Federal Aviation Administration
Office of Commercial Space
Transportation (FAA/AST)

SPACEPORT LICENSING PRIMER

An Introduction to the Spaceport Licensing Process

APPROVED FOR PUBLIC RELEASE

INTRODUCTION

SO, YOU WANT TO OPERATE A SPACEPORT?

Congratulations! As you probably know better than most, the space economy and its associated marketplaces are projected to go from $500 billion in 2025 to over $1trillion between 2030-2040.

This amazing statistic is enhanced by the technological advances that make the space marketplace such an exciting realm for advancement and exploration. This economic boom will see an increase in space tourism, the advent of orbital mining, the introduction of routine, on-orbit maintenance of satellites, space debris removal, point-to-point cargo delivery, etc.

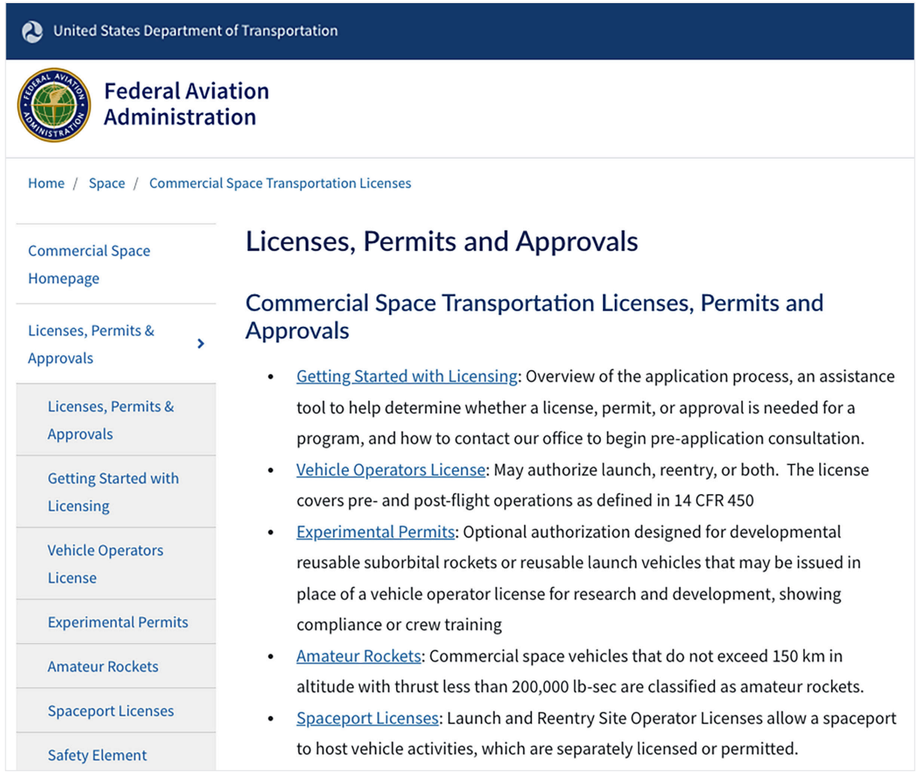
However, the space launch market is not without its challenges. The first thing for all prospective spaceport licensees to remember is that the space environment is hard and unforgiving, and licensing is just the first step to accessing space. As such, consider this primer a stepping-off point in your pursuit of realizing your proposed spaceport. If you can apply due diligence in learning about the licensing process in advance, you will exponentially increase your probability of successfully realizing your spaceport business plan.

ABOUT THE SPACEPORT LICENSING PRIMER

This *Spaceport Licensing Primer* (SLP) is designed as a brief, to-the-point guide for prospective spaceport license applicants. It represents the collective experiences of Federal Aviation Administration (FAA) personnel and the spaceport community, and highlights some of their best practices, lessons learned, vignettes, etc. This primer can help you avoid common pitfalls or a needlessly circuitous path. Our intent is to educate our prospective customers, as well as save you time and money before entering the licensing process.

What the primer is not, however, is a step-by-step guide for the applicant, though we do offer several checklists on our website to help guide you in specific areas. Notably, the SLP is not intended to supplant any existing regulations or laws (international, federal, and/or state). If you think there is a conflict, please let us know immediately so we may clarify any concerns or perceived inconsistencies.

