programs approved prior to the effective date of the regulation (September 25, 2006). This regulatory provision was an effort to reduce the burden on those programs which were already actively launching from a Federal launch range.

Although common launch safety requirements, and the launch site safety assessments further streamline the regulatory approach to FAA-licensed launches from USAF and NASA launch and reentry sites, the authority of each agency does not change. The FAA, USAF, and NASA retain their respective approvals consistent with their respective authorities for a given commercial launch activity. This also includes waivers, as the FAA, USAF, and NASA do not have the authority to grant a waiver to another agency's launch safety requirements, but do retain the right to waive their own.

The FAA, USAF, and NASA work very closely in their respective evaluations to ensure consistent implementation of common safety requirements in an effort to preclude different answers to questions of compliance among the agencies. The MOA originally signed in 2001 provides for sharing of information regarding proposed launches and to notify each other of any specific change to the proposed launch that may alter or change any agency's previously conducted analysis or conclusion. These provisions greatly improve the ability of the FAA, USAF, and NASA to remain consistent in their implementation of safety requirements.

5.2 Common Standards Working Group

The CSWG is an interagency partnership established in 2004 to align FAA, USAF, and NASA common launch safety requirements and practices to protect the public during launch and reentry operations. By standardizing safety requirements among the three agencies, the agencies work to achieve the same level of safety throughout the United States at Federal and non-federal launch sites alike. This partnership also improves efficiency in the launch industry because launch operators have a common set of clearly delineated requirements regardless of the location of the launch activity. Creation of the CSWG was another joint FAA-USAF-NASA effort to further streamline common launch safety requirements to improve efficiency, reduce unnecessary requirements and costs, resolve inconsistencies, and preclude unnecessary duplication among the agencies.

Objectives for the CSWG are the following:

1. Align to common safety standards that provide a stable framework for the U.S. space launch industry while minimizing implementation and administrative burdens;
2. Promote consistency and technical rigor in the substance and application of common safety standards;
3. Facilitate effective communication between the USAF, FAA, and NASA such that the three agencies are informed of issues that could result in potential changes in any common safety standard;
4. Provide consistent interpretations of common safety standards and guidance on proper implementation;

5. Periodically review and update common safety standards;
6. Facilitate the exchange of launch and reentry data relevant to common safety standards; and
7. Monitor decisions and analyze trends regarding requests for relief from common safety standards.

The tangible benefits from the creation of common safety standards include a stable framework of safety requirements for the U.S. space launch industry and a streamlined administrative process for the Government and commercial sectors. Another welcome by-product is the creation of a system of coordination and balancing among the three agencies.

The CSWG is a Government-only forum; however, in recent years the CSWG has extended invitations to commercial space company representatives for certain public meetings, while ensuring the proper role of industry and Government participants. In these cases, subject matter experts from commercial companies aid Government decision-makers by bringing unique information and data to the CSWG to help the Government body make informed decisions.

6.0 Current Progress Toward Streamlining

6.1 Minimizing Duplication Between FAA, USAF, and NASA Processes

Although the FAA, USAF, and NASA have separate processes for commercial space companies, each are founded on the desire for common launch safety standards. The partnership between these agencies that established these common launch safety requirements also provides additional efforts to minimize the duplication between the processes of each for commercial space companies operating from CCAFS, VAFB, WFF, and KSC.

One such effort to reduce duplication from the CSWG was the establishment of a Memorandum of Understanding (MOU) that outlines the coordination process among agencies in resolving launch operator requests for relief from common launch safety requirements. Through this process launch operators submit a single relief request form and the agencies work together to provide a single Government determination back to the launch operators. Each agency retains its respective approval authorities, but all work together to provide one government determination that satisfies the interests of each agency, resulting in a streamlined process for the commercial companies.

Duplication has also been minimized for instances where requirements vary between the agencies as a result of one of them making a change to common launch safety requirement. In cases such as these, the partnership agencies typically concede to the most stringent requirement to ensure satisfaction of both range requirements and FAA regulations. This has been exercised on many occasions with the difference in the public risk criteria described in section 4.1. In these cases the USAF launch decision authority did not allow for launch when FAA criteria were violated unless the FAA provided approval.

