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BEFORE THE
COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON DEFENSE
U.S. SENATE

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Chairman Durbin, Ranking Member Cochran, and Members of the Committee,

Thank you for the opportunity to participate in this important hearing. I also want to thank this Committee for its continued support for competition in the Evolved Expendable Launch Vehicle (EELV) program. This Committee's commitment to reliability, transparency, and cost-effectiveness coupled with clear and sustained support for New Entrant competition will ensure mission success, reduce launch costs, spur innovation in the national security launch enterprise, and provide true assured access to space for our warfighters as they defend our Nation. To be clear at the onset, I believe that competition in the EELV program will save the taxpayers in excess of $1 billion per year.

I founded SpaceX in 2002 to radically improve the reliability, safety, and affordability of space transportation. Twelve years later, SpaceX is the fastest growing launch services company in the world, with nearly 50 missions contracted at a total contract value of approximately $5 billion. We have now successfully launched our Falcon 9 rocket eight times, including four successful launches for NASA and three successful launches for leading commercial satellite companies.[1] Our Dragon spacecraft has berthed with the International Space Station (ISS) three times, and we are scheduled to conduct another resupply mission to the ISS for NASA this month.

SpaceX has achieved massive, unprecedented reductions in the cost of launch and spacecraft development, all while achieving 100% mission success, scaling our production operations to produce 40 rocket cores and nearly 400 rocket engines annually later this year—we are today the largest rocket engine manufacturer in the world. Meanwhile, we continue to push the envelope on rocket technology as we advance toward fully reusable launch vehicles, design the safest crew transportation system ever produced, and begin testing on the world's next-generation rocket engine at Stennis Space Center. Critically, all of this innovation is occurring in the United States and our launch vehicles (including engines and fairings) and spacecraft are made in America. We do not rely upon Russia for any element of the launch vehicle.

SpaceX today is serving the Nation's space program by routinely resupplying cargo to and from the International Space Station with our Dragon spacecraft and integrating numerous satellites for government launches to occur in the next 2 years. We are restoring America's competitive position in the global commercial space launch market, recapturing market share that U.S. launch companies long ago surrendered to our French, Russians, and Chinese competitors. With NASA, we are poised to develop a new human spaceflight system that will restore America's domestic capability to launch our astronauts from our own soil. And we are dedicated—if given a fair opportunity—to successfully executing missions

[1] The first launch of the Falcon 9 was a successful SpaceX-funded demonstration flight, which occurred on June 4, 2010.

in furtherance of the Nation's defense and space priorities, while offering the Air Force and other defense agencies the means to achieve mission success at a fraction of the cost they are paying for launch today.

To that end, SpaceX is working aggressively to achieve Air Force certification to become a certified provider of national security space launches with our Falcon 9 and Falcon Heavy launch vehicles. As a threshold matter, we have been required to successfully launch three upgraded Falcon 9 launch vehicles, two consecutively. Importantly—in just five months—we successfully and consecutively launched all three of the three required Falcon 9 launches as required by the Cooperative Research and Development Agreement (CRADA) with the Air Force and the New Entrant Certification Plan. One has already been declared a successful certification flight. We continue working with our Air Force partner as they conclude the data and engineering reviews from the remaining two flights, and we look forward to timely certification of the Falcon 9 so that we may compete for EELV missions in 2014 for missions to be ordered in Fiscal Year 2015.

Although the aggressive reintroduction of competition into the EELV Program is now the established policy of the Defense Department, the details related to creating a fair, full, and open competitive acquisition environment remain unresolved. Fair competition in the EELV Program will lower the costs of launch, result in a higher quality of customer service, drive contractor-funded innovation, increase operational flexibility for the Air Force, and relieve congestion on the Air Force launch manifest. Indeed, the EELV Program was initiated in 1995 in part to introduce affordability, customer service, and flexibility to national security space launch. Unfortunately, as this Committee well-knows, these goals have not been achieved as launch costs have grown dramatically since the EELV Program was established, and there is congestion in the ULA manifest.

By Fiscal Year 2013, the Government was forced to budget in excess of $380 million per launch, while subsidizing ULA's fixed costs to the tune of more than $1 billion per year if the company never launches a rocket.[2] Several recent cost analyses have determined the EELV Program will double in price over initial estimates to $70 billion.[3] This sustained cost growth triggered multiple "critical" Nunn-McCurdy breaches, most recently in 2012 when the program exceeded 58 percent unit cost growth.[4] These cost increases have been exacerbated by an opaque and confusing contracting structure that made it difficult to understand the true cost of a launch service to the Government. By contrast, SpaceX's Falcon 9 price for an EELV mission is well under $100M—a $280 million per launch difference – and SpaceX seeks no subsidies to maintain our business.