Once you've read the primer, your next step should be to become thoroughly familiar with our FAA/Office of Commercial Space Transportation website. It is an excellent resource for information. The website also includes guidance for a variety of other FAA licenses and permits associated with spaceports (e.g., launch vehicles, experimental programs, etc.) that you may find of interest.



https://www.faa.gov/space/licenses

ABOUT FAA/AST

In 1995, the Office of Commercial Space Transportation (AST) became FAA's only space-related entity. Its charter is to:

- Regulate the U.S. commercial space transportation industry to ensure compliance with international obligations and to protect the public health and safety, safety of property, and national security and foreign policy interests.
- Encourage, facilitate, and promote commercial space launches and reentries by the private sector.
- Recommend appropriate changes in federal statutes, treaties, regulations, policies, plans, and procedures.
- Facilitate the strengthening and expansion of the U.S. space transportation infrastructure.

As an applicant, your first interaction with FAA/AST is the Office of Operational Safety, Safety Authorization Division, Pre-Application Program. The Pre-Application Program Team will conduct your initial discussion and get you started on the right track to begin the spaceport licensing application process.

SLP BEST PRACTICE

Prior to your Initial Discussion with FAA/AST, review, read, and become familiar with navigating FAA/AST's website.

https://www.faa.gov/space

FEDERAL LAWS AND REGULATIONS

FAA's responsibilities for conducting the spaceport licensing process are derived from and authorized by the Commercial Space Launch Act (51 U.S.C. Subtitle V, Ch. 509, §§ 50901-50923). The specifics of the licensing process are mandated in the Code of Federal Regulations (CFR), Title 14 (Aeronautics and Space), Chapter III (Commercial Space Transportation), Subchapter C (Licensing).

For spaceports, pay particular attention to Part 420, "License to Operate a Launch Site," and Part 433, "License to Operate a Reentry Site," which "Prescribes the information and demonstrations that must be provided to the FAA as part of a license application, the basis for license approval, license terms and conditions, and post-licensing requirements with which a licensee shall comply to remain licensed."

A sampling of information and actions required by the applicant identified in Part 420 includes (but is not limited to):

LAUNCH SITE LOCATION (PART 420, SUBPART B)

- Demonstrate that a launch vehicle may be flown safely from a launch point (includes risk assessment)
- Analyze debris dispersion for the launch site boundary
- Define the flight corridor, including debris containment analysis and identification of the overflight exclusion zone
- File required agreements with the U.S. Coast Guard for Notice to Mariners (NOMARS), as well as the affected FAA Air Traffic Control (ATC) office for Notice to Air Missions (NOTAMS)
- Satisfy additional requirements including maps, launch vehicle trajectory data, historical wind data, estimated casualty data for anomalous flights, etc.

RESPONSIBILITIES OF LICENSEE (PART 420, SUBPART D)

- Control public access to the launch site and associated hazardous facilities through security personnel, surveillance systems, physical barriers, etc.
- Establish procedures to schedule operations to ensure operations do not create the potential for a mishap that could result in harm to the public or to operations of any other customer
- Develop a mishap plan to include procedures for launch mishap investigations
- Develop a detailed explosive site plan, to include management of various classes of explosives, as well as energetic liquids (e.g., hydrazine, liquid hydrogen, etc.)

SLP BEST PRACTICE

Prior to your Initial Discussion with FAA/AST, read and become familiar with the federal regulations on licensing, in particular CFR 14, Title 14, Chapter III, Subchapter C.

https://www.ecfr.gov/current/title-14

LICENSEE'S SPACEPORT TO-DO LIST*

- Site Location Review
  - Debris Dispersion/ Containment Analyses
  - Expected Casualty Assessment
  - Investigate/Plan Flight Corridor Access (Letter of Agreement)
- Flight Safety Analysis
- Explosive Site Plan
- Mishap Investigation Plan
- Lightning Protection Plan
- Public Access Control Plan
- Agreements with the U.S. Coast Guard and FAA (NOMARS/ NOTAMS)

**This is a sample list and is by no means all inclusive*

INITIAL STEPS IN THE SPACEPORT LICENSING PROCESS

Here is what you can expect in your initial communication with FAA/AST. Please complete the **Pre-Application Initial Contact Information** on the FAA/AST website: https://www.faa.gov/space/licenses/licensing_process/.