The most significant effort to minimize duplication of requirements and processes between the agencies is through the launch site safety assessments of USAF and NASA launch and reentry ranges conducted by the FAA. These launch site safety assessments satisfied the partnership goal to minimize governmental requirements for commercial space companies seeking to conduct FAA-licensed launches from USAF launch and reentry sites. To execute this, the FAA conducted launch site safety assessments of the USAF and NASA launch and reentry ranges at Cape Canaveral AFS, Vandenberg AFB, and Wallops Flight Facility and found that USAF and NASA safety processes, procedures, and requirements implemented for each licensed launch activity satisfied applicable FAA regulations (14 CFR Part 417). This meant commercial space companies conducting FAA-licensed launches from AF and NASA launch and reentry sites utilizing a range that the FAA reviewed during its launch site safety assessment would be compliant with Part 417. The FAA would rely on the USAF or NASA safety processes for compliance with its requirements thereby streamlining the overall requirements placed on commercial companies launching from USAF and NASA launch and reentry sites.

6.2 NASA Kennedy Space Center (KSC) Development of a Multi-User Spaceport

Transition planning at KSC began with the announcement of Shuttle retirement in 2004. The Center began reaching out to commercial space companies to understand how they could utilize KSC facilities and capabilities. This was accomplished with a request for information (RFI) in 2005 to seek interest and potential commercial uses at KSC, followed by a 2008 KSC Master Plan that identified areas that could be used for commercial operations.

In the NASA Authorization Act of 2010 (Public Law 111-267), Congress directed NASA to improve infrastructure at KSC to provide measures to implement multi-vehicle support, as well as improvements in payload processing and partnering. NASA held workshops with the commercial community, released a second RFI, and in 2011 released a notice of availability that identified underutilized facilities at KSC.

Through these workshops and other engagements with commercial space companies, commercial space companies repeatedly wanted to know if the USAF would retain range safety responsibility for FAA-licensed commercial launches from KSC.

In 1963, then NASA Administrator Webb and former Secretary of Defense McNamara entered into a Memorandum of Agreement to delineate roles and responsibilities for the USAF and NASA at CCAFS and KSC. The intent of this agreement was to ensure that USAF and NASA would not duplicate infrastructure and capabilities between these adjacent launching properties. This Agreement formed the basis for the USAF role in protecting public safety for Government launches from both NASA and USAF property, including launches during the Shuttle era

To protect public safety, FAA regulations set standards with which operators must comply during licensed launch or reentry; however, the FAA's regulations are not prescriptive. FAA-licensed launches from CCAFS may utilize USAF range safety infrastructure and support to satisfy FAA public safety regulations, but the FAA regulations do not require utilization of the USAF infrastructure even for launches from USAF property.

In March 2013, NASA determined that FAA-licensed commercial launches from KSC could use range safety services other than USAF range safety infrastructure and support, as long as they met FAA requirements. (It should be noted that this determination does not preclude a government customer of FAA-licensed launch services from directing the use of USAF range safety services as a contractual requirement.)

At that time, KSC informed commercial companies that it would not require utilization of USAF range safety infrastructure and support as a condition of launching from KSC property. Instead, as part of KSC's multi-user spaceport it would accommodate other options for the commercial space companies' compliance with FAA public safety regulations.

6.3 Working Group to Consider NASA, USAF, and FAA Commercial Launches from Kennedy Space Center

NASA, USAF, and FAA have been working together to optimize roles and responsibilities under this new environment at KSC for FAA-licensed commercial launches. In this instance, KSC does not seek to impose duplicative public safety requirements on commercial companies operating from their multi-user spaceport but rather intended to rely, in part, on the regulations and licensing approvals from the FAA. There would still be approvals that NASA would retain related to its property and utilization of its services, but those would be limited to instances where NASA determined FAA regulations did not address and capitalize on data commercial companies already prepare for FAA license applications. This effort represents the next step in streamlining duplicative requirements for commercial launches, and although this effort is solely focused on launches from KSC property, it represents a good test case for what might be possible at other Federal launch locations.

