

Commercial Launch and Reentry Site Development

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**Federal Aviation
Administration**



Commercial Space Transportation

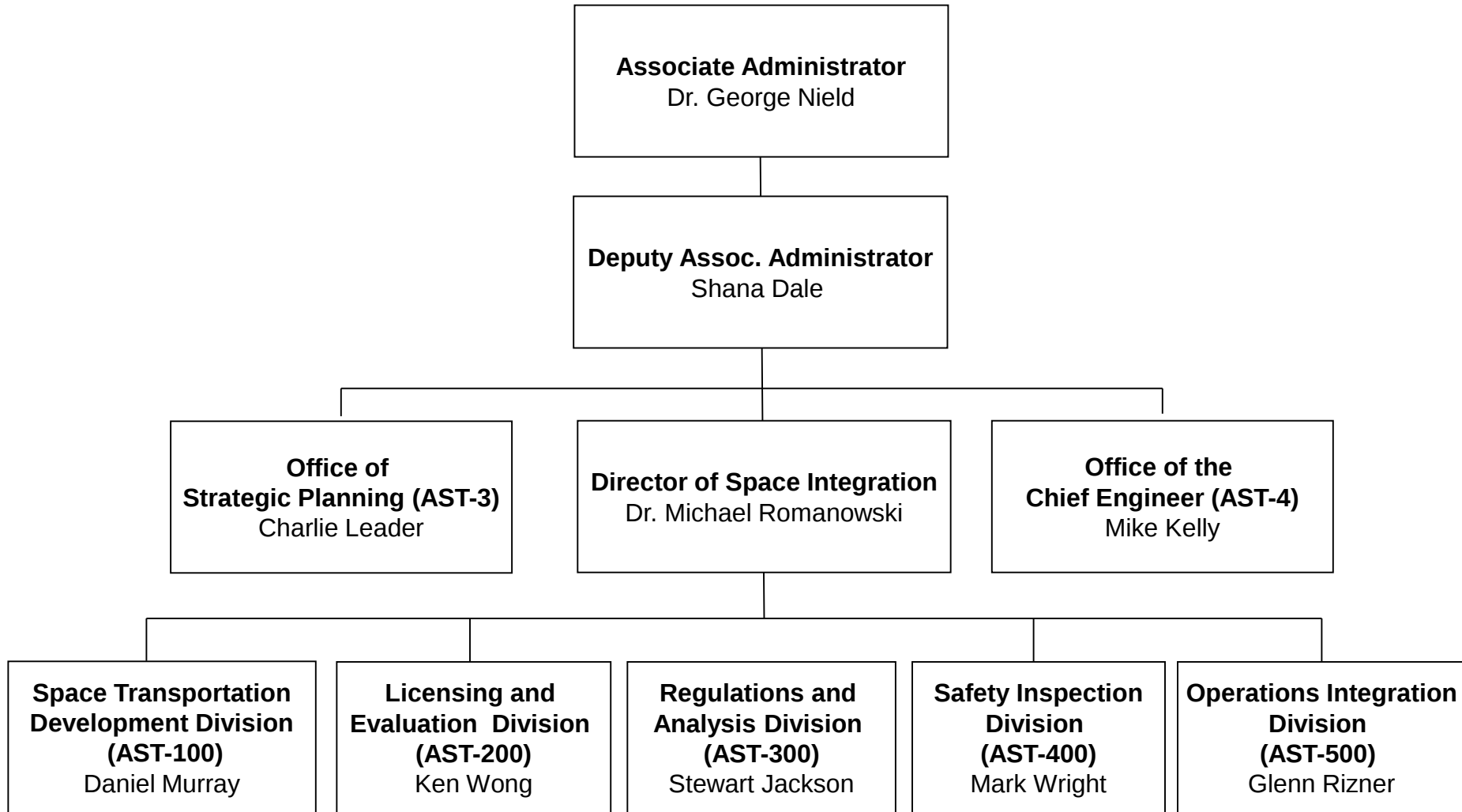
- The U.S. space activity conducted over 3 sectors:
 - Civil
 - Military
 - Commercial
- The *commercial* sector had its official start in 1984 with Executive Order 12465
 - DOT designated as lead Federal agency for enabling private-sector launch capability
- Congress passed the Commercial Space Launch Act in 1984
 - Regulatory oversight for the commercial sector was given to the Office of Commercial Space Transportation
 - Office was originally within DOT and the Office of the Secretary
- Today, the office is one of four lines of business within the FAA
 - Aviation Safety (AVS)
 - Air Traffic Organization (ATO)
 - Airports (ARP)
 - Commercial Space Transportation (AST)