Once we receive this from you, we will contact you to schedule a date for our **Initial Discussions**. These discussions are conducted via telephone or video teleconference where, among other things, you will introduce your concept of operations (CONOPS), and let us know your vision for establishing a spaceport. During this time frame, our Pre-Application Team will serve as your FAA/AST point of contact (POC), so you have someone to engage with in the weeks and months that follow.

Once our Pre-Application Team has reviewed and assessed your CONOPS, the next step is the **Pre-Application Consultation**.

Once an applicant's proposal has reached a level of maturity that requires frequent subject matter expertise, a licensing team is assigned to support the discussions for final application development. Some key activities you may want to consider after consultation with your FAA/AST counterparts include the environmental process (as required by the National Environmental Policy Act, or NEPA) and airspace assessments (multiple agencies involved include FAA and potentially the Department of Defense, as well as others), as these are both time- and labor-intensive tasks.

It is imperative that you understand the **Pre-Application Consultation** period can be extensive and, in our experience, will take many months—even years, in some cases. Thus, we want to underscore the importance of reading and being familiar with CFR, Title 14, Chapter III:

> *"A prospective applicant must consult with the FAA before submitting an application to discuss the application process and possible issues relevant to the FAA's licensing or permitting decision. Early consultation helps an applicant to identify possible regulatory issues at the planning stage when changes to an application or to proposed licensed or permitted activities are less likely to result in significant delay or costs to the applicant."*
>
> —CFR,Title 14, Chapter III, Part 413.5

There are certainly many more steps in the process before you can obtain license authorization, as outlined in Title 14. A summary of the full complement of licensing activities is available on our website.

NOTABLE CHALLENGES

While all aspects of the spaceport licensing process are important, in our experience, several areas present the most challenges to prospective spaceport licensees:

1) Stakeholder engagement
2) Co-location with an airport
3) Environmental issues
4) Airspace integration

STAKEHOLDER ENGAGEMENT

Time and again, FAA is asked to identify the biggest challenges our applicants may face on their path to achieving a spaceport license. Undoubtedly, *failure to engage in early and consistent communications with potential stakeholders* tops the list.

Other stakeholders might include local airport management, local aviation groups, etc., who may wonder how they could ever co-exist with a spaceport on the other side of the runway, and how it might impact their daily operations. The airlines may also have an interest in your CONOPS, so they will want to hear from you. Does a national park or a state- or federally protected refuge wetland exist near your proposed spaceport? This will interest a segment of the public and some state and/or federal government agencies (e.g., Department of the Interior). The Department of Defense (DOD) may also take special notice if your proposed spaceport is located near one of their facilities, or if the proposed flight trajectory of your vehicle could infringe on the DOD's Special Use Airspace (SUA).

SPACEPORT LICENSING VIGNETTE

"There was a spaceport whose proposed boundaries included tribal hunting and fishing lands. These lands are literally sacred ground to the local indigenous community. They also had a state-maintained public road going through their spaceport property, and the fact that they are located in a relatively remote and small area means the public will always have access through that road. They did a pretty good job engaging these parties (and others) from the beginning (of the licensing process), and they have maintained those relationships ever since."

—FAA Licensing Team

Stakeholder Engagement Builds Lasting Relationships

Remember, the onus is on you, the applicant, to engage these stakeholders and advocate for your proposed spaceport. These stakeholders will have their own regulatory requirements you may need to meet. Some of these requirements may parallel FAA's, but not all. Therefore, identification of all potential stakeholders, followed by early and consistent communication of your vision, is imperative to successfully obtaining a license.

CO-LOCATION WITH AN AIRPORT

The opportunities for co-locating a spaceport with an airport are enticing, especially if the proposed CONOPS is for a horizontal spaceport (e.g., captive carry of a launch vehicle, human space flight, etc.). Likewise, siting a spaceport near an airport presents its own challenges, including airspace deconfliction, scheduling, debris management, propellant storage, etc. For now, we will focus on the former—a spaceport co-located with an airport.