This interagency group has identified several items that will require coordination between KSC and CCAFS. Largely, these are a function of the close proximity between launch sites on these adjacent properties. They include airspace coordination, frequency management, and launch or hazardous activity scheduling and coordination. This group continues to meet regularly to develop the coordination necessary to support the environment KSC seeks to establish for FAA-licensed commercial launches. The group established appropriate processes and agreements to support the first FAA-licensed launch from Pad 39A at KSC, which occurred on February 19, 2017.

This interagency effort also has sought to more fully understand the respective authorities among NASA, USAF, and the FAA for commercial launches from KSC property. Understanding the authorities of each agency for these activities will ensure the NASA, USAF, and FAA roles and responsibilities developed for the environment that KSC seeks to establish are consistent with the enabling statutes and authorizations of each agency.

6.4 One Agency Approval Satisfies Common Requirements

The concept of one agency approval to satisfy that of another is precisely what the FAA implemented with its launch site safety assessments discussed earlier. Commercial space companies conducting FAA-licensed launches from USAF and NASA launch and reentry sites of which the FAA conducted a launch site safety assessment would be compliant with Part 417. The FAA relies on USAF or NASA safety processes for compliance with its regulations thereby streamlining the overall requirements placed on commercial companies launching from USAF and NASA launch and reentry sites. The FAA believes this approach can be expanded to other parts of its regulations (e.g., 14 CFR Part 431, Launch and Reentry of a Reusable Launch Vehicle, and Part 437, Experimental Permits). On June 1, 2016, the FAA issued a notice of proposed rulemaking that proposed revisions to its regulations to extend the equivalent level of safety approach to all relevant parts of the FAA's commercial space transportation regulations. The public comment period for this rulemaking closed on August 1, 2016, and the FAA is continuing the rulemaking process.

Similar allowances for streamlining requirements are included in NASA procedural requirements for range flight safety (NPR 8715.5).[6] In this document NASA states these range safety requirements do not apply if the range operation is conducted under an FAA license unless specified by the applicable NASA contract or agreement. Additionally, AFSPC recently issued a memorandum[7] identifying the FAA licensing process as the single process to be used for satisfying commercial launch safety obligations at Kennedy Space Center, and committed to further streamlining requirements between NASA, FAA, and the USAF.

6.5 Increasing Commercial Space Presence at Federal Launch Sites and Ranges

The footprint of commercial space companies operating from Federal property has changed substantially over the last several years. Today commercial space companies have agreements with the Government to utilize more than 260 facilities and 17 launch/landing pads at Cape Canaveral AFS, Vandenberg AFB, and Wallops Flight Facility combined. These agreements are

[6] NASA Procedural Requirement regarding protection of the public, workforce, and property during flight operations.
[7] Air Force Space Command, Memorandum for 14 AF/CC, Subject: 45th Space Wing Support to Kennedy Space Center FAA Licensed Commercial Launch Operations, Oct. 21, 2016.

leases, licenses, Commercial Space Launch Agreements, or Space Act agreements with varying durations and provisions depending on the policies and procedures of the agency involved. We expect the number of agreements for commercial use of Government property to rise over the next several years as agreements for additional facilities and launch pads are currently being negotiated.

The significant number of facilities, launch pads, and launch rates of commercial space companies operating from Federal property signals a change for the commercial space transportation industry. Commercial markets are on the rise, and the number of unique companies developing vehicles and capabilities is diversifying the operator base for the commercial space industry. Therefore the FAA expects the number of launch and reentry facilities needed to support this increased activity to rise.

7.0 Conclusion

The streamline legislation in both the CSLCA and NDAA seeks to eliminate outmoded or duplicative requirements or approvals for commercial space launch and reentry activities among the FAA, USAF, and NASA. This report has provided background and context for the creation of common launch safety requirements among these agencies, as well as a description of current efforts to further streamline these requirements on commercial space companies operating from Federal launch and reentry sites.

In particular, the current efforts underway among NASA, USAF, and the FAA focused on commercial launches from Kennedy Space Center serve as a test case for what might be possible for future streamlining at other Federal launch and reentry site locations. This effort is not necessarily predicated on the common safety requirements among the FAA, USAF, and NASA, but rather seeks to avoid duplicative efforts and approvals among these agencies specifically for FAA-licensed commercial launches from Kennedy Space Center property. The agencies will continue to work through remaining issues, but at this time the FAA has no recommendations for legislative change.