Recently, some have claimed that the Air Force's block buy of 36 booster cores from the incumbent will save the taxpayer "$4.4 billion over the next several years." Any "savings" resulting from a block buy of 36 rocket cores from the incumbent provider are derived directly from a 50 percent year-over-year budget projection increase in FY2012, which was purposefully based on worst-case assumptions for a single-Launch buy, and acknowledged at the time by the incumbent as being inflated.[5] If SpaceX had contracted for these missions, using the same baseline, we would have saved the taxpayer a total of $11.6 billion. That is a 77 percent reduction from the projected $15B procurement total from which ULA is claiming its

[2] Department of Defense, "Fiscal Year (FY) 2014 President's Budget Submission, Missile Procurement, Air Force." Apr. 2013. Vol. 1, 232.

[3] Department of Defense OUSD (AT&L) ARA/AM, "Selected Acquisition Report (SAR) Summary Tables," December 2012, 6; U.S. Government Accountability Office, "Defense and Civilian Agencies Request Significant Funding for Launch-Related Activities," September 2013, 2.

[4] U.S. Government Accountability Office, "Uncertainties in the Evolved Expendable Launch Vehicle Program Pose Management and Oversight Challenges," September 2008, 7; 20-21. U.S. Government Accountability Office, "Assessments of Major Weapon Programs," March 2013, 59.

[5] Svitak, Amy. "Rising Engine Costs, Uncertainty Drive Up Atlas 5 Prices for NASA." Space News. Feb. 2, 2011. http://www.spacenews.com/article/rising-engine-costs-uncertainty-drive-atlas-5-prices-nasa.

savings. If we all use the same baseline, it is accurate to say that the absence of full and open competition actually has resulted in a $7.2 billion penalty to the taxpayer, and untold consequences for important defense priorities that might otherwise have been funded.

Despite the continuing promise of lower costs since 2006, the fact is that the current situation of sole-source providers has become unsustainable, a fact now recognized by most observers and the Defense Department. The EELV program is now the largest single item in the unclassified Air Force space budget, comprising more than 40 percent of all Air Force space funding. General William Shelton, the head of U.S. Air Force Space Command, acknowledged that these costs are "unsustainable."[6] These issues stem from the current reliance on a single-provider, and a contracting structure that disincentivizes affordability, innovation, and adherence to schedule.[7] Further, the Government Accountability Office (GAO) has commented in depth on these problematic aspects of the program.[8]

Mr. Chairman, we appreciate this Committee's timely review of the EELV Program. We commend the Air Force and NRO efforts to reintroduce competition into the EELV Program as a means to counter the rising costs of national security space launch and the stagnant innovation in this critical sector. In order for true, meaningful competition to occur, we respectfully suggest the EELV Program be further reformed to adopt contracting practices and other acquisition reforms consistent with a competitive procurement environment, as follows:

1) Most importantly, every single mission capable of being launched by qualified new entrants should be competed this year and every year moving forward. There should be no reason that a mission is sole-sourced to ULA, whether as part of the recent 36-core deal or any other arrangement. And if competition opportunities are being delayed, we should understand why that is so, and we should fix it immediately;

2) Introduce a FAR Part 12 commercial contract structure that creates rational incentives for both the contractors and the government to achieve reliable, cost effective on-time launches;

3) Leverage commercial practices wherever possible – a philosophy and acquisition approach that NASA has successfully employed in its launch programs. Fundamentally, the Air Force should establish clear requirements for launch services and associated activities, but it should not dictate how those requirements are implemented. Rather, contractors should be empowered to meet requirements in a manner best suited to their organization's strengths; and

4) Eliminate payments—more properly called subsidies—under the EELV Launch Capability (ELC) contract line item that are exclusively in support of the incumbent provider. And when conducting competitions for launches, properly account for the subsidies that the incumbent enjoys so that an even playing field is created. The long-term elimination of the ELC is paramount if an efficient acquisition approach is to be created. As was noted in DOD's recertification of the EELV program after its 2012 "critical" Nunn-McCurdy breach, cost-plus

[6] "Department of Defense Fiscal Year (FY) 2014 President's Budget Submission, Missile Procurement, Air Force." Apr. 2013.
[7] Wydler, Ginny, Su Chang, and Erin M. Schultz. "Continuous Competition as an Approach to Maximize Performance." Proc. of Defense Acquisition University Research Symposium. McLean: MITRE Corporation, 2012, 3.
[8] U.S. Government Accountability Office, "DOD Needs to Ensure New Acquisition Strategy is Based on Sufficient Information," September 2011, 10-12.