SPACEPORT LICENSING VIGNETTE

"We had one spaceport license that took six years [to obtain], primarily because of stakeholder concerns, in particular with two local airports —one regional and the other a major, international air hub. A good bit of the problems could be traced to the licensee's timing in engaging the airport authorities early on. Thus, they spent a lot of time having to convince airport senior management teams that their proposed CONOPS would not interfere with airport operations. They probably could have allayed these fears and saved a lot of time and money if they had contacted the airports before they went public with their plans."

—FAA Licensing Team

Consider the Local Airport a Partner in Your Endeavors

As an airport tenant, your relationship to the Airport District Office (ADO) is your responsibility. Your **Site Location Review** will go a long way in identifying your plans for occupying a segment of the airport and using its resources. This will require a good deal of preparatory work on your behalf. For example, you will need to establish your proposed spaceport's property boundary, which will also identify the spaceport's facilities and their locations. Perhaps most notable, your proposed boundary may also include part of the existing airport.

Once this is done, you will need to provide a myriad of products in accordance with federal and state regulations, to include (but not limited to):

- Explosive Site Plan (ESP). This plan identifies and locates hazardous operations and propellant storage within the site boundary.
- Flight Safety Analysis. This identifies the public risk associated with your proposed operations.
- Control of Public Access. While you might not own the land your spaceport occupies, you must coordinate with the landowner (public or private), and this will require a written agreement.

Much like your commitment to CFR Title 14, airports also share a responsibility for meeting federal requirements within the same document. For example, in accordance with Part 139, your spaceport ESP (as approved by AST) will mandate that the airport authority revise its **Airport Layout Plan** (ALP) (e.g., to include the addition of spaceport hazardous facilities) and resubmit it to FAA for conditional approval. Thus, we encourage you to engage the ADO early on, so they can be part of the licensing process going forward.

SLP BEST PRACTICE

The Airport District Office (ADO) is the target of your first stakeholder engagement if your spaceport is co-located with an airport.

ENVIRONMENTAL ISSUES

It is likely no surprise that the potential impact your spaceport operations may have on the environment will receive a good deal of scrutiny. History has shown us that the environmental piece of the space licensing process can take a good deal of time. Nevertheless, the applicant should not start this process too early as the concept of operations or other plans may change, which will likely drive a revision of environmental documents resulting in additional time and cost. FAA/AST will not review the applicant's environmental information until it has determined that the licensing concept of operations is mature enough and the items for environmental analysis are available. However, rest assured that FAA/AST will work with you to balance the timing of your environmental requirements with pre-licensing analyses and concept of operations. Again, your familiarity with environmental regulations at the federal and state level will go a long way in helping you efficiently navigate this important piece of the licensing process.

SLP BEST PRACTICE

Start your **Site Location Review** as soon as possible and before you start the environmental process. Doing so will help you navigate NEPA.

FAA/AST will follow your NEPA activities closely, as Title 14 requires you to submit a NEPA finding prior to receiving a license. You are responsible for preparing and funding the Environmental Impact Statement (EIS).

FAA/AST is responsible for complying with the procedures and policies of NEPA and other applicable environmental laws, regulations, and Executive Orders prior to issuing a launch site license. An applicant must provide FAA/AST with information needed to comply with such requirements. FAA/AST will consider and document the potential environmental effects associated with issuing a launch site license.

FAA/AST's actions subject to NEPA include issuing new licenses or permits, and modifying or renewing existing licenses and permits. Additionally, AST's environmental review must consider and disclose the potential impacts of the applicant's proposal and its alternatives on the quality of the human environment.

The following excerpt from one of the NEPA requirements for an operational spaceport notes the potential complexity involved:

SPACEPORT LICENSING VIGNETTE

"Other agencies will be involved besides the FAA. In Texas, the Department of the Interior, as part of the Endangered Species Act Section 7 consultation process, the U.S. Fish and Wildlife Service (USFWS) issues a Biological Opinion (BO), which concludes the (spaceport licensee's) Proposed Action is not likely to jeopardize the continued existence of any federally listed species or adversely modify designated critical habitat."

