

TESTIMONY FOR HEARING ON
NECESSARY UPDATES TO THE COMMERCIAL SPACE LAUNCH ACT

UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON SPACE

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Thank you for the opportunity to testify today on the topic of updating the Commercial Space Launch Act. I am pleased that the Committee has engaged on the important process of reviewing these matters. The space industry in the United States is undergoing some very significant changes as more commercial space activities move from planning and design phases to manufacturing, launch, and customer-based outer space projects. It is very timely to begin a review of existing U.S. law in light of national and international issues that will need to be resolved in the years ahead as these private activities in space grow and evolve.

I will discuss both near-term and long-term issues that will need Congressional review of the role of the Commercial Space Launch Act of 1984, as amended. This legislation authorizes the regulations that the DOT/FAA Office of Commercial Space Transportation implements.

Strengths of the current CSLA:

This Act has proven and continues to be a very powerful and productive force in stimulating commercial space transportation in the United States that is used for both government and private payloads. Its two basic regulatory functions are overseeing the safety of payloads and launches and insuring that the companies involved are financially responsible. Important other functions are the promotion of commercial space

transportation and in recent years the administering of regulations for future experimental suborbital commercial launches of people to the edge of outer space.

The legislation recognizes not only domestic economic and technological issues but it also recognizes our international obligations under the U.N. treaties that we have ratified on space affairs. The DOT/FAA has carried out its obligations well and the U.S. is recognized as a responsible nation in administering commercial space launch activities.

The FAA has also been successful in promoting commercial space endeavors. Even without any specific “cheerleading” for commercial space, the fact that the regulations have remained predictable, stable, consistent, and have been administered with fairness and transparency is alone enough to provide confidence in the domestic and international commercial communities.

Issues of current and future consideration for Congress

Jurisdiction Issues

But there are some considerations that the Congress should address as commercial space activities evolve. The first is to clearly define which federal agencies have jurisdiction over different types of specific activities. The DOT and the FAA under it is an agency with expertise in administering rules concerning transportation and specifically air and space transportation. Until recently commercial space, other than telecommunications and earth observations satellites, has been focused since the late 1980s on private launch vehicles and that is the primary focus of the CSLA and of the FAA’s Office of Commercial Space Transportation. Currently there are a number of U.S. companies that are well advanced in the development of various new launch vehicle projects, some suborbital and some aimed at orbital or even more distant space destinations.

In recent public reports there are at least two companies preparing plans for resource extraction on asteroids. There are a number of companies vying for the Google Lunar XPrize that entails safely landing a payload on the Moon. There are companies building

equipment for outer space as well as planning other projects as diverse as landing humans on Mars or generating power from space platforms.

It is obvious that all of these efforts will require space transportation and therefore they or their launch company will have to get a license from the FAA for launch (and reentry, if that is also planned). At present, Congress has not granted regulatory authority to any agency for most of these newly developed commercial activities that will take place in outer space, or on celestial bodies. Yet, issues of safety, international responsibility, and liability will remain with the Federal Government as mandated by our treaty agreements. The question for the Congress will be to determine what agencies within the Government will best provide the expertise and oversight of these non-transportation activities occurring in outer space.

The FAA has no special expertise in the fields of resource extraction, energy generation, or in many other activities planned for space. Their jurisdiction in space affairs should clearly be defined and preferably limited to those issues directly related to launching and reentry. Their more general Congressional mandate to promote commercial space has led the FAA to issue a legal response to an activity that involves space equipment but is only marginally related to launching or reentry. This decision concerned a recent license request for a balloon to be placed by a commercial company well within national airspace at 30 km altitude. The reasoning for this approval was two-fold, 1) the payload was for testing equipment that was designed to withstand conditions in outer space, and 2) their enabling legislation, the CSLA (Chapter 509 of U.S. Code Title 51), allowed for the FAA to issue this license. However, as the letter opinion clearly recognizes, a balloon is not a rocket launch.

This decision illustrates a policy decision more concerned with promoting commercial space than with the core mission of the FAA's Office of Commercial Space. They could easily have ruled that this test was limited to airspace and would fall under traditional FAA air regulations. There was nothing inherently or legally incorrect with their ruling. In fact, it may be helpful to the company developing equipment for space tourism. But, in the absence of other agencies with jurisdiction to oversee activities in outer space, the

willingness of the FAA Office of Commercial Space to rule on this and other matters, suggests that there may be future issues where they may go well beyond their existing Congressional mandate to regulate commercial launches.

The Congress should study and review the scope of the jurisdiction in regulating space activities that has been granted to the DOT/FAA under the CSLA. Questions such as the ones below will arise more frequently.

