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Chairman Nelson, Ranking Member Boozman, and Members of the Subcommittee:

Good morning. Thank you for inviting me to speak with you today.

America recently witnessed a turning point in transportation to low-Earth orbit, when a domestic commercial company, SpaceX, launched its Falcon 9 rocket from Cape Canaveral, placing its Dragon capsule on a successful course to berth with the International Space Station (ISS). This flight successfully demonstrated SpaceX's ability to deliver cargo for NASA. Later, Dragon safely re-entered the atmosphere and splashed down off the West Coast of the United States, demonstrating the domestic commercial ability to bring back scientific samples and other supplies. Both the launch and reentry for the SpaceX mission were licensed by the Federal Aviation Administration's (FAA) Office of Commercial Space Transportation.

The Office was established by statute in 1984, with a mission to ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch and reentry activities – like those demonstrated by SpaceX. The Office also has a Congressional mandate to encourage, facilitate, and promote commercial space transportation. In carrying out our safety responsibilities, we develop and issue regulations; grant licenses, permits, and safety approvals; and conduct safety inspections during every licensed or permitted launch. We grant licenses for launch, reentry, and the operation of launch and reentry sites or "spaceports," as they are popularly known. We issue permits for experimental reusable suborbital rockets launched or reentered for demonstrating compliance with license requirements, testing new design concepts, equipment, or operating technologies, and crew training. By law, permitted activities are not eligible for the government's conditional provision of payment of third-party claims exceeding a launch operator's required financial responsibility, also commonly referred to as "indemnification."

Keeping Pace with Market Growth

The growing importance of the FAA's mission is evident, given recent expansion of commercial space transportation industry activity and the promise of more to come. In the suborbital domain, several new commercial providers expect to enter regular service within the next five years. We are funding a study, to be released this summer, to evaluate the potential growth in commercial suborbital activity. As for Earth-to-orbit commercial transportation, initiatives are on the verge of expanding well beyond traditional unmanned satellite launches. The most advanced of these new initiatives includes SpaceX cargo flights servicing the ISS and similar services by Orbital Sciences Corporation, through their contracts with NASA's Commercial

Resupply Services (CRS) program. Like those of SpaceX, Orbital Sciences' flights will be licensed by the FAA. NASA estimates that commercial manned flights can be accomplished within the next five years. Beyond vehicle development and operations, several states are creating or expanding spaceports and the associated infrastructure to service evolving markets.

Typically, space operations require years for development. As a result, an accurate understanding of the full extent of the FAA's activities requires considering not only launches but also extensive pre-launch preparatory functions. For example, there were limited licensed launch operations in Fiscal Year (FY) 2011, involving three licensed launches and two permitted launches. However, intense preparation and testing also occurred, which we expect will result in increasing licensed and permitted launch operations in FY2012 and FY2013. In FY2012, two licensed launches have already taken place. As for pre-launch licensing and permitting activity, in FY2011 there were two new licenses, five license renewals, and one new permit. So far in FY2012, we have already issued three new licenses, one license renewal, and one new permit. In addition, we are carrying out evaluations of three license applications and one permit application, as well as ten pre-application consultations for licenses and permits. This activity, coupled with informal inquiries from current and potential commercial launch developers, demonstrates a continued interest in commercial space operations.

Highlighting the increasing volume of the FAA's "behind-the-scenes" activities helps demonstrate not only market potential but also the growing workload of the Office of Commercial Space Transportation's dedicated professional staff. Field Offices are critical both to our understanding of transportation operations and to enhancing our key relationships with other U.S. Government entities, such as NASA and the Air Force. To address this need, we are moving headquarters staff to field assignments, recruiting new field personnel, and adding contractor support where appropriate to maximize efficiency. By increasing our field presence, FAA provides operational safety oversight, speeds up communications and efficiency, and strengthens partnerships with the many stakeholders in commercial space operations.

Further reinforcing the FAA's commitment to the commercial space transportation industry, the Office of Commercial Space Transportation funds research through the FAA's Center of Excellence in Commercial Space Transportation. This initiative is a dynamic research partnership comprised of government, academia, and industry that involves matching U.S. Government and private-sector funding to pursue a variety of projects relating to a broad spectrum of areas vital to industry safety and growth. The Office of Commercial Space Transportation also carries out a variety of education and outreach initiatives, designed to increase awareness of opportunities for companies, investors, potential transportation customers, and the general public.

Public Safety Protection

The FAA authorizes and oversees launch, reentry, and the operation of launch and reentry sites. Since 1989, we have licensed 207 launches with no loss of life, serious injuries, or significant property damage to the general public. Safety inspection is a core function of FAA oversight. Inspections involve the monitoring of all licensed and permitted commercial space transportation activities. Activities include those conducted by the licensee/permittee, its contractors and subcontractors. FAA inspectors use approved safety inspection plans, templates, and checklists

to conduct and document inspections. A safety inspection encompasses more than flight activities alone. Inspectors also monitor and participate in mission dress rehearsals, safe and arm checks, flight termination system installation and checkout, accident investigation, and other activities related to public safety. Inspections are coordinated with other relevant agencies.