Commercial Space Transportation

- **FAA's Office of Commercial Space Transportation (AST)**
http://www.faa.gov/about/office_org/headquarters_offices/ast/
- Mission: *To ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation*
- Over 230 licensed and permitted commercial launches since 1989 with no public casualties or major property damage

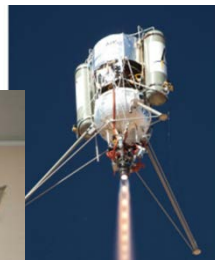
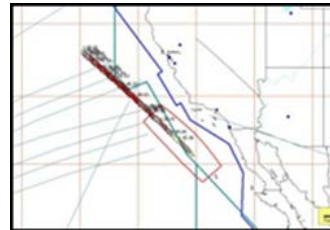


AST's Organizational Structure



AST Products & Services

- **Licensing**
 - Launch and reentry vehicle operations
 - Launch and reentry site operations
- **Experimental Permits**
 - Suborbital Reusable Launch Vehicle (RLV) operations
- **Safety Approvals**
 - Systems, subsystems, and processes
- **Safety Inspections & Oversight**
 - Inspections and compliance monitoring for AST-issued licenses and permits
- **Rulemaking**
 - Development and publication of regulations, guidelines, and Advisory Circulars
- **Infrastructure Development**
 - Space Transportation Infrastructure Matching (STIM) Grants
- **Research**
 - Partnership of government, industry, and academia to address research needs, including the Commercial Space Transportation Center of Excellence



Who Needs a License or Permit?



- **An entity must obtain a license:**
 - To ***launch*** a launch vehicle from the United States;
 - To ***operate*** a launch or reentry site within the United States;
 - To ***reenter*** a reentry vehicle in the United States.
- **An entity must obtain a permit:**
 - To ***launch*** a reusable suborbital vehicle from the United States for research and development, or prior to obtaining a launch license, to show compliance with requirements for a license or crew training.
- **A U.S. citizen or an entity organized under the laws of the United States or any State must obtain a license:**
 - To launch a launch vehicle *outside* the United States;
 - To operate a launch or reentry site *outside* of the United States;
 - To reenter a reentry vehicle *outside* of the United States; or
- **FAA does not license launches or reentries “the Government carries out for the Government”:**
 - NASA and the Department of Defense typically carry out their own launches.

Regulatory Process

- AST sets the public safety requirements for commercial space operators in Chapter 14 Part 400 of the US Code of Federal Regulations
1. Launch and reentry vehicle operators apply to AST seeking licenses or permits authorizing them to conduct proposed operations
 2. Launch and reentry site operators apply to AST seeking licenses authorizing them to operate a site
 3. AST evaluates an operator's application to ensure compliance with the regulations
 4. AST makes a license or permit determination