Streamlining requirements for commercial launch and reentry among the FAA, USAF, and NASA is important to facilitate continued growth of the commercial space transportation industry, a goal supported by all. The FAA, USAF, and NASA look forward to continued work on this challenging task.

8.0 Appendix I – Licensing Process

8.1 FAA Regulations and Licensing Process

The FAA has comprehensive regulations that are intended to protect public health and safety, safety of property, and the national security interests of the United States. FAA regulations for launch and reentry are in 14 CFR Chapter III. Table 4.1 provides a description of all FAA regulations by part.

Table 4.1: FAA Regulations

Part	Description
400	Basis and Scope
401	Organization and Definitions
404	Regulations and Licensing Requirements
405	Investigations and Enforcement
406	Investigations, Enforcement, and Administrative Review
413	License Application Procedures
414	Safety Approvals
415	Launch License
417	Launch Safety
420	License to Operate a Launch Site
431	Launch and Reentry of a Reusable Launch Vehicle (RLV)
433	License to Operate a Reentry Site
435	Reentry of a Reentry Vehicle Other than a Reusable Launch Vehicle
437	Experimental Permits
440	Financial Responsibility
460	Human Space Flight Requirements

Figure 4.1 describes the process to obtain an FAA license for launch or reentry, for the operation of a launch or reentry site, or for an experimental permit.

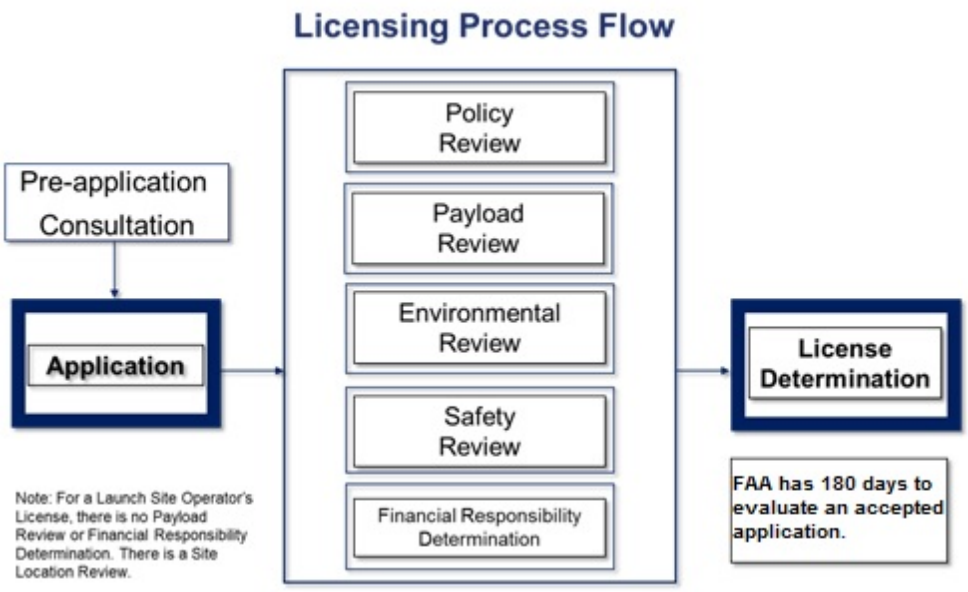

Figure 4.1: Licensing Process Flow

The licensing process begins with a pre-application consultation. A prospective applicant must consult with the FAA before submitting an application to discuss the application process, applicable regulations, and possible issues related to the proposed activity that the applicant will conduct under an FAA license or permit. Following application acceptance, the FAA commences with its review of policy, payload, environment, safety, and financial responsibility in accordance with applicable regulations. Per statute (Pub. L. 98-575 and Pub. L. 108-492), the FAA is allowed 180 days for reviewing license applications and 120 days for experimental permit applications. Upon issuance of a license or experimental permit, an operator is subject to compliance monitoring, reporting requirements, and financial responsibility requirements consistent with representations made in its application and applicable FAA regulations.