contracting and the ELC has funded "effectively idle personnel" at ULA.[9]

I. SpaceX Commitment to Reliability and Mission Success

Mission success is paramount to SpaceX, as our eight consecutive successful Falcon 9 launches to date have demonstrated. The Falcon 9 is designed for the highest reliability starting at the architectural level. Because 91 percent of launch vehicle failures in the past two decades can be attributed to engine failures, avionics failures or stage separation anomalies, the Falcon 9 design incorporates robust, fault-tolerant propulsion systems, fault-tolerant avionics and controls systems with internal triplication and redundant harnessing, and a minimum number of separation events. With its nine-engine configuration, Falcon 9 features a unique engine-out capability, and is designed to permit the loss of up to two engines in flight without compromising the mission. The Falcon 9 is the only American rocket since the Saturn V with any engine-out capability; any other launch vehicle in the world, including the current EELV fleet, that encounters a major engine anomaly on ascent will almost certainly fail its mission.

The Merlin engine—which is designed and manufactured by SpaceX and powers the Falcon 9 first and second stages—is a human-rated engine with high structural margins and a highly reliable, redundant ignition system. A hold-before-release system verifying nominal operations of the first-stage engine before liftoff has been successfully demonstrated multiple times. Rigorous qualification and acceptance testing from the component to the vehicle system level are part of SpaceX's "test what you fly" approach, and the company uses liquid-fueled engines and non-pyrotechnic, resettable separation systems that allow testing of actual flight hardware before flight. Notably, SpaceX does not rely on any foreign companies for critical components or subsystems. There is absolutely zero dependence on Russia with this rocket. To state the obvious, the same cannot be said of ULA.

Demonstrating our long-held commitment to launching national security payloads, SpaceX designed the Falcon 9 and its follow-on, the Falcon Heavy, from the outset to meet the EELV design specifications, including the EELV Standard Interface Specification (SIS) and System Performance Requirements Document (SPRD), at no charge to the U.S. Air Force. Separately, SpaceX has passed rigorous certification efforts by NASA in order allow the Dragon spacecraft to berth with the International Space Station, as it has now successfully achieved three times, with another mission scheduled later this month. This accomplishment demonstrates that SpaceX can be trusted with extremely critical national and international assets.

The Falcon Heavy, which SpaceX will debut in 2015, will leverage the same engines, tooling, and launch facilities to enhance reliability, while also being the most powerful launch vehicle in the world.

II. EELV New Entrant Certification

To validate our singular emphasis on mission success and to earn the confidence of the Air Force, SpaceX formally submitted Statements of Intent to become a certified provider of national security space launches with our Falcon 9 and Falcon Heavy launch vehicles. SpaceX subsequently entered into a formal CRADA with the Air Force to become certified under the EELV Program for the Falcon 9, with plans to execute a similar agreement for the Falcon Heavy. The Falcon 9 certification will enable SpaceX to compete for the 14 EELV missions that have been identified for competition, and with the Falcon Heavy certification, SpaceX intends to compete in 2018 and beyond for the entire spectrum of national security space missions.

[9] Kendall, Frank. "Evolved Expendable Launch Vehicle Nunn-McCurdy Certification: Basis of Determination and Supporting Documentation." Memorandum to Congressional leadership. 12 Jul. 2012.

As part of our certification plan for the Falcon 9, SpaceX was required to conduct three successful flights, with two consecutive successes. I am proud to say that SpaceX successfully completed the third flight needed for EELV certification on January 6, 2014, and we achieved 100 percent mission success for each flight. Importantly, all three missions were for commercial customers, eliminating any risk or cost to the Government for these certification flights. In early February, the Air Force recognized our CASSIOPE mission, launched on Sept. 29, 2013, as having met all mission requirements and qualified the flight under the EELV Certification CRADA; we are now awaiting an Air Force decision on the subsequent two flights. Here, it bears noting that the New Entrant Certification requirements that SpaceX must live up to exceed the requirements that the Atlas V and Delta IV launch vehicles had to meet in 1998, prior to their ability to compete for and be awarded EELV launch service orders**.**

At this point, the Air Force must complete independent verification activities, audits of our processes, and engineering review boards (ERBs) to conclude the certification process. SpaceX has committed personnel and resources to support these technical interchanges. The Air Force kicked off the first ERB process as of late February of 2014, but there are many more to conduct and we hope that the Air Force will be able to support the schedule to conclude the certification process in 2014. This will allow SpaceX to compete for the FY2015 missions. Consistent with DOD and Air Force directives, these risk reduction activities can and should occur in parallel with the early competition phases for the Phase 1A competed missions.[10] This method is consistent with NASA's Launch Services Program (LSP), which requires certification prior to launch rather than contract award.

