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Chairman Lucas, Ranking Member Lofgren, and distinguished members of the Committee: thank you for inviting me to testify on behalf of the Commercial Spaceflight Federation (CSF). I am honored to share our members' views on the state of the U.S. commercial space industry and the policy and regulatory issues facing our industry.

Founded in 2006, CSF is the leading national trade association for the commercial spaceflight industry, with roughly 90 member companies and organizations across the United States. CSF and its members are focused on expanding America's leadership in space, laying the foundation for a sustainable space economy, and democratizing access to space for scientists, students, civilians, and businesses. But it's not just success in orbit and beyond; we are seeing these benefits here at home. CSF members have created tens of thousands of high-paying engineering and manufacturing jobs and have invested billions of dollars across the country, revitalizing a domestic aerospace supply chain that had been in decline.

The far-sighted policies enacted by this Committee and by Congress as a whole have played a vital role in making this possible. As we look to the future, it is critical that we continue to implement smart, balanced policies that encourage and facilitate the growth of this nascent industry and support American leadership vice geopolitical foes like China and Russia. As National Aeronautics and Space Administration (NASA) Administrator Bill Nelson has noted, "It is a fact: we're in a space race."[1] Winning that race increasingly relies on strengthening a robust, agile commercial space sector.

My testimony will provide a brief overview of the industry and the policy and regulatory issues that this Committee should consider as it looks to lay the foundation for the next era of American spaceflight.

INDUSTRY OVERVIEW

For much of America's space program, the Government—through NASA and the Department of Defense (DOD)—developed and operated the launch sites, rockets, and spacecraft that represented the backbone of our civil and national security space enterprise. Without a doubt, their past and present successes represent a monumental technical achievement and continue to inspire all of humankind.

At every step of the way, companies supported these efforts by manufacturing the components and systems that the Government operated. In recent years, the industry's role has transitioned and grown from being simple contractors to providing meaningful commercial services to the

[1] Bender, Bryan. "'We better watch out': NASA boss sounds alarm on Chinese moon ambitions." POLITICO. 1 Jan, 2023. https://www.politico.com/news/2023/01/01/we-better-watch-out-nasa-boss-sounds-alarm-on-chinese-moon-ambitions-00075803

Government and the public. Key milestones in the development of the commercial human spaceflight ecosystem include:

- **1984:** Commercial Space Launch Act (CSLA) – Established Federal Aviation Administration (FAA) licensing authority for commercial launch and reentry activities.
- **1988:** Commercial Space Launch Amendments Act (CSLAA) – Laid out policies to improve industry competitiveness on the international market and address insurance requirements for satellite launches.
- **1992:** Land Remote Sensing Policy Act – Established procedures to license commercial remote sensing satellites.
- **2004:** Spaceship One Flight – First nongovernmental crewed flight to suborbital space. Since then, the commercial human spaceflight industry has blossomed and is now flying crew to suborbital and orbital space a handful of times per year with a strong growth trajectory.
- **2005:** Commercial Space Launch Amendments Act (CSLAA) – Established a licensing framework for human spaceflight missions. Recognizing that private space activity was in its nascency and that "space transportation is inherently risky," this foundational law put in place an informed consent regime for the industry coupled with an occupant safety learning period. This has enabled industry to innovate as occupant safety regulation is limited to demonstrated issues. This regime requires that commercial space operations protect public safety and property. Industry is proud of its 100% public safety record. CSLAA also required that any new occupant safety rules be tailored to industry's state of development.
- **2006:** First NASA Commercial Orbital Transportation Services (COTS) Awards – NASA entered firm, fixed-price, milestone-based Space Act Agreements (SAAs) with multiple companies for development. This fostered the development and operation of multiple reliable and affordable commercial cargo vehicles to support International Space Station (ISS) resupply efforts, saving the Government billions of dollars compared to traditional Government-owned and operated acquisition methods. This led to Commercial Resupply Services contracts, which continue to be how NASA delivers cargo to the ISS. The success of this model led to the creation of the Commercial Crew Program as we know it today and a plethora of other commercial programs at NASA and other federal agencies.
- **2015:** Commercial Space Launch Competitiveness Act (CSLCA) – Extended the learning period for commercial spaceflight participant safety regulations through October 1, 2023, in light of the maturity of industry and readiness of the Federal Aviation Administration to regulate at the time. This important legislation also updated insurance requirements and put in place reporting requirements on these items to ensure Congress is able to carry out its oversight responsibilities relative to the learning period.
- **2020:** First Crewed Commercial Crew Program Flight -– Marked the world's first privately-operated crewed mission to orbit, which safely carried NASA astronauts Bob Behnken and Doug Hurley to and from ISS.

