The Regulatory Role of the Federal Aviation Administration

Presented to: Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space

By: Laura Montgomery, Senior Attorney, FAA
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

ELV

Air Launch

Launch & Reentry Sites

Launch & Reentry

Sea Launch

Human Space Flight
Types of Launch Sites

- Sea Launch
- Oklahoma Spaceport
- California Spaceport
- Florida Spaceport
- Kodiak Launch Complex
- Mid-Atlantic Regional Spaceport
- Mojave Air and Space Port
U.S. Spaceports

Key
- U.S. Federal Launch Site
- Non-Federal FAA-Licensed Launch Site
- Proposed Non-Federal Launch Site
- Sole Site Operator (FAA license or permit)

- California Spaceport
- Mojave Airport
- Edwards AFB
- Vandenberg AFB
- Spaceport America
- White Sands Missile Range
- Blue Origin Launch site
- Oklahoma Spaceport
- Wallops Flight Facility
- Kennedy Space Center
- Cape Canaveral Air Force Station
- Spaceport Florida
- Mid-Atlantic Regional Spaceport
- Cecil Field Spaceport
- Sea Launch Platform
- Equatorial Pacific Ocean
- Reagan Test Site
  Kwajalein Atoll, Marshall Islands

FAA/AST: January 2010
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

- 200 FAA-licensed launches, 1989-2009 (121 GEO, 60 NGSO, 19 Suborbital)
- 20 Permit launches 2006-2009 (All Permits are suborbital)

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
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:
  Laura Montgomery
  Office of the Chief Counsel
  Federal Aviation Administration
  800 Independence Ave., SW
  Washington, DC  20591
  (Tel.) 1 202 267-3150
  (email) laura.montgomery@faa.gov