

The Regulatory Role of the Federal Aviation Administration

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**Federal Aviation
Administration**



Regulatory Structure

- **Congress**
- **Executive Branch**
 - Federal Aviation Administration – space transportation
 - Federal Communications Commissions – space communications
 - National Oceanic and Atmospheric Administration – remote sensing from space
- **Judiciary**



Administrative Procedure Act

- **Rulemaking**
- **Authorizations: licenses and permits**
- **Adjudication**



Statutory Authority

- **49 U.S.C. Subtitle IX, chapter 701 (Ch. 701)**
 - Authorizes the Secretary of Transportation to authorize launch and reentry and operation of launch and reentry sites as carried out by U.S. citizens or within the United States.
 - Directs the Secretary to
 - Exercise this responsibility consistent with public health and safety, safety of property, and national security and foreign policy interests of the United States.
 - Encourage, facilitate and promote commercial space launches and reentries by the private sector.

Statutory Mission



Air Launch



Launch & Reentry Sites



Launch & Reentry



Sea Launch



Human Space Flight

Types of Launch Sites



Sea Launch



**Oklahoma
Spaceport**



California Spaceport



**Kodiak Launch
Complex**



**Mid-Atlantic
Regional Spaceport**



**Florida
Spaceport**



Mojave Air and Space Port



U.S. Spaceports



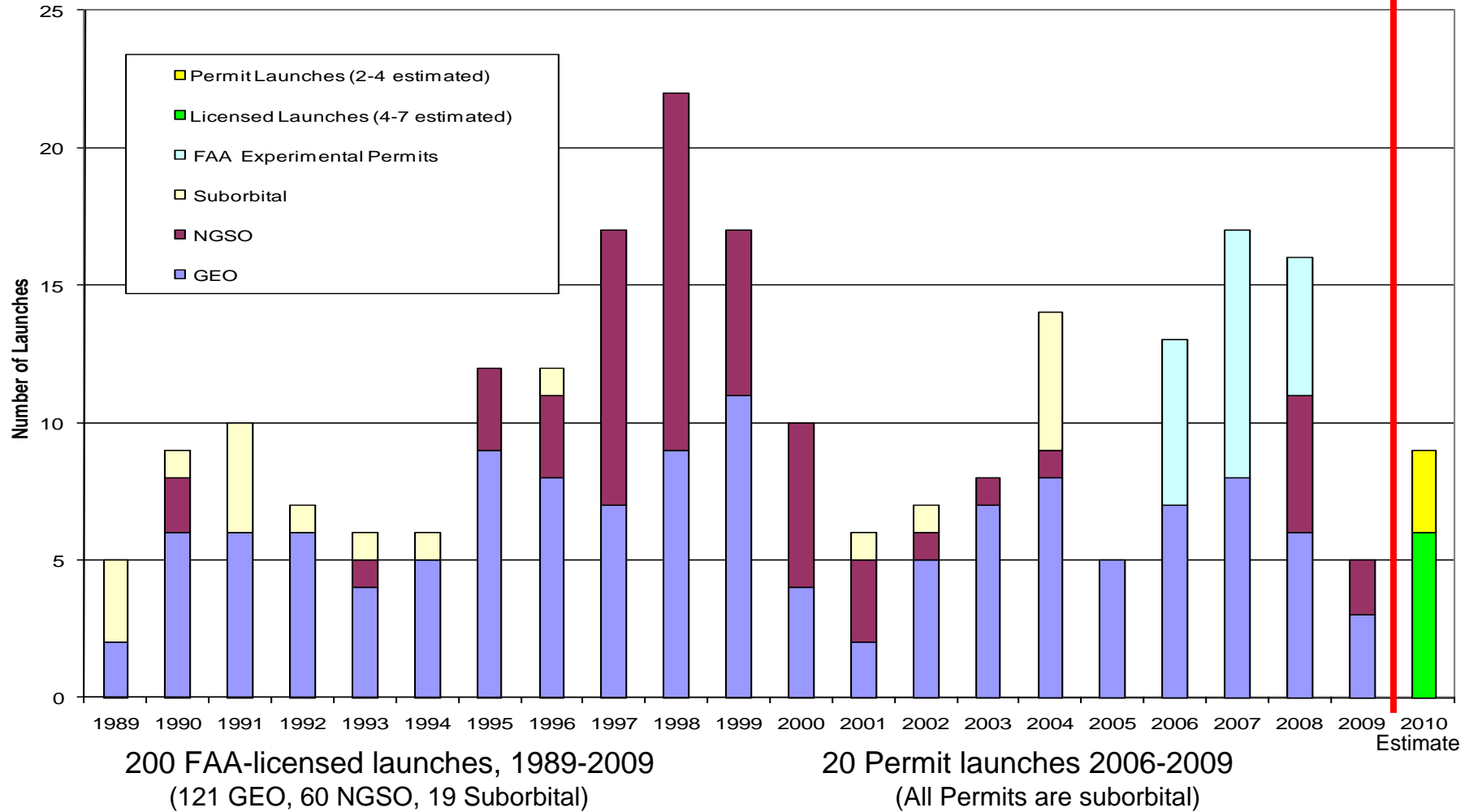
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Governmental Space Activity