SpaceX has taken multiple other actions to ensure we meet all EELV certification requirements, including:

- Building and debuting a new launch facility last year at Vandenberg Air Force Base (VAFB), CA with a successful September 2013 Falcon 9 launch. This was self-funded by SpaceX;
- Agreeing to incorporate the ability to provide vertical integration at both launch sites for NSS payloads that require their space vehicles to be processed in this manner. SpaceX will self-fund this capability;
- Providing the Air Force with the ability to observe or receive data from our contracted commercial launch service activities at no cost to the Government; and
- Being awarded and working on a lease with NASA for the use Launch Complex 39A to increase SpaceX's ability to meet a growing launch manifest and outfitting the launch pad to serve additional customers, including the national security community, at our own expense to further reduce EELV manifest congestion.

III. Challenges to EELV Competition

The Air Force is now taking a major step forward in addressing the challenges of reintroducing competition into the EELV Program by outlining a plan that takes advantage of the recent significant advances that have taken place in the U.S. launch services business. SpaceX commends the Air Force for moving to certify New Entrants and take advantage of new, commercially-developed reliable launch systems. As the Air Force moves to restructure the EELV program to on-ramp New Entrants for competition in the intermediate term, and contemplates the format for full and open competition beginning with the FY2018 Phase 2 acquisition, a number of key issues must be addressed to ensure a fair and level competition:

[10] Kendall, Frank. "Evolved Expendable Launch Vehicle Program Quantity Buy Decision Acquisition Decision Memorandum." Memorandum to the Secretary of the Air Force and the Director, Cost Assessment and Program Evaluation. 27 Nov. 2012. Secretary Kendall directs the reintroduction of competition into the EELV Program "as soon as possible." 2

- **Number of Competitive Missions.** In his November 27, 2012 Acquisition Decision Memorandum (ADM), Under Secretary of Defense Frank Kendall clearly directed that up to 14 missions be made available for competition to certified New Entrants. This directive was designed to "aggressively introduce a competitive procurement environment in the EELV program." SpaceX strongly supports the decision to compete these 14 missions, but remains concerned that, faced with a difficult budget environment, the Air Force may push many of the 14 missions out of the FY2015-FY2017 competition, even while leaving the 36-core block buy for the incumbent untouched. Such a decision would materially slow progress toward the ADM's goal of aggressively transitioning to a competitive environment and further delay real savings that can be realized with competition. Undersecretary Kendall's acquisition directive is quite specific about the need to "aggressively" introduce competition. His directive does not require buying 36 cores from ULA. Rather, every mission capable of being launched by qualified new entrants should be competed this year and every year moving forward.

- **EELV Launch Capability Funding.** ULA receives on average $1.2 billion annually primarily on a cost-plus basis to fund "facility and facility support costs, launch and range operations, mission integration, mission unique development and integration, subcontract support engineering, factory engineering, etc."[11] ULA receives these "EELV Launch Capability" (ELC) payments whether they launch zero rockets or eight; if they launch more than eight times, they are paid additional funds. Essentially, the Government supports all of ULA's fixed costs. Such funds are not provided to SpaceX, and SpaceX has not sought them. Rather, SpaceX has self-funded its EELV efforts.

  ELC funding provides ULA with a major competitive advantage for national security missions, as well as civil and commercial missions. ULA can, and most likely will, marginally price launch services for commercial and civil customers because ELC funding allows ULA to maintain its operations and covers its fixed costs. In fact, ULA appears to have marketed a marginal launch services price for the MEXSAT mission. Here, it appears the Mexican government will be paying substantially less for an Atlas launch service than does the Air Force. In these challenging economic times—or any economic times for that matter—why should American taxpayers subsidize a launch for the Mexican government or a commercial purchaser of launch services?

- **Sole Source, Non-Compete Block Buy to ULA.** The Air Force's decision to provide ULA with a sole-source block buy guarantee of 36 rocket booster core from FY2013-FY2017 provides the incumbent with unprecedented business stability and presents New Entrants with a substantial competitive disadvantage. An early reason for the block buy was to save on launch costs, but it is not clear that the Air Force has created savings over the last acquisition, known as "Buy 3." In a head-to-head competition against New Entrants, the incumbent is well-positioned to leverage this guaranteed order to impact the competition outcome. The 36 core block buy gives ULA an extreme and unfair competitive advantage relative to New Entrants by allowing ULA to allocate its operating costs to the block buy and offer marginally-priced launches to other customers (e.g. NASA, commercial customers) as well as future bids for EELV missions.