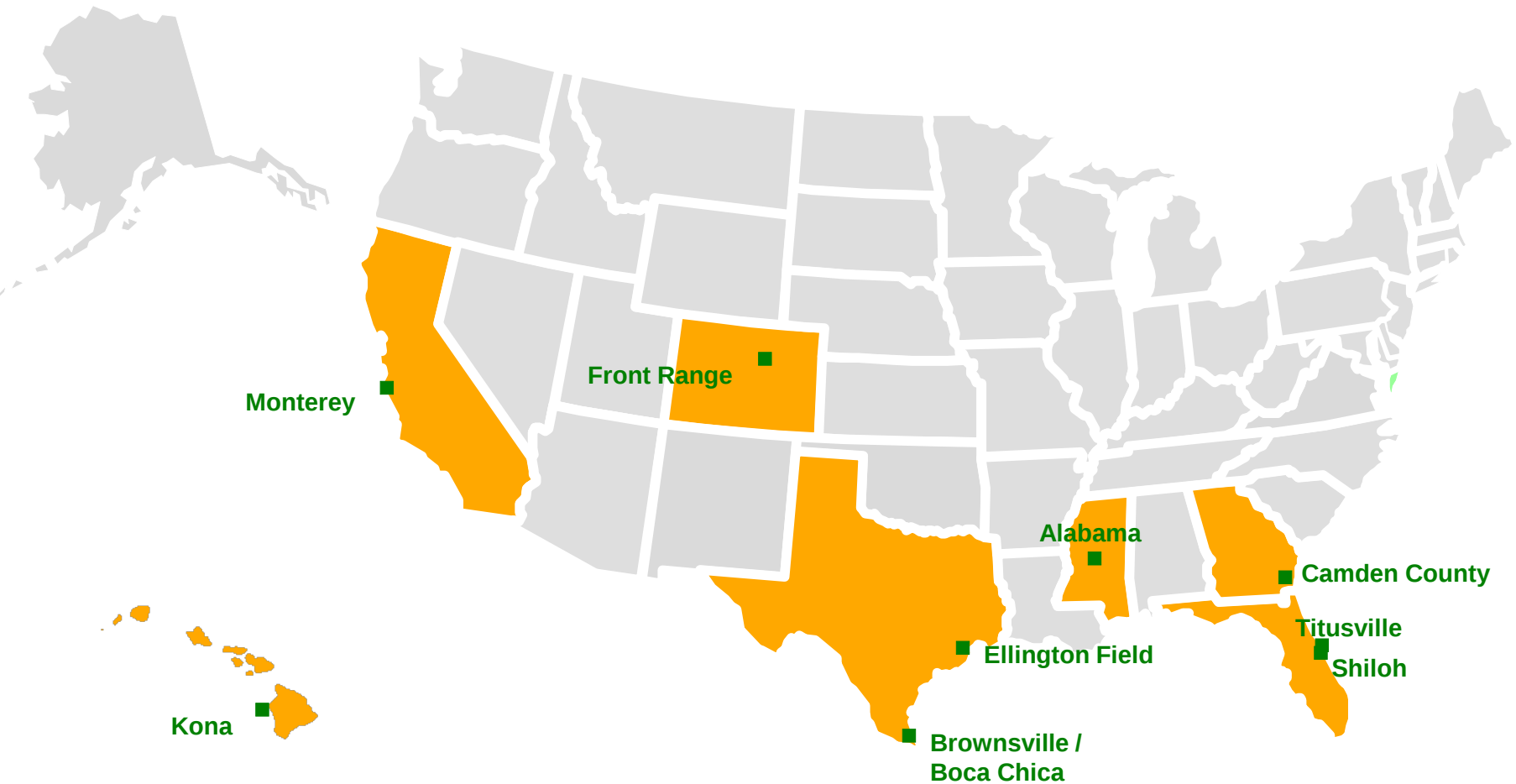
Extremely Dynamic and Diverse Market



U.S. Licensed Launch Sites – “Spaceports”

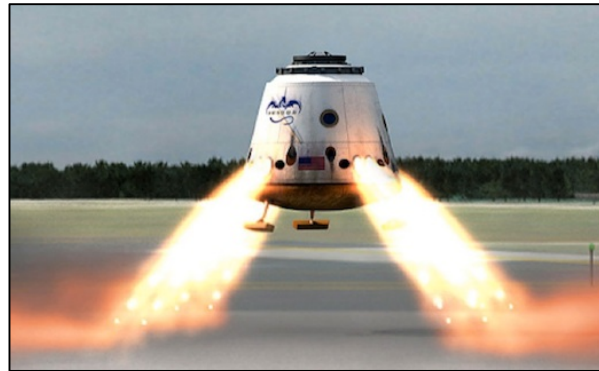


Proposed Future U.S. Spaceports



Variety of Spaceport Operations

- Vertical Launch to Orbit
- Vertical Suborbital Launch
- Horizontal Suborbital Launch
- Reentry from Orbit