- **FAA authority has limits**
 - 49 U.S.C. § 70117(g) states that Chapter 701 does not apply to launches or reentries or the operation of launch or reentry sites “the Government carries out for the Government.”

FAA-Licensed Launches, 1989-2009



Includes 26 licensed launches operated commercially for DOD, NASA, NOAA

January 2010



Licensing

- **Elements of a license review for launch and reentry**
 - Policy
 - Payload review
 - Safety review
 - Environmental
 - Financial responsibility

- **180 days**

Licensing--Safety Review

- **The FAA's regulations require review of the safety of a launch to protect the public. The regulations**
 - Impose positive safety controls,
 - Implement a system safety approach, and
 - Establish maximum risk thresholds for different hazards.

Licensing--Environmental Review

- **An applicant must provide enough information for the FAA to analyze the environmental impacts associated with proposed activities.**
- **The information must enable the FAA to follow:**
 - The requirements of the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq., and
 - The Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500–1508.

Licensing - Financial responsibility

- **Licensees must demonstrate financial responsibility to compensate for the maximum probable loss (MPL) from claims by:**
 - A third party for death, bodily injury, or property damage or loss; and
 - The U.S. Government for damage or loss to government property.
- **The U.S. Government will seek a payment for any claims above the insured amount (up to \$1.5 billion as adjusted for inflation)**
 - Subject to Congressional appropriation.

Financial Responsibility - Cross-Waivers

- **A licensee must sign reciprocal waivers of claims with its contractors, its customers, and the U.S. government.**
- **Each party waives and releases claims against the other parties to the waivers and agrees to assume financial responsibility for:**
 - Property damage it sustains, and
 - For bodily injury or property damage sustained by its own employees.
- **The purpose is to reduce litigation expenses by requiring launch participants to assume responsibility for their own losses.**
- **Flight crew and space flight participants must execute reciprocal waivers of claims with the federal government.**

Suborbital RLVs In Development



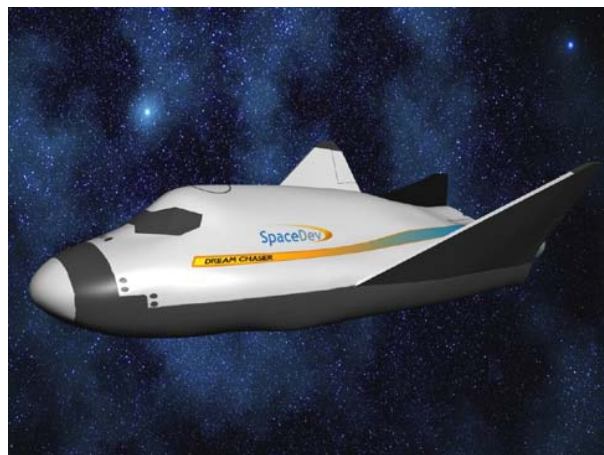
Blue Origin



XCOR Aerospace



Armadillo Aerospace



Sierra Nevada (SpaceDev)



Virgin Galactic



Rocketplane Global

Commercial Space Launch Amendments Act of 2004

- **On December 23, 2004, President Bush signed into law the CSLAA, which:**
 - Promotes the development of an emerging human space flight industry and
 - Makes the FAA responsible for regulating commercial human space flight
 - Establishes an “informed consent” regime for space flight participants
 - Premised on the view that industry needs same freedom to grow as aviation industry experienced.