- **Cost-Plus Contract Elements.** The EELV Launch Services contract line item, which basically represents the cost of the launch vehicle hardware and production, is structured as a fixed-price, incentive fee (FPIF) line item. The ELC, which funds the engineering and infrastructure costs to actually execute the launch, is now contained in multiple contract line items, many of which are

[11] "Department of Defense Fiscal Year (FY) 2014 President's Budget Submission, Missile Procurement, Air Force." Apr. 2013. Vol. 1, 230.

cost-plus types. It should be noted that the EELV Program is the only U.S. Government launch program that utilizes any cost-plus features. As a New Entrant provider, SpaceX does not seek out similar ELC funding. Rather, SpaceX believes that the utilization of a FAR Part 12 commercial contracting structure, with payments based on achievement of results at pre-negotiated prices—rather than costs expended, which has no limit—should be the preferred acquisition approach for the EELV Program. This contracting mechanism rewards organizations that spend more time and more money, rather than being efficient and achieving results. A contracting mechanism that drives efficiency and innovation will improve quality of service at much better value for the customer. It bears noting that the current contract structures add substantial overhead cost to the taxpayer for oversight of a largely mature booster core. Further, New Entrants will be forced to adopt these higher overhead cost structures or be at a disadvantage to the incumbent. In today's budget environment, it would be far better to buy these mature products as commercial systems and use lower overhead procedures such as FAR-based commercial contract structures.

- **Government-funded Upgrades to Incumbent Systems.** The Air Force continues to provide ULA with development funding for numerous items, such as the RL-10C, common upper stage, and has discussed potential funding for dual payload adaptors and other efforts which give ULA a competitive advantage relative to New Entrant competitors. Launch service providers are also affected by range modernization and programs such as Automatic Flight Termination Systems or GPS metric tracking. ULA is funded by the Air Force to upgrade their launch vehicles for these programs while New Entrants are expected to bear the burdens of these costs. ULA should be required to self-fund these upgrades in a competitive procurement environment.

IV. Recommendations to Reform the EELV Program

To achieve real and continuous competition and address the challenges outlined above, the EELV Program must transition from its current sole-source, non-commercial contracting structure to an acquisition approach that employs competition and makes use of meaningful aspects of commercial business practices and contract structures that reward success, efficiency and innovation.

The Air Force should begin the transition to a standard, commercially-oriented procurement process which can be supported by a commercial business model, and place its emphasis on achieving mission success rather than maintaining legacy contract structures that give its incumbent provider a competitive advantage. As it has done with other major procurements, such as the Wideband Global Satcom (WGS), the Air Force can achieve significant capability at substantially lower costs by incorporating competitive, commercial practices into its acquisition approach. A commercial approach, however, is hindered by the contractual structures that are currently in place and which provide a material competitive advantage to the incumbent provider. Should the Air Force transition to a new model and fully embrace competition, it will be in a position to support U.S. launch companies as they win commercial business from foreign competitors, while leveraging the broader launch services market to absorb fixed costs and reduce the overall costs to the U.S. Government. Congress should continue robust oversight of the program to ensure these acquisition reforms are implemented.

(a) Eliminate the ELC

No competition will be fair, full, and open so long as the Air Force continues to utilize contract line items to fund ULA's fixed costs to maintain its launch capability. There are reasonable ways to address this competitive inequity now. At minimum, the fixed cost funding must be accounted for in a meaningful way in competitions for EELV launches and must be completely offset in non-EELV competitions. This near-term approach should be leveraged as the ELC is ultimately phased out. The Air Force must

eliminate the funding of ULA's launch capability prior to the Phase 2 EELV Acquisition or there can be no fair competition, and Congress should conduct continuous oversight to ensure the elimination of the ELC.

The original rationale for incorporating the ELC concept in the EELV program was to maintain the capability and assured access to space with Atlas and Delta when both Lockheed and Boeing threatened to exit the launch business. With the later formation of ULA, the Air Force implemented the ELC as a means to secure assured access to space in a single-supplier environment, opting to insulate its provider from market conditions by fully funding its infrastructure and business overhead. In addition, many national security space programs were having development challenges that were resulting in significant delays in satellite delivery, resulting in a low launch rate and supporting arguments in support of a launch capability payment structure. Notwithstanding whether or not the ELC was an appropriate mechanism to achieve assured access to space when it was instituted, it is clear now that the prevailing conditions which were used to justify it no longer exist. Critically, the newly revised National Space Transportation Policy eliminates a 2005 policy that called for the DOD to fund the annual "fixed costs" of the EELV provider.