To date, FAA-licensed launches from Federal property have been conducted under Part 415, which prescribes requirements for obtaining a license to launch, and post-licensing requirements for expendable launch vehicle. Some of these licensing requirements include more detailed safety requirements contained in Part 417. Part 417 was intended to be consistent with the USAF and NASA launch safety requirements, as recommended by the 2000 IWG Report.

The FAA, USAF, and NASA have worked closely to maintain and consistently implement their common launch safety requirements. Since 2006, the last time Part 415 was substantially revised, the USAF and NASA each have modified safety requirements based on changes to processes for launch safety or technology developments. The FAA was aware of these changes to USAF and NASA requirements through regular meetings of the CSWG, but the changes have had the unintended consequence of making their requirements not fully consistent with FAA regulations. Most notable was the decision by USAF and NASA to aggregate risk from debris, toxic release, and far-field blast overpressure to allow a total risk of 100 expected casualties per

1 million launch events instead of the FAA limit of 30 expected casualties per 1 million launch events for each risk separately. In this particular example, the FAA initiated a rulemaking to more closely align these requirements. The final rule resulting from this process was published on July 20, 2016.[8] While the rulemaking process was underway, the FAA, on several occasions, approved a waiver for a launch that exceeded the FAA's collective risk requirement but met the USAF's. Each of these waivers were issued after detailed analysis of the launch operator's rationale showed no significant impact to public safety and property, national security, or foreign policy interests by waiving the FAA requirements. The FAA adopted the aggregate approach used by NASA and the USAF because the revised risk threshold that it produces more accurately reflects the level of uncertainty in estimated casualty calculations. In all cases of such changes to requirements by one agency, the CSWG provides a regular forum to ensure the other agencies are aware of proposed changes to common launch safety requirements.

Even with the substantial effort to develop and implement common launch safety standards, there are areas where the FAA has regulatory requirements which USAF and NASA do not include in their range requirements. Likewise, the USAF and NASA have requirements that the FAA does not. For example, the USAF and NASA have facility protection requirements called hit probability criteria for launches from adjacent property for facilities they deem critical to their respective programs and missions. Protection provisions for adjacent facilities are addressed through FAA financial responsibilities requirements, subject to statutory limits for government and third party property, which is a different approach than USAF and NASA employ for protection of property.

8.2 USAF Process for Commercial Space Companies

USAF launch and reentry sites are common user resources servicing the DOD, civil, and commercial launch markets. The USAF has a consistent process for all range users for use from program introduction, to final approval for launch, including the AFSPC-owned land. This process includes the following:

- Entering into real property agreements for use of USAF property using a lease or license.
- Completing a Commercial Space Operations Support Agreement for commercial (FAA-licensed) launch providers
- Introducing the launch program and unique user requirement through the Universal Documentation System (UDS)
- Tailoring[9] launch and ground safety requirements contained in the AFSCPC Manual (AFSPCMAN) 91-710 Volumes 1-7, and similar guidance

[8] Changing the Collective Risk Limits for Launches and Reentries and Clarifying the Risk Limit Used to Establish Hazard Areas for Ships and Aircraft, 81 FR 47017 (July 20, 2016).
[9] AFSPCMAN 91-710 Volume 1.0, Section 4.4, Tailoring Process

- Executing commercial launch providers Day-of-Launch/Landing (DoL) processes and procedures to include Space Wing (SW) Launch Decision Authority (LDA) final clear to launch and land

Real property leases or licenses are required for commercial space companies that wish to use USAF owned or controlled facilities or property. The use of the facilities or property can be for Government or commercial (FAA-licensed) launch activity. Before allowing use, the USAF will determine if existing or planned USAF resources can support the activity; if it is compatible with USAF and other Federal activities; and if any proposed use is consistent with public safety, national security and international treaty obligations. Additionally, an USAF review will be required to determine if equivalent commercial services are available on reasonable terms where (i) "equivalent" means substantially the same property in terms of function, capacity, utility, and quality; (ii) "available" means as and when needed by the user to the user's reasonable satisfaction; and (iii) "reasonable" means that price and other terms and conditions of use are commercially reasonable. The commercial space company is also required to coordinate with the USAF to determine any required environmental actions and ensure responsibilities are identified as a condition of a real property lease/license.