Site Operator License

- A site operator license:
 - Authorizes a licensee to operate a launch site in accordance with the representations contained in its license application
 - Operator may offer its site for use by licensed or permitted launch and reentry vehicle operators of vehicle of the type identified in the license application and upon which the licensing determination is based
 - Remains in effect for 5 years
 - May be surrendered, suspended, or revoked
 - Is renewable upon application
 - Is subject to FAA compliance monitoring and safety inspections

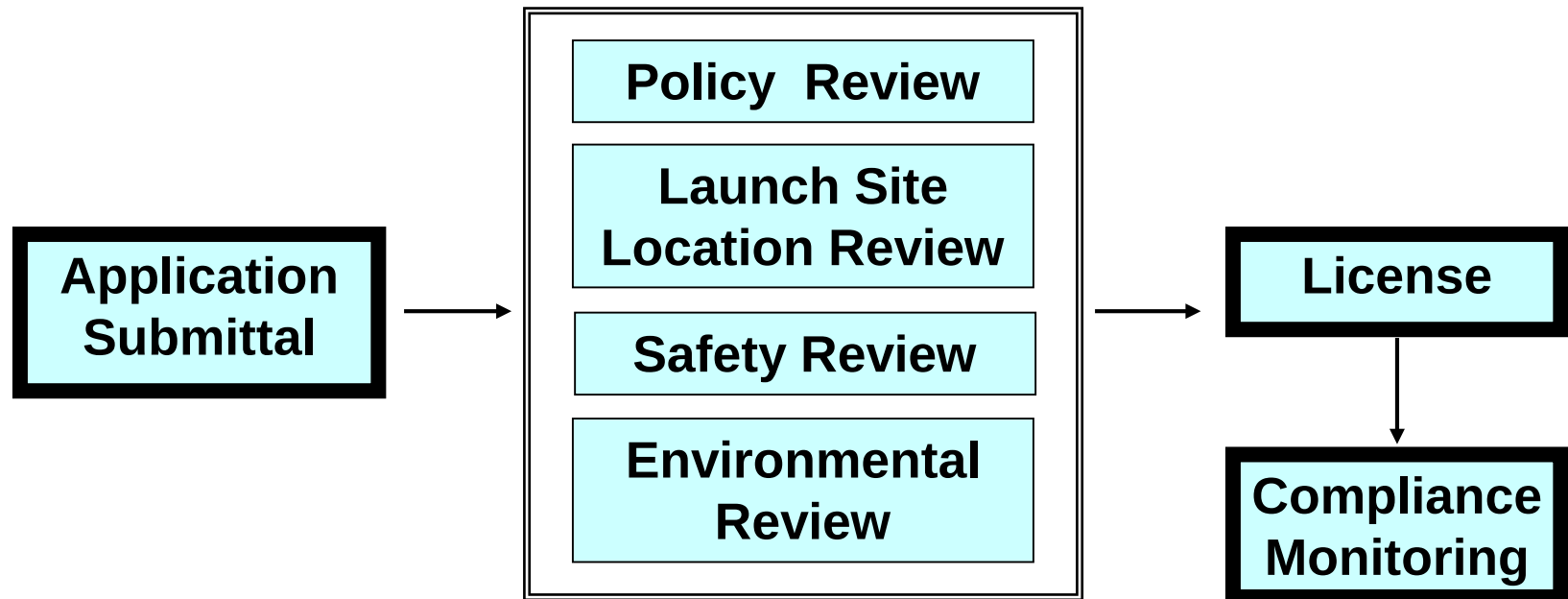
Site Operator License

- A site operator license does not:
 - Authorize a launch or reentry operation
 - A launch or reentry vehicle operator must receive its own license or permit to conduct operations of its vehicle from the site.
 - Relieve a licensee of its obligation to comply with any other laws or regulations
 - Confer any proprietary, property, or exclusive right in the use of airspace or outer space