- If a payload is “launched” from a platform in space (rather than from Earth directly), should that activity be considered legally as a separate launch and subject to FAA jurisdiction or is it beyond any existing U.S. regulatory regimes?
- How long before the actual act of reentry should the FAA have jurisdiction while the vehicle/payload is still in outer space?
- Is a suborbital flight that goes into the legal regime of outer space the same as a suborbital flight that never leaves domestic airspace?
- What criteria will be developed to determine the end-of-life of a vehicle or payload and what are the appropriate regulatory provisions applicable to a decommissioned payload that remains in orbit?
- Does FAA transportation oversight apply in outer space when a commercial payload lands on a celestial body?
- If celestial resources are moved in space, are those actions under FAA regulatory authority and if so, at what point in the process would the FAA jurisdiction begin and end?

These, and other questions are not clearly answered in the CSLA. They will arise if many of the current commercial plans become operational. And, it is important to remember that by treaty agreements, the United States Government as a launching state is ultimately liable for damages from these activities should something go wrong.

I would recommend that Congress study this issue and allocate future jurisdiction over non-transportation issues to agencies with the required expertise in those areas. At the

same time, Congress should clearly define the jurisdiction limits of the CSLA in order to avoid overlapping jurisdictions.

Indemnification

In 1988 the Congress agreed to indemnify for damages from an accident involving a launch from the United States up to \$1.5 Billion (today, with the legislatively required inflation adjustments that figure is above \$2.5 Billion). The DOT/FAA requires private companies to either buy or show the ability to pay an amount equal to the maximum probable loss from a launch. That insurance requirement is capped at \$500 million (the estimate of the amount the insurance industry can underwrite for any given launch) and is determined by estimates for each type of launch vehicle. Since the Outer Space Treaty and the Liability Convention do not provide any limits to a nation's liability, either in amount or in time, the United States could be faced with a claim of any amount. If there ever were a catastrophic accident in space involving a U.S. government or corporate asset, politics and international relations rather than any Congressional limit will likely determine who would pay and how much.

The good news is that the probability of such a catastrophic accident in space is relatively small. To date, although there have been collisions of satellites in space; none have resulted in economic losses that were large enough to warrant a claim or legal suit. Although such an accident is always possible, the probability is very low. And, even if something happened that created compensable damages, the provisions of the treaties require the finding of fault and the likely sharing of the damages if there are multiple nations involved.

The bad news is that some orbits in space are becoming crowded with human-created debris. There is a growing probability that something catastrophic with large economic consequences could happen as we launch more satellites into space and as the world's economies become more dependent on satellite applications and services. This, coupled with emerging space capabilities such as satellite servicing, active debris removal, and moving/using asteroids and other NEOs, will raise new insurance/indemnification issues.

Another approach that the Congress might want to consider and study would be to separate the U.S. Government's 3rd party indemnification regime into two parts. The first adheres to Article II of the Liability Convention, which mandates absolute liability for space objects falling to Earth, and would provide for an unlimited 3rd party liability provision for damages from space objects to terrestrial property or assets (including aircraft in flight). The second would be a different indemnification regime that follows Article III of the Liability Convention and would include caps on liability for fault-based incidents occurring in outer space and where the damages are solely to assets or property in outer space.

Additionally, current international space law lacks an effective dispute resolution system. Diplomatic negotiations have worked well in the past when all space assets were government owned and operated. In today's emerging commercial space activities, there will be accidents involving private space assets and a likely need for a binding and enforceable dispute resolution system. One possibility, frequently used in other commercial domains, would be a requirement that if the parties cannot settle their differences through direct negotiations, the national launch license would include a provision that mandates binding arbitration under existing bilateral and multilateral treaties. To be effective, this type of dispute resolution system would have to be mandated not only in the United States but also in other space-faring nations. The United States Congress could take the lead in this effort by directing all of the licensing authorities in the United States include such a clause. However its value would depend on other nations also adopting similar requirements.

There are several other new situations that will need to be addressed, both to protect the United States Government as well as U.S. companies.

- Although launch insurance is required, satellite insurance is not.
- The United States could undertake an effort to negotiate international limits on damage in space from space assets? Such limits have been agreed to in other domains such as maritime losses.

- Since commercial launches may become frequent enough that, like the experience with civil nuclear insurance, can the U.S. Government develop incentives for the private industry to develop its own insurance pool and eventually be able to cover large damage claims without government indemnification?

Experimental Period of Time for Human Suborbital Flights

There is no clear time or answer to when to let the experimental period lapse and to develop clear rules for these companies.

The human space flight amendments of 2004 were originally to expire in 2012 based on the expectations that private suborbital flights would be routine by 2012. This eight-year period allowed the FAA to issue permits during this development period. Space flight is complex and difficult and the private sector has not as yet begun flights with paying passengers. In light of this, Congress extended the experimental period an extra three years to 2015. Clearly, even if there are test flights this year, that experimental period will continue well beyond 2015.