AFSPC and the appropriate Space Wing will enter into a commercial space operations support agreement (CSOSA) or an annex to an existing CSOSA with the commercial space company. The CSOSA and annexes are support agreements that describe how AFSPC will support commercial space company activities; allocation of risks; financial arrangements; and safety, security and environmental compliance requirements. The CSOSA is largely a standard agreement between AFSPC and the commercial space company, while annexes are tailored by the Space Wing to accommodate specific commercial space company requirements and support requests.

DoD ranges use the Universal Documentation System process to provide a common language and format for commercial space companies to communicate requests for support and services to the range. Communicating requests to the range is an iterative process and begins one to two years in advance of need with a user submitted program introduction. This first submittal will initiate program support planning and will be refined until the range provides a detailed operations directive in response to requirements expressed by the user. This directive is a detailed plan for implementation of support functions for a program, mission, specific tests, or a series of tests.

AFSPCMAN 91-710, Volume 1	Air Force Space Command Range Safety Policies and Procedures
Volume 2	Flight Safety Requirements

Volume 3	Launch Vehicles, Payloads, and Ground Support Systems Requirements
Volume 4	Airborne Flight Safety System Design, Test, and Documentation Requirements
Volume 5	Facilities and Structures
Volume 6	Ground and Launch Personnel, Equipment, Systems, and Material Operations Safety Requirements
Volume 7	Glossary of References, Abbreviations and Acronyms, and Terms

Table 4.2: Air Force Space Command Range Safety Policies and Procedures

The Space Wing will tailor the AFSPC safety requirements for each launch vehicle family and mission, as required. The tailored requirements will be common for all payload users to include DOD, civil, or commercial space company operations on an AFSPC launch property. The AFSPCMAN 91-710, Volumes 1-7, are identified below. The standards established within these volumes (and equivalent AFSPC publications) are well understood by the FAA and inconsistencies are worked through the CSWG.

Launch planning and preparation culminates in Day of Launch/Landing activity where the Space Wing Commander provides the final approval to launch and land. The Space Wing Commander reviews flight readiness, to include flight safety system and safety risk analysis approval, prior to initiating the final countdown procedure. Throughout the final countdown, the Launch Decision Authority has the authority to review and accept risk as required to support all launch user activity. If the hazards of launch exceed established USAF criteria and cannot be mitigated or accepted, the Launch Decision Authority will deny the range user authority to launch or land. The Launch Decision Authority's approval is recognition of the USAF Commander's ability to accept the risk associated with the hazards of activity on USAF launch property.

USAF standards, processes, and approvals for launch activity from AFSPC launch property are well established and accommodate all range user requirements. The USAF recognizes, as a service provider and customer of commercial launch capability, facilitating commercial launch strengthens national security. The USAF continues to look for ways to enhance AFSPC range processes and policies to meet commercial user requirements.

8.3 NASA Process for Commercial Space Companies

A licensed commercial launch or reentry that takes place from NASA property may utilize range flight services provided by the Government, or via another FAA-approved and/or licensed entity. When the NASA range services are employed, range flight safety requirements, established in NASA Procedural Requirements (NPR) 8715.5 Range Flight Safety Program, are used and implemented through the Range Safety Program at the Kenney Space Center and the Range and

Mission Management Office at the Wallops Flight Facility. The risk criteria imposed by NASA are consistent with Range Commanders Council 321, Range Commanders' Council Common Risk Criteria for National Test Ranges. The Range Safety Risk Assessment considers the same hazards as those of the DoD and FAA range safety policies: debris, distant focusing overpressure, and toxic material release. The input requirements for these Range Safety Risk Assessments are consistent with DoD and FAA risk assessment requirements. These include Range safety systems, such as a flight termination system and vehicle tracking, and operational requirements, such as launch commit criteria and collision avoidance. In summary, NASA's range safety requirements are consistent with those of the DoD and FAA; however, Wallops Flight Facility, as with any other range, has its own facility-unique requirements due to geography and critical assets.