Definitions

- ***Suborbital Rocket*** – a vehicle, rocket propelled in whole or in part, intended for flight on a suborbital trajectory, and the thrust of which is greater than its lift for the majority of the rocket-powered portion of its ascent.
- ***Crew*** - employee of a licensee, or of a contractor or subcontractor of a licensee, who performs activities in the course of that employment directly relating to the launch, reentry or other operation of or in a launch vehicle or reentry vehicle that carries human beings.
- ***Space flight participant*** - an individual, who is not crew, carried within a launch vehicle or reentry vehicle.

CSLAA (cont'd)

- **Provides FAA responsibility for crew and space flight participant safety**
 - Limits that responsibility for eight years
 - Unless there has been a death, serious injury or close call
 - Prevents even individualized license conditions to protect passengers or crew absent regulations
- **Leaves unchanged the FAA's ability to protect the public on the ground**

CSLAA (cont'd)

- **Crew and space flight participants must release the U.S. Government from liability claims.**
- **Under section 70105, a holder of a license or permit must inform any crew and space flight participants that the U.S. Government has not certified the launch vehicle as safe, and about**
 - The risks of the launch and reentry, or
 - The safety record of the vehicle type, including government launches.

Regulations at 14 C.F.R. part 460

- **Crew requirements**

- Crew are part of the flight safety system
- Training requirements
 - To avoid harming the public
 - Train for nominal and non-nominal conditions
- Demonstrate an ability to withstand the stresses of space flight sufficiently to carry out duties, including from
 - High acceleration or deceleration
 - Microgravity
 - Vibration

Crew Requirements (cont'd)

- **Pilot and remote operator must possess an FAA pilot certificate with an instrument rating and receive training specific to the vehicle, using**
 - Simulators,
 - Flight testing
 - An equivalent
- **Remote operator may demonstrate level of safety equivalent to pilot certificate with instrument rating.**
- **Safety-critical crew must have a 2nd class airman medical certificate.**



Environmental Controls

- **Monitoring and control of atmospheric conditions**
 - Composition of the atmosphere, including oxygen, carbon dioxide, and revitalization;
 - Pressure, temperature and humidity;
 - Contaminants, including particulates, gases and vapors
 - Ventilation and circulation.
- **Adequate redundant or secondary oxygen supply for flight crew.**

Environmental Controls (cont'd)

- **An operator must --**
 - Provide a redundant means of preventing cabin depressurization; or
 - Prevent incapacitation of any of the flight crew in the event of loss of cabin pressure.
- **An operator or crew must be able to detect smoke and suppress a cabin fire to prevent incapacitation of the flight crew.**

Human Factors

- **Operator must take precautions necessary to account for human factors able to affect a crew's ability to perform safety-critical roles, including in**
 - Displays and controls;
 - Mission planning, including in allocating functions between persons and equipment;
 - Restraint and stowage; and
 - Vehicle operations, so that flight crew can withstand stresses of space flight.

Verification Program

- **Operator must verify integrated performance of a vehicle's hardware and software in an operational flight environment**
 - Before allowing any space flight participant on board during a flight.
- **Verification must include flight testing.**

Waivers of claims

- **Each crew member and each space flight participant must execute a reciprocal waiver of claims with the Federal Aviation Administration.**
- **Unlike payload customers, a space flight participant is not required by federal law to waive claims against a launch operator.**

Space Flight Participants

- **Informed consent must be based on**
 - Knowledge of hazards and consequences
 - Past history of that vehicle and others like it
 - Written consent after opportunity to obtain more information.
- **Training is required for emergencies.**
- **Operator must implement security requirements.**
- **A space flight participant may not carry explosives or weapons on board.**

Permits

- **CSLAA established an experimental permit regime for reusable suborbital rockets flown for:**
 - Research and development;
 - Showing compliance with requirements for a license; or
 - Crew training prior to obtaining a license.
 - Compensation or hire is not allowed.
- **Legislative history suggested that permit be**
 - Granted more quickly and easily than a license.
- **Differences between permits and licenses**
 - 120 days vs 180 days
 - No compensation or hire
 - For reusable suborbital rockets only
 - No “indemnification”
 - No quantifiable risk requirements

For more information

- **49 U.S.C. Subtitle IX, ch. 701 and 14 C.F.R. Ch. III**
- **AST's Website:**
http://www.faa.gov/about/office_org/headquarters_offices/ast/ or <http://ast.faa.gov>
- **Legal questions:**

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