In addition to these key Congressional and technical milestones, multiple executive agency policy directives issued over decades further recognized the importance of the commercial space industry and laid out actions to improve development and competitiveness, including:

- **National Security Decision Directive-42 (NSDD-42) of 1982**, which directed the U.S. Government to expand private sector investment and involvement in space activities.
- **National Security Presidential Directive-27 (NSPD-27) of 2003**, which directs U.S. policy related to remote sensing with the goal of solidifying American leadership in remote sensing.
- **The National Space Policy of 2010**, which reaffirmed the U.S. government's commitment to utilizing commercial products and services to carry out its missions, expanded international collaboration, and more.
- **The Space Policy Directives of 2018-2021**, which directed a faster return to the Moon, regulatory streamlining efforts across civil space regulatory agencies, directed the transfer of civil space situational awareness (SSA) capabilities to the Department of Commerce, outlined space nuclear policy, identified principles for space cybersecurity, and more.
- **The National Space Policy of 2020**, which affirmed the nation's commitment to the Artemis program, identified the Department of Commerce as the agency fit to take on mission authorization responsibilities, reaffirmed the government's commitment to using commercial space products and services, and more.

Today, the U.S. has a robust commercial space market that leads the world with an increasingly diverse set of vehicles and capabilities. The competition and innovation facilitated by the prudent policy actions above has significantly reduced launch prices, which has catalyzed the expansion of the domestic space industry beyond launch to include everything from remote sensing satellite services to CubeSats to in-space service, assembly, and manufacturing (ISAM) to space-enabled broadband to space situational awareness capabilities (SSA) to commercial space stations and beyond. While many of these activities seem to be in the realm of science fiction, they are making a big difference at home by helping to track and fight climate change and wildfires, expanding high-speed internet access to millions of Americans, and more. In recognition of innovation and cost-efficiencies offered by the private sector, many civil and national security federal agencies are transitioning to rely on the commercial industry to procure data and services from commercial providers instead of relying solely on Government-developed and operated systems. CSF members provide imaging and launch capabilities to science, national security, and intelligence agencies, enable suborbital microgravity research platforms to advance scientific disciplines, operate satellites that aid in understanding our changing planet, and more.

Looking ahead, the future of the commercial space industry is bright and expansive. CSF members already use suborbital, low-Earth orbit (LEO), and cislunar space to generate value for the economy – and have plans to operate missions to Mars, Venus, and other celestial destinations. However, the future pace of development of this industry – and the retention of our nation as the flag of choice for the commercial space industry – is dependent on a policy and regulatory environment that facilitates innovation. The United States faces increasing global competition in this sector, particularly from China, and must continue to thoughtfully update its policies and regulations to ensure American industry is able to lead. This is not a theoretical proposition – China's space station already competes with the ISS in LEO and NASA Administrator Bill Nelson has stated that he believes China could beat the United States to the Moon this decade.[2] In order

[2] Hanafusa, Ryosuke. "NASA chief says U.S. will beat China in race to the moon." Nikkei Asia. 11 December, 2022. https://asia.nikkei.com/Editor-s-Picks/Interview/NASA-chief-says-U.S.-will-beat-China-in-race-to-the-moon

to retain our international leadership, our nation must leverage and grow the incredible innovation and know-how offered by the commercial sector to out-compete state actors like China and Russia.

POLICY RECOMMENDATIONS

This Committee has a long history of advancing policies that facilitate the growth of the commercial space industry, most recently through the 2015 CSLCA. CSF appreciates the Committee's continued leadership in crafting thoughtful, future-looking policies for these activities. As the Committee looks to develop a commercial space package, CSF respectfully offers the items below for your consideration. Further details on each of these priorities – and a full list of priorities – are included as an addendum to my testimony.

- **Learning Period Extension – Congress must enact a long-term extension of the FAA commercial spaceflight regulatory learning period beyond the current expiration on September 30, 2023.**

  The FAA Office of Commercial Space Transportation (AST) regulates commercial space operations to protect public safety and property. The Commercial Space Launch Amendments Act of 2005 recognized the "inherently risky" nature of spaceflight and established a framework of an informed consent liability regime and the learning period restriction on regulating for occupant safety, except in certain cases. This framework is consistent with many other activities in the United States that millions of people per year partake in, including skydiving, adventure sports, etc. Congress has extended this learning period several times, most recently in the 2015 CSLCA, in recognition of the need for additional time to allow both industry and FAA to evolve and to understand what a future safety framework would entail.