A further complication is that there are a number of companies developing human suborbital systems. Each company has a different technological approach, making any end to an experimental period unique to each company. Therefore, companies could conceivably argue for a continuation of this experimental period for an indefinite period in the future.

That would leave Congress with a dilemma—if it ends the experimental period when the first company is deemed to be successful, then it penalizes late starters using different technologies. But, if it continues indefinitely, then final regulations for safety and suborbital vehicles will be greatly delayed, possibly risking lives and damage.

As I have testified previously, Congress could consider a transfer of regulatory authority of suborbital flights that do not enter outer space to other FAA offices that regulate aircraft.

However, normal FAA rules would need special waivers so as not to place unrealistic financial and regulatory burdens on this relatively new activity. For example, commercial airplanes are regulated as common carriers. At least in the near-term, directly applying those regulations to suborbital spacecraft would be unduly burdensome to space flight participants and companies and would likely terminate that activity. Clearly, this is not the intent of this recommendation. The reason for the transfer would be to relieve the FAA's Office of Commercial Space from regulating activities within domestic air space in order that they could focus on their primary mission.

Comparisons with Regulations in Other Nations

Every nation approaches the issues of the oversight of space activities in different ways that reflect their own culture, history, society, and economy. More significant than the details of any specific legislative approach are the many, many other issues of economic competition. Normally, price is the market signal that consumers respond to. However, in the space sector almost every activity has dual-uses: government and private. Governments rarely use price alone as a determinant of a purchase decision. And, in space launches, even private customers have many other considerations for launch purchases. Regulations are one factor, but most likely not the major determinant of a competitive advantage or disadvantage at least for the vast majority of nations that have responsible and sophisticated space programs.

Because of the close relationship between defense, security, and government research in space, all nations take individual approaches to regulating space and to laws enforcing space treaty provisions. All nations indemnify launches, and all have ratified at least the Outer Space Treaty and agreed to assume liability. But, there is no guarantee that if a problem occurs in space, all will handle it the same way or in a way that will be satisfactory to all other nations.

Many nations that have companies that compete with the United States in the launch business are more business oriented and more "customer friendly." They tend to attract

business with incentives that are difficult to match in the United States. How well the newer U.S. launch companies such as Space X will compete when they demonstrate reliability equal to or better than Roscosmos or Arianespace is still in the future since all marketing plans (theirs and their competitors), prices, government relationships, and actual costs are unknown today. What is clear is that the elasticity of demand for space launches, particularly of the vehicles capable of launching heavy lift payloads, is very inelastic. That is, the demand is not very sensitive to price or regulatory differences, but is more determined by a customer's needs, timeliness, and reliability.

With the exception of a major unilateral shift in the indemnification regime (such as terminating the U.S. Government's guarantee), It is unlikely that the current CSLA or any changes to it will significantly alter the competitiveness of U.S. launch companies.

Finally, as I have testified previously, Congress might want to revisit the informed consent rules in the CSLA for space participants. I have two suggestions: First, that the FAA draft clauses dealing with information to be given to the space flight participant on accident risk history and other data that the FAA is in a better position to provide than private companies. These clauses should be required to be included in the consent form. However, the companies are still responsible for drafting the form and making it specific to their vehicles. 2) Second, states are starting to compete with each other by enacting laws that require passengers to sign waivers of liability that protect the private owner/operator of the suborbital vehicle. Currently Florida, Virginia, Texas, New Mexico, and California have these laws, each with different wording and slightly different legal implications. Federal preemption on this issue might be warranted to prevent competition among states on an issue that involves interstate commerce, and may adversely affect safety decisions the companies make concerning the vehicle and operations.

Conclusion:

In summary, the CLSA has proven to be effective and responsive to U.S. industry's needs. Since the launch and private space sector has evolved from being just an industry with

expendable launch vehicles to an industry of many facets, the CSLA will need to be adjusted to reflect these emerging changes.

Congress will either have to expand the jurisdiction of the CSLA beyond launching activities or it will have to develop new regulatory agencies for the types of activities that go beyond transportation issues. In the past the latter has been the approach the Congress has chosen, witnessed by the DOC/NOAA licensing remote sensing payloads and the earlier FCC licensing of telecommunications satellites.

I would recommend that Congress study this issue and allocate future jurisdiction over non-transportation issues to agencies or specially created committees, as needed, with the required expertise in those areas to work with either the DOT/FAA or another designated agency to coordinate the process of licensing. At the same time, Congress should clearly define the jurisdiction limits of the DOT/FAA in order to avoid overlaps in jurisdiction.

Furthermore, where necessary, the Congress should address the overall interagency coordination of all United States space activities so that future licenses will be handled effectively, efficiently, and quickly, with the maximum transparency possible.