In 2014, these conditions have materially changed in virtually every respect. For example, as the Air Force determined in the course of adjusting its Acquisition Strategy to support a transition to competition, most national security satellites are out of development and into production, with delivery now being somewhat predictable. The rate of national security space launch has increased significantly, which eliminates the need for continuous launch capability funding support and enable a transition to a fully-loaded launch services price offered by each competitor. Finally, the EELV program is emerging from its reliance on a single provider with a limited ability to compete on the open market, and transitioning to a model with potentially multiple certified providers. With respect to the commercial market, the market is robust and forecasts are predicated on rational market assumptions and analysis. With the onset of at least two viable new entrants, the existence of a robust and durable commercial launch market, and stability achieved in major NASA space programs with cargo resupply, commercial crew, SLS and numerous science missions, there is no remaining rationale for maintaining the ELC.

SpaceX recognizes that a transition away from the ELC will take significant planning and time. In the intervening period, however, as the Air Force on-ramps New Entrants and allows those certified to compete for 14 identified missions beginning to be ordered in FY2015, the Air Force must require the incumbent provider to account for the derived financial and non-financial benefits it is afforded through the ELC payments it receives from the Government. The ELC contract line items total roughly $1B annually in direct payments to ULA to fund its annual sustaining engineering, manufacturing, operations, and overhead costs. These payments constitute a substantial competitive advantage for ULA, and Congress should insist that actions to mitigate this structural competitive inequity be imposed on ULA.

(b) Return to Fixed-Price Services for the EELV Program

Unlike the past 10 years, the commercial space launch market is robust, stable, and predictable, and the U.S. is recapturing market share previously surrendered to international competitors. The Air Force should change its existing contracting structure to leverage the commercial market and allow for alternate business models to be utilized for the acquisition of launch services. While potentially appropriate in a development or sole-source environment, cost-plus contracting does not incentivize contractors or the government to control and reduce cost, nor does it foster contractor innovation, as the EELV Program has plainly demonstrated. The requirements associated with launch services and mission assurance for the EELV Program are well-understood at this time. Indeed, prior to the execution of the "Buy 3" contracts, the EELV program fully and successfully implemented the enhanced mission assurance requirements that are used today based upon the recommendations from the Space Launch Broad Area Review (BAR 1). However, given the continued existence of legacy contracting structures like the ELC, the EELV Program

is currently the only U.S. Government program utilizing a cost-plus arrangement for the execution of launch services. Consistent with the direction in the FAR and pursuant to Public Law 103-355, SpaceX recommends that the EELV Program be transitioned back to a FAR Part 12 commercial-item acquisition approach, which will then achieve parity in the contracting structure among all potential competitors.

Although the FAR Part 12 acquisition authority was employed in 1998 in the EELV program, it was not the use of FAR Part 12, or any shortcomings resulting from its use, that prompted the restructure of the EELV program. The need to restructure the program was driven by the original business decisions of the EELV contractors 1998, which included an overly optimistic forecast of the commercial market. Today, the situation is materially different in two significant ways. First, the commercial market is far more predictable, robust and stable than it was in the early 2000s.[12] Second, the commercial market has largely moved overseas as foreign competitors have filled the commercial space launch services business in light on uncompetitive pricing by U.S. launch providers. Bringing competition and continuous improvement to the EELV program, along with additional manifest availability, will help enable U.S. launch providers win back that business from foreign competitors. This is, in fact, what SpaceX is doing right now.

In 2005, both the launch vehicles used by EELV lacked flight-proven maturity in their designs and the number of executed launches on the EELV program was low. Eight years later, the EELV Program has now demonstrated performance in managing a complex launch and mission integration environment, successfully launching all "first of a kind" satellite payloads. Future launches will be for satellites that have all been previously integrated, with some (WGS, GPS IIF, DMSP) launched on both EELV Systems provided by ULA. Consequently, most requirements are well-understood and the need to continue on a cost-plus basis no longer exists.