  As Congress considers the future of the learning period, it is important to note that industry has had far slower technical development and significantly fewer commercial crewed spaceflight missions than anticipated at the time of the last extension in 2015. Equally importantly, FAA does not yet have the expertise, resources, or plan needed to implement a revised occupant safety regulatory framework. Allowing the learning period to end this year would open the door to regulations that inadvertently freeze development before industry has had time to mature, harming safety in the long-term and our nation's competitiveness. The commercial space industry is heterogenous and dynamic. While a common carrier type regulatory framework is appropriate for commercial air travel, it is decades away from making sense for commercial space travel. Additionally, beginning regulatory action would siphon resources away from AST's launch and reentry licensing efforts, which already struggle to keep up with industry's growth.

  Beyond these immediate impacts, extending the learning period would provide the vital time necessary for industry and FAA to develop consensus standards for broad adoption. Key dialogues continue about these activities through the ASTM F47 Committee on Commercial Space, where industry is leading consensus standards development efforts with government participation; in the FAA Part 460 Aerospace Rulemaking Committee

(SpARC); and through the Commercial Space Transportation Advisory Committee (COMSTAC) safety working group.

While initial progress on standards development was inherently slow as a result of limited commercial human spaceflight development, this activity has accelerated recently. Today, the ASTM F47 Committee has published seven standards and is actively working on 11 more. Standards require years of real-world evaluation and modification prior to any expansion of federal occupant safety regulatory authority. Furthermore, FAA AST recently chartered the Part 460 SpARC to study the existing framework for commercial spaceflight occupant safety and understand what, if any, changes are required. CSF and its members are eager to participate in this process, which will encompass multiple years.

Accordingly, CSF proposes a learning period extension through at least 2031 to provide the appropriate time for the Part 460 SpARC to conclude and to allow for implementation and evaluation of any subsequent recommendations, and to allow for the continued development of consensus industry standards, consistent with the intent of the 2015 CSLCA.

Additionally, the current indemnification statute is set to expire on September 30, 2025. As Congress charts the future path for human spaceflight regulations, it is critical to include an extension of the indemnification and waivers as authorized in 51 USC 50914. The indemnification regime and waivers authorized under current law are key to retaining international competitiveness and our nation's position as the flag of choice for the commercial space industry.

- **Article VI Compliance/Mission Authorization Framework – Congress should provide explicit statutory authority to the Department of Commerce (DOC) to serve as the sole federal entity responsible for mission authorization for new and novel commercial space activities.**

  Consistent with prior legislation offered by this Committee, notably the American Space Commerce Free Enterprise Act (ASCFEA), and with Administration guidance, DOC is the most appropriate agency to ensure federal compliance with Outer Space Treaty Article VI obligations for "authorization and continuing supervision" for activities that fall outside of the existing regulatory approval structure (FAA – launch and reentry; FCC – spectrum utilization; NOAA – remote sensing).[3,4] This regime should be light touch to satisfy treaty compliance requirements and provide interagency clarity while facilitating innovation and American leadership in space.

  The mission authorization process should be simple, transparent, and efficient, built on applicant self-certification as the mechanism for meeting treaty supervision obligations. It

[3] *H.R.3610 - 116th Congress (2019-2020): American Space Commerce Free Enterprise Act of 2019*, www.congress.gov/bill/116th-congress/house-bill/3610

[4] "Memorandum on the National Space Policy 2020." *National Archives and Records Administration*, trumpwhitehouse.archives.gov/presidential-actions/memorandum-national-space-policy/

is critical that this process be managed by a single agency to ensure there is a single accountable entity, minimal burden on industry, and no unnecessary duplication of effort between federal agencies. The Office of Space Commerce (OSC) at DOC is best suited to manage interagency input as appropriate. OSC should be required to follow good government practices and be as light touch as possible, focusing solely on protecting national security and comporting with international treaty obligations as it considers these activities. To the extent such concerns are raised during interagency review, they should be communicated within three days to the applicant for an opportunity to cure. To ensure effective administration and implementation of these additional responsibilities, OSC should receive appropriate funding to accommodate additional staffing and resource needs.