Liability Risk-Sharing Regime

Even with a rigorous framework of safety measures, space transportation is not without risk. As part of its licensing and permitting mission, the FAA administers financial responsibility and risk-sharing requirements for commercial launch and reentry operators. The Commercial Space Launch Act requires a licensee or permittee, any customer, contractors, and subcontractors, and the government to waive claims among themselves. In this "cross-waivers" arrangement, each party involved in a launch agrees not to bring claims against the other parties and is financially responsible for damage or loss it sustains to its own property. With the exception of the U.S. Government, each party is also responsible for claims associated with death or injury to its own employees, resulting from activities carried out under a license or permit.

Beyond first party losses, the risk-sharing regime places the first tier of risk of financial loss due to third-party damages squarely on the commercial company. The operator must cover the maximum probable loss that a launch or reentry could cause to third parties and their property. The FAA calculates a required amount of financial responsibility to ensure coverage of this maximum probable loss, or "MPL." We assess the risk that a license applicant's proposed launch or reentry activity might pose to "third parties" – in other words, the public on the ground not involved in the launch or reentry. The MPL methodology is based on a variety of carefully integrated factors, including historical experience with unmanned expendable launch vehicles and their payloads. Our office assesses the debris field resulting from a series of assumed failures along a launch or reentry trajectory, models the probability of failure of the activity, and ascertains the presence of property or potential casualties. The maximum financial responsibility requirement that the FAA could require of an operator is $500 million for claims by third parties, and $100 million for claims for U.S. Government property. Commercial launch companies generally demonstrate financial responsibility through the purchase of private liability insurance. By statute, the insurance policy must name all launch participants as additional insureds. This includes the U.S. Government and its contractors and subcontractors participating in launch. Also, by statute, claims by or against space flight participants are <u>not</u> covered by this insurance, which is only for third-party damages.

Only in the case of a very low probability event – one with a likelihood of happening of less than 1 in 10 million – would the second tier of the risk-sharing regime be activated. This second tier provides for the conditional U.S. Government payment of claims in excess of the amount of financial responsibility required of a commercial company. As mentioned above, this statutory risk balancing mechanism is commonly referred to as "indemnification." Here, the government's liability exposure is capped at $1.5 billion, adjusted for inflation since 1988, and payments are subject to Congressional appropriation. This coverage is for third-party claims only; space flight participants, or the loss of the property of the launch operator, are not covered by this tier. Any claims above this amount would comprise a third tier of risk, which is the responsibility of the commercial company.

Since the financial responsibility and risk-sharing regime for launch activities became law in 1988, there has not been a need for any liability payments. Congress has maintained the regime's functionality and effectiveness over the past twenty-four years by enacting five extensions of the regime. In 1998, Congress broadened the regime to include reentry in addition to launch. Ongoing support for extension of the regime is a testament to bipartisan efforts recognizing the need for developing a strong commercial launch industry to serve government and commercial interests.

Importance of Extending "Indemnification"

The FAA supports extending the "indemnification" provision for five years beyond its current statutory expiration date of December 31, 2012. This support is in line with the 2011 Commercial Space Transportation Advisory Committee (COMSTAC) finding that extension of indemnification past December of 2012 would be "critical to the viability of the commercial launch industry in the US." COMSTAC issued a recommendation in May of 2012 reiterating its support for extension.

Should the indemnification provision expire, all other portions of the financial responsibility and risk-sharing framework would remain in force. Accordingly, the FAA would continue to be charged with licensing launches and reentries subject to minimum financial requirements. The remaining statutory requirements would only provide license applicants with an amount of financial responsibility that represents the maximum probable loss without regard to the maximum possible loss.

If the indemnification provision were to expire, increased demand for private insurance to address more than the maximum probable loss could lead to higher insurance costs. Companies with fewer resources could struggle to manage risk, and investors could be discouraged from providing capital to companies with catastrophic risk exposure, further restricting access to capital and suppressing growth. A stable regulatory environment, including predictable, risk-based financial responsibility requirements and certainty in allocating risk, is critical to securing investor confidence and willingness to place capital at risk.

The current financial responsibility and risk-sharing framework was created with Congress recognizing the emergence of foreign launch services made competitive through government subsidies and preferential foreign national laws. The emerging U.S. commercial launch industry requires a stable and predictable risk-sharing program, including government indemnification of claims in excess of maximum probable loss, in order to plan future operations and encourage investment. Maintaining the current risk-sharing regime through a five year extension of indemnification would contribute to meeting this need. Fostering growth of this vital industry will produce public benefit in the form of national security, technological capacity, and national pride, by enabling domestic access to space for government and commercial users and contributing to U.S. aerospace preeminence.