A separate rationale for maintaining cost-plus elements has been the uncertainty in launch schedule. Clearly, the situation existed in 2005 when the Air Force could not necessarily predict when new satellites would be ready for launch, and when they would be, there was a sense of urgency for these systems to be launched to replace aging national security assets or to provide new capabilities in order to support national need. In 2011, the EELV Program began the transition to a "launch slot concept" that enables the Air Force to have improved flexibility to determine as late as six months prior to launch which satellite has the highest priority for the launch slot. Up until that point, the Air Force maintains through the integration process the ability to consider alternative missions as "back-ups" should the primary mission encounter a schedule problem. Further, as the Air Force has recently assessed, most satellites today are moving out of development and into production, which should have a positive impact with respect to on-time satellite delivery and the ability to launch on time. As a result, this rationale for a cost-plus contract element is no longer valid.

Consequently, the use of a commercially-focused contracting approach for the integration, mission assurance, and launch operations elements of the EELV Program is appropriate and consistent with the guidance contained in FAR Part 16. In addition, as referenced above, the FAR plainly instructs (see FAR Part 12.101) the Government to acquire commercial items when they are available to meet the needs of the agency. Launch services are clearly commercially available and are routinely sold on the commercial market. Nearly 60 percent of SpaceX's manifest of 50 launches is for commercial customers. Indeed, Lockheed Martin Commercial Launch Services (LMCLS) recently sold an Atlas V launch vehicle commercially to the Mexican government, subcontracting with ULA to execute the launch service. LMCLS has stated publicly its intent to market at least two Atlas vehicles annually, leveraging the

[12] The commercial launch market available for U.S. competition is stable and averages approximately 30 satellites per year, with a total value of nearly $3 billion annually.

Government's 36-core block buy and the Launch Capability payments to reduce its price for commercial customers.[13]

As such, the Air Force should execute launch services procurement under a FAR Part 12 commercial-item acquisition, as is required under the FAR. This approach will allow for the elimination of the non-valued items that have no impact to mission success, but add costs to program execution.

SpaceX intends to demonstrate the benefits associated with competition—including timely support to the warfighter, contractor-funded improvement and excellent value—and provide truly assured access to space through two distinct launch providers. By providing launch services on a commercially-available, proven launch vehicle under a FAR-based commercial-item contract, SpaceX can help alleviate manifest congestion and reintroduce cost competition and the accompanying improvements it provides. As a commercial launch services provider with a manifest of almost 50 launches representing over $4 billion in contracts, SpaceX is able to share its fixed cost among a strong customer base in national and international commercial and government markets.

(c) Competitive, Commercial Acquisition Model for Space Launch is Proven

In the mid-2000s, NASA, like the DOD, faced the challenge of unacceptably high launch costs. To contain this problem, the agency partnered with private industry to produce new launch vehicles that were not only highly reliable, but also affordable. This collaboration, known as the Commercial Orbital Transportation Services (COTS) program, was structured under firm fixed-price, milestone-based development agreements that leveraged private sector innovation and capital with Government investment and technical expertise. For less than the cost of a single Space Shuttle flight, COTS produced two new launch vehicles and spacecraft and reestablished American capability to reach the International Space Station (ISS). The SpaceX Dragon developed under this program is currently the only spacecraft in the world capable of bringing substantial cargo both up and back from space.

NASA further endorsed this approach when it awarded 20 ISS cargo missions to multiple providers under the Commercial Resupply Services (CRS) program. Using firm fixed-price, FAR Part 12 contracts, NASA is able to ensure the safety of the astronauts and equipment onboard the $160 billion International Space Station, while also maintaining cost-control and benefiting from contractor innovation. This contracting approach is an unmitigated success, with SpaceX's cargo delivery prices the lowest per pound in the history of the ISS. SpaceX has already completed its first two CRS missions and is on track to conduct its third in the coming weeks.

NASA properly approached launch acquisition as a "commercial item," consistent with the FAR and the Commercial Space Act of 1998.[14] There exists a robust and competitive global launch market that grants the Government deep insight into price reasonableness. This approach has proven highly successful for the agency. It conducts many science missions through the NASA Launch Services (NLS) II program (and its predecessor NLS I program), where launch services are competed between a stable of providers operating under indefinite delivery, indefinite quantity (IDIQ) task order contracts. This structure enables

[13] Fester, Warren. "New ULA-Lockheed Relationship Helps Atlas 5 Compete for Commercial Launches." *Space News.* September 23, 2013. "Robert Cleave, president of Lockheed Martin Commercial Launch Services, said . . . the company expects to be able to capture two commercial contracts per year starting in 2015." And: "Cleave credited the U.S. Air Force's planned block buy of up to 36 Atlas 5 and Delta 4 launch vehicle cores from ULA for Lockheed Martin's ability to bring its commercial launch prices to more competitive levels. The block buy is intended primarily to generate volume-based price discounts for government customers.