- **Space Launch Infrastructure Investments – Congress should invest in modernizing America's space launch infrastructure to ensure it is able to continue to support the growth of the domestic commercial space industry.**

  As U.S. Space Force Colonel James "Jim" Horne has noted, space launch infrastructure demand is steadily outpacing supply.[5] Thankfully, there is a network of FAA-licensed space launch infrastructure sites across the country eager to step up to help ensure our nation has sufficient infrastructure for this sector. However, these sites by and large do not have access to federal infrastructure grant money. There is a currently authorized grant program on the books, established on paper in 1993 and funded from 2010-2012, but it has been dormant for over a decade.[6] The time is now to fix the problems the Government Accountability Office (GAO) identified with this program and reinvigorate it,[7] as proposed by the bipartisan SPACEPORT Act recently introduced in the Senate.[8] Namely, the STIM program's cost share should be modified to comport with other Department of Transportation (DOT) grant programs, the authorization of appropriations should be increased to $60 million to meet increased space launch infrastructure needs, and FAA should work with other federal agencies to develop criteria for evaluating and selecting awardees to ensure these grants make our nation's space economy stronger. This program should not be funded with user fees.

- **Regulatory Streamlining and Clarity – Congress should mandate appropriate review and modernization of existing federal regulations governing commercial space activity to ensure they are adequately designed to support the rapid cadence of development and activity while maintaining an absolute commitment to public safety and without compromising national competitiveness.**

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[5] Foust, Jeff. "FAA Forecasts Surging Commercial Launch Activity." *SpaceNews*, 21 Feb. 2023, www.spacenews.com/faa-forecasts-surging-commercial-launch-activity/

[6] *51 USC Ch. 511: Space Transportation Infrastructure Matching Grants*, uscode.house.gov/view.xhtml?path=%2Fprelim%40title51%2Fsubtitle5%2Fchapter511&edition=prelim

[7] "Commercial Space Transportation: FAA Should Examine a Range of Options to Support U.S. Launch Infrastructure." *U.S. Government Accountability Office (U.S. GAO)* , www.gao.gov/assets/gao-21-154.pdf

[8] "Hickenlooper, Cornyn, Luján, Wicker Introduce Bill to Launch New Era of Spaceports." *Senator John Hickenlooper*, www.hickenlooper.senate.gov/press_releases/hickenlooper-cornyn-lujan-wicker-introduce-bill-to-launch-new-era-of-spaceports/

Many current regulations governing commercial space activities require near-term modernization to ensure efficient license and permit processing as the rate of commercial activity and development accelerates. These regulations – from launch and reentry licensing to export control regulations to remote sensing regulations – were developed in an era with limited industry activity and were prescriptive in nature, assuming space programs were static with little to no technology improvement during the program's lifetime. Clearly, the industry is far more dynamic today, as evidenced by new satellite systems and record-high domestic launch rates. Without reasonable improvements, agencies risk missing statutory timelines to fulfill regulatory responsibilities, harming national competitiveness and slowing innovation while other countries surge ahead.

The industry is primarily regulated by three federal civil agencies: FAA which oversees launch and reentry operations, with a mandate to protect public safety through its licensing process; the Federal Communications Commission (FCC), which oversees spectrum use and allocation; and DOC's National Oceanic and Atmospheric Administration (NOAA), which licenses the commercial remote sensing industry.

Importantly, all three agencies have taken steps to update their regulatory processes given the pending challenge, but there is room for continued improvement. For example, in some cases, interagency coordination is manually managed via email, which is inherently slow, whereas a digital clearinghouse would both accelerate processing and reduce the burden on civil servants. Congress has recently taken steps to address these challenges, including in the Launch Communications Act for coordination at FCC.

In 2020, FAA issued updated Part 450 regulations intended to streamline the process for issuing launch and reentry licenses. However, this process remains cumbersome—and in some cases more so than before—to both FAA and industry, often requires years to reach license issuance, as was anticipated in industry comments during the FAA AST rulemaking process.[9] To maintain America's competitive position as China surges ahead, FAA must be able to effectively and efficiently approve weekly and eventually daily launch and reentry operations by multiple companies without requiring unsustainable resource growth.

The regulatory revisions that were adopted in Part 450 warrant significant, timely revision. CSF proposes the following improvements:

- Direct FAA AST to review the impacts of Part 450 implementation, including the implementation of the incremental review process, on the commercial spaceflight industry and develop solutions to reduce these regulatory self-induced delays and inefficiencies.
- Direct FAA AST, consistent with its regulatory goals to facilitate the development of innovative systems and processes, to accept reasonable safety rationales proposed by applicants, including new approaches.