Responsibilities of a Licensee

- Control of Public Access
- Explosive Siting
- Agreements with Air Traffic and US Coast Guard
- Scheduling Hazardous Operations of its Customers
- Accident Investigation
- Continued Obligation to Comply with Any Other Laws, Regulations, and Contractual/Administrative Commitments

License Evaluation Process



Launch Site Location Review

To determine whether a launch may potentially take place safely from the proposed site an applicant must:

- Demonstrate it is hypothetically possible to safely launch one type of launch vehicle on one trajectory from each launch point at the site

To do so, the applicant may:

- Provide assumptions of conceptual vehicle – an agreement with an operator is not required
- Provide data from an actual operator

Commercial Space Launch Act

- Congress finds that:
 - Space transportation, including the establishment and operation of launch sites, reentry sites, and complementary facilities, the providing of launch services and reentry services, the establishment of support facilities, and the providing of support services, is an important element of the transportation system of the United States, and in connection with the commerce of the United States there is a need to develop a strong space transportation infrastructure with significant private sector involvement
 - The participation of State governments in encouraging and facilitating private sector involvement in space-related activity, particularly through the establishment of a space transportation-related infrastructure, including launch sites, reentry sites, complementary facilities, and launch site and reentry site support facilities, is in the national interest and is of significant public benefit

Space Transportation Infrastructure Matching (STIM) Grants

- In 1994, Congress authorized the FAA to make project grants to ensure the resiliency of the space transportation infrastructure of the United States
- Congress appropriated funds of \$500,000 in 2010
- Funding was continued at 2010 level in 2011 and 2012 under continuing resolution authority
- No funds have been available since 2012
- Basic requirements:
 - Sponsors must be government agencies or entities (e.g., an airport authority)
 - At least 10 percent of the total cost of the project will be paid by the private sector
 - The grant will not be for more than 50 percent of the total cost of the project

STIM Grant Awards

FY 2012

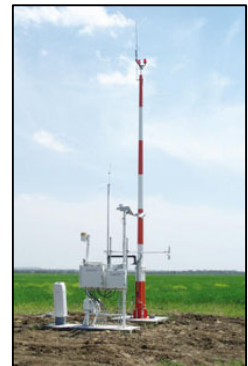
- Front Range Airport, CO – Feasibility studies, environmental assessment
- State of Hawaii – Feasibility studies, environmental assessment
- Mojave Air and Space Port, CA – Pyrolance firefighting equipment

FY 2011

- Mid Atlantic Regional Spaceport, VA – Security/surveillance system
- Mojave Air and Space Port, CA – Pumphouse for firefighting capabilities
- Spaceport America, NM – Vertical launch pad

FY 2010

- Spaceport America, NM – Automated Weather Observing System
- Kodiak Launch Complex, AK – Rocket Motor Storage Facility
- Cecil Airport, FL – Spaceport Master Plan
- Mojave Air and Space Port, CA – Emergency Vehicle



Challenges Going Forward

- Commercial Space Transportation industry is growing
 - US Government increasing reliance on commercial services
 - NASA ISS Commercial Cargo Resupply, ISS Crew Transport, EFT-1, Flight Opportunities Program
 - DoD DARPA XS-1
 - Movement of sites from coastal locations to inland, more populated areas
 - Metro areas (e.g. Jacksonville, Houston, Denver)
 - Part 139 airports
- Operations tempo is increasing
 - Number of operators
 - Number of operating locations
- Operations are becoming more complex
 - New concepts, technology, processes and procedures
 - Autonomous Safety Systems
 - Flyback boosters

Integration into the NAS

- FAA AST and ATO have developed a Joint Space Operations Group based at the Air Traffic Control System Command Center to develop processes and procedures for safely and efficiently integrating commercial space launches and reentries into the NAS
- New launch and reentry sites present unique challenges, particularly when they are proposed to be located in close proximity to major airports and other traditionally congested areas
 - FAA conducts case-by-case examination of characteristics of site, vehicle, and proposed operations, such as:
 - Site: Vertical launch (pad) or horizontal launch (runway)
 - Vehicle: Carrier aircraft, gliding return, powered return
 - Ops: Experimental (flight test) or operational vehicles (demonstrated)

Contact

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