—FAA Website

Navigating NEPA Can Be Complex, Involving Multiple Agencies

The NEPA process ensures FAA decisionmakers have sufficient information about potential project impacts so they can make more informed decisions. More detailed information on FAA's policies and procedures for implementing the NEPA process can be found here: https://www.faa.gov/environmental

AIRSPACE INTEGRATION

Another notable challenge in the pre-application period is defining your notional aircraft hazard area and the impacted airspace. The local air traffic authority requires this information early in the planning process. Once you enter the pre-application phase, a member of FAA's licensing team will engage colleagues in FAA's Air Traffic Organization (ATO), Space Operations Group, as well as the applicable regional Air Route Traffic Control Center (ARTCC) to begin separate meetings with you on airspace management.

SPACEPORT LICENSING VIGNETTE

"Airspace management is a unique part of the spaceport licensing process. It is a significant issue and (as with most challenges) needs to be considered up front. For Letters of Agreement (LOAs) and air routes, the applicant is best served by involving the FAA early on. While stakeholder engagement and environmental activities are important and challenging, we have found that the airspace deconfliction is a more 'applicant + FAA' teaming activity. While the task is labor intensive for our FAA team, tackling it early definitely helps both parties in terms of time and money expended."

—FAA Licensing Team

Airspace Integration Is a Teaming Activity

Some key considerations in airspace integration include:

- An airspace **Letter of Agreement (LOA)** is completed during this point in the pre-application process. This is an agreement between the Regional ATC, the applicant, and (if required) the DOD. This effort—even with FAA assistance—will take considerable time, especially in the coordination phase, due to many variables and the dynamic nature of air route configurations.
- While the LOA is underway, FAA will begin an **Impact Analysis** of your proposed flight trajectories.
- Competition with major airline corridors can limit or restrict launch corridors. This is especially true for coastal spaceport locations, where international air routes exist.

SLP BEST PRACTICE

You are much better postured if you enter the pre-application process with a known launch vehicle design versus a hypothetical one. Absent a known launch vehicle, many analyses cannot be completed, thereby significantly extending the timeline in the application process.

One important consideration worth noting is the potential conflict with Special Use Airspace (SUA) assigned to the DOD by FAA. This requires the DOD to coordinate on your LOA. Your challenge as the applicant is to deconflict any operations in an SUA, and this requires advanced discussions with FAA and the DOD before the LOA can be executed.

SPACEPORT LICENSING VIGNETTE

One of the smaller operational spaceports (an average of two launches per year over the last five years) utilizes an economic model in which it relies on revenues earned from launch operations. Annual maintenance costs are substantial, including infrastructure maintenance (e.g., clean rooms, vehicle assembly buildings, operations center, computer and communications systems, propellant storage); transportation maintenance (e.g., roads, rail, bridges, etc.); launch pad maintenance; security and safety infrastructure, etc. These annual costs can run between $10-20 million. These figures do not account for labor, which is a significant challenge in terms of finding personnel with the technical experience needed to operate and maintain a spaceport.

Spaceport Operational Costs Can Be Significant

SUMMARY

The personnel of FAA/AST's Office of Operational Safety, Safety Authorization Division, along with our colleagues, look forward to working with you. We understand the licensing process can be challenging, and hope this primer has given you some things to consider that will make the process faster and easier. Remember these key points before you embark on your journey:

- Thoroughly review and become familiar with our FAA/AST website: https://www.faa.gov/space
- Review and become familiar with the Code of Federal Regulations (CFR), Title 14 (Aeronautics and Space), Chapter III (Commercial Space Transportation), Subchapter C (Licensing): https://www.ecfr.gov/current/title-14
- Identify and engage your stakeholders early and often.
- Engage the Airport District Office at your earliest opportunity if your proposed spaceport is co-located with an airport.
- Complete your **Site Location Review** and **Explosive Site Plan** in advance of the environmental process.
- Save significant time and money by having an existing vehicle design for your spaceport operations.

To start the application process, applicants should visit https://www.faa.gov/space/licenses/licensing_process/ and complete the form. Email the completed form and request for an Initial Discussion meeting with the Pre-Application Team to astapplications@faa.gov.