[9] FAA Docket 2019-0229

- Require the FAA Administrator to adjudicate determinations and revisions as part of the incremental review process in a timely manner to reduce overall approval timelines.
- Direct FAA AST to eliminate and streamline duplicative review process(es) with other agencies, particularly on federal ranges, to limit inefficient bureaucratic requirements for applicants, while ensuring transparency and timely feedback on applications.
- Require FAA AST to assign a Principal Inspector to each applicant company to assist in the review and approval of each license application. Direct FAA AST to develop a report providing objective solutions improving the overall regulatory process' efficiency and effectiveness without solely relying on additional billets or funding.

Similarly, NOAA's 2020 updated commercial remote sensing rulemaking, while an improvement, can still result in a burdensome or slow regulatory processes without the flexibility or certainty intended with the regulatory updates. Commercial remote sensing licensees face additional uncertainty through unclear application instructions, lack of notice of changing implementation guidance, and unnecessary information being designated as "material facts" requiring additional filings. This situation forces both the Government and commercial companies to invest considerably more resources in complying with legacy regulations than should be necessary, creates risk of unsustainability as the industry grows, and puts U.S. industry at a competitive disadvantage internationally.

NOAA should implement the new regulations modernized in 2020 with the goal of maintaining U.S. leadership in remote sensing. CSF recommends:

- Greater transparency and engagement with applicants throughout the application process,
- Creating a hard limit for temporary license conditions placed on Tier 3 systems (i.e. a date or condition certain after which such conditions may not be renewed),
- Regularly reevaluating the tiering of satellite systems, and
- Defining a timeline where a system is no longer considered "new and novel" and upon the end of that timeframe, immediately reclassifying the system to a lower tier.

Additionally, there are a series of policy debates about which agency should oversee which portion of the commercial space industry. This has become problematic as more and more agencies are interested in entering the commercial space policy and regulatory space. This encompasses the FCC, National Transportation Safety Board (NTSB), DOT, DOC, and other agencies. While we welcome the expertise of these agencies, it is critical to establish clear, minimally burdensome, and purposeful roles for any agency seeking additional authority over the industry. CSF looks forward to engaging with Congress and the executive branch as those clear roles for appropriate agencies are developed.

- **Space Situation Awareness (SSA) – Congress should authorize DOC to perform the Nation's civilian SSA mission.**

Access to accurate and timely tracking data is essential to ensuring continued safe operations in space for all users. The U.S. Space Force 18th Space Control Squadron (SPCS) collects and distributes space object tracking data from U.S. government and commercial sensors worldwide and provides all spacecraft operators, regardless of their nationality, with conjunction data messages that indicate whether the probability of collision between two objects is greater than 10^{-4}. To better align agency focus and keep up with industry needs, the Space Force and independent technical authorities, including the National Academy of Public Administration, have recommended that SPCS transition unclassified SSA activities for non-U.S.-government users to DOC. Space Policy Directive-3 (SPD-3) issued further guidance for this transition. CSF fully endorses this recommendation and acknowledges that this Committee has also long supported DOC assuming this mission.

DOC has made important progress to support this transition, including developing the Traffic Coordination System for Space (TraCCS). CSF and its members have been actively engaging with DOC as it works to define the parameters of its system. DOC assuming the mission currently provided by SPCS is essential to ensure continued growth. As part of that transition, DOC must be intentional in differentiating between basic and advanced services. It is essential that DOC use commercial systems, data, and analytics to deliver a higher-quality product faster. The commercial sector is developing advanced services that go beyond what government currently provides and the government must be careful not to squash this nascent market that is rapidly innovating.

As Congress considers SSA, it is essential that DOC is definitively given the authority to take on this mission, which prior appropriations bills have repeatedly reinforced. Continued uncertainty in this realm is unproductive. Additionally, Congress should actively encourage DOC to use commercial services, data, and analytics to the greatest extent possible, consistent with national space policy directives dating back to the 1980s.

CONCLUSION

Thank you again for the opportunity to contribute to this conversation on the commercial space industry. This is a critical time for our industry, and we greatly appreciate Congress' attention to these important issues. As noted in my introduction, the full list of CSF priorities for a commercial space bill is attached in the addendum to my testimony.