Accident Investigation

In addition to providing for appropriate government-industry risk sharing, planning is in place for the investigational procedures that will be necessary in the event of an accident. The FAA requires licensees to comply with their previously approved accident investigation plan, including immediate notification to the FAA Washington Operations Center in the event of a fatality or serious injury, or notification within 24 hours in the event of a mishap, which includes both accidents and incidents.

The FAA has also established a strong working relationship with the National Transportation Safety Board (NTSB) to familiarize the NTSB with commercial space flight. The NTSB has supported the FAA in developing plans for managing a mishap investigation as well as training and preparing the commercial space industry for a mishap. The FAA Office of Commercial Space Transportation Mishap Program Manager works directly with the NTSB on a frequent basis. Additionally, the FAA, NTSB and the Air Force have a joint Memorandum of Agreement (MOA) that calls out roles and responsibilities for mishap investigation. This MOA has been in place for several years. The FAA and NTSB, in coordination with NASA, the Air Force, and commercial space flight companies have reviewed mishap scenarios on a frequent basis at both the eastern and western launch ranges, in order to exercise roles and responsibilities in the event of a launch or reentry mishap. The NTSB will respond to a commercial space launch or reentry accident in a similar fashion to that in the commercial airline industry, if the FAA declares an accident has occurred in accordance with established FAA regulatory definitions in 14 C.F.R. Part 401. In the event of an accident, the FAA is prepared to carry out its investigatory responsibilities as outlined in the joint MOA. We value this partnership, respect each other's expertise, and are certain that the many discussions and joint exercises have prepared us to work together effectively in the future.

Approaches to Human Space Flight

As human space flight begins to evolve, the current financial responsibility and risk-sharing regime is well suited to cover emerging activities such as commercial crew. Since MPL coverage only applies to third-party damage, the MPL estimate would not be impacted by whether the launch includes a commercial crew or space flight participants. The MPL is not an estimate of risk to crew or space flight participants, but rather, to third parties, including members of the public and non-flying U.S. Government employees. Space flight participants and crew are not third parties.

By law, the FAA may not propose regulations for occupant safety until October 2015, except under certain circumstances. We anticipate that occupant safety regulations will be a major undertaking, and will require a comprehensive regulatory framework to eventually be proposed through a suite of rulemaking activities. Implementing this framework will take time, and will involve significant public comment and input.

NASA is planning to contract with the private sector to transport NASA astronauts to the ISS within a few years. NASA and the FAA have agreed that FAA licensing will be required for operational flights to the ISS. Recently, the FAA and NASA signed a historic agreement to coordinate standards for commercial space travel of government and non-government astronauts

to and from low-Earth orbit and the ISS. The two agencies will collaborate to expand efforts that provide a stable framework for the U.S. space industry, avoid conflicting requirements and multiple sets of standards, and advance both public and crew safety. The agreement establishes policy for operational missions to the ISS. Commercial providers will be required to obtain a license from the FAA for public safety. Crew safety and mission assurance will be NASA's responsibility. This approach allows both agencies to incorporate experience and lessons learned as progress is made. Beyond this, the FAA's role involving flights carrying NASA astronauts is still under consideration. We are grateful to NASA for paving the way for commercial crew transportation, and recognize that industry will benefit from our cooperation to ensure compatibility between operational requirements for NASA missions and regulations for commercial customers.

The FAA's top priority is public safety, and, when the time arrives, will extend to appropriately protect occupants from risks. However, we must also leverage our existing knowledge of human space flight safety in a way that does not restrict innovation. This is in accordance with the Congressional mandate that human space flight regulatory standards evolve as the industry matures so that regulations neither stifle technology development nor expose crew or space flight participants to avoidable risks.

Planning for the Future

As the industry evolves, and the government's reliance on commercial vehicles changes, it may be necessary to revisit some of the statutes and regulations that govern commercial space transportation. Specifically, the FAA's statutory authority may require expansion and adjustments to definitions to ensure public safety. For example, there may be a need for greater regulatory authority in the areas of transportation on orbit as well as launch and reentry. We look forward to working with the interagency community and Congress as the industry matures and evolves.

The U.S. commercial space industry continues to achieve new milestones. Beyond servicing the ISS, companies may soon be transporting participants to commercial orbital facilities like those being developed by Bigelow Aerospace.

As the pace of change accelerates, the current launch liability risk-sharing regime remains good public policy and should be extended. As Congress has recognized, the development of the commercial space transportation industry enables the United States to retain its competitive position internationally, contributing to the national interest and U.S. economic well-being. Extending indemnification and the current risk-sharing regime will continue to enable industry to attract and maintain a growing customer base, in the face of international competitors offering robust protection against risk.

With the help and leadership of Congress, the domestic commercial space transportation industry will continue to move forward – fueling innovation, creating jobs, and driving economic growth.

Again, I am grateful for this opportunity to speak before you today, and I am happy to answer any questions you may have.