[14] "Special Requirements for the Acquisition of Commercial Items," FAR Part 12, Subpart 2, Section 207; "To encourage the development of a commercial space industry in the United States, and for other purposes (Brief title: Commercial Space Act of 1998)." (PL 105-303, 28 Oct. 1998). NASA Office of the General Counsel.

NASA to weigh a variety of factors, including risk, technical capability, and price prior to issuing any mission award. It further encourages launch providers to continually innovate throughout program life by permitting them to "introduce launch vehicles or technologies that were not available at the time of the award of the initial contract."[15] Consequently, NASA is able to take advantage of a continually refreshed portfolio of launch vehicles for its diverse missions without resorting to arcane contracting approaches. Importantly, NASA does not pay for the ELC, but rather pays for each launch service. ULA, Orbital Science, and SpaceX are all part of this competitive launch services contract.

In 2012, the Air Force awarded SpaceX two missions under the Orbital/Suborbital Program (OSP-3). These EELV-class missions, which were designated as New Entrant missions for EELV, utilized a firm fixed-price contracting approach requiring compliance to Air Force mission assurance, mission integration, and launch operations requirements, with performance-based payment structure. It is important to note that for CRS, NLS II, and OSP-3, NASA and the Air Force conduct mission assurance (MA) activities on a firm fixed-price basis. This demonstrates a strong confidence that safety and reliability can be achieved without compromising affordability.

V. Benefits of Competition for DOD Launch

The Air Force has attempted to contain cost-growth through an economic order quantity "block buy," sole-sourced to ULA for 36 rocket booster cores to be ordered through 2017. Although SpaceX is pleased that the Air Force made the decision to reinstate competition for 20 percent of the DOD launch manifest through 2017 (though would far prefer fair and open competition for all missions), the competitive advantage created by its sole-source block buy of 36 rocket booster cores to ULA must be recognized. It is a factor that challenges a level playing field for competition and one which will have limited long-term impacts on cost reduction. As has been recognized by numerous Government and independent reports, competition is the only true mechanism for achieving both performance and affordability. This approach is consistent with "commercial item" requirements under the FAR and the Defense Federal Acquisition Regulation Supplement (DFARS).[16] The Weapon Systems Acquisition Reform Act of 2009 (WSARA) further requires competition as "a means to improve contractor performance" through program lifecycle, and the DOD's Better Buying Power 2.0 initiative calls competitive procurement and firm fixed-price contracting "the motivation to control and reduce cost."[17]

Competition drives notably lower costs than a block buy when multiple certified companies exist in a program. If launches were awarded today, the DOD would save at least one billion dollars per year by selecting SpaceX over the incumbent. Competitive pressures will further induce certified providers to continually improve on both cost and reliability. These savings would not result in diminished Government insight into provider processes and mission assurance, as commercial item acquisitions still include substantial insight between companies and relevant agencies. There is no connection between cost-plus contracting and consistent mission assurance, as has been successfully demonstrated in NASA's COTS, CRS, and NLS programs and the Air Force's OSP-3 program. However, there is a direct correlation between complicated, opaque cost-plus contract structures and higher program costs.

Consistent with the initial goals of the EELV program, competition ensures that in the event of a launch vehicle anomaly or national emergency, the U.S. still maintains its access to space with another independent launch vehicle capability, something which is absent with the consolidation of ULA and the

[15] U.S. Government Accountability Office, "Medium Launch Transition Strategy Leverages Ongoing Investments but Is Not Without Risk," November 2010, 4.
[16] Ibid. 8-9.
[17] "Weapon Systems Acquisition Reform Act of 2009," Pub. L. no. 111-23, 22 May 2009, Sec. 202 (a)(1); Kendall, Frank. "Better Buying Power 2.0: Continuing the Pursuit for Greater Efficiency and Productivity in Defense Spending." Memorandum to the Defense Acquisition Workforce. 13 Nov. 2012. 5.

increasing commonality between the Atlas and Delta launch vehicles. An independent report by the MITRE Corporation in September 2012 affirms that multiple providers establish an "insurance for transition in case of performance failure."[18] Even without any anomalies, multiple providers with separate launch sites decrease manifest congestion at a time when DOD's launch needs are at their highest in years. The recently issued National Space Transportation Policy (NSTP) dictates that "competition among providers" is critical to "assure access to space for [the] United States Government."[19] -

Critically, competition also reduces national dependence on a foreign supply chain. The Atlas V rocket utilizes the first stage Russian RD-180 engine and a Swiss 5 meter payload fairing. Further, the Delta IV is dependent on Japanese suppliers for its upper stage liquid hydrogen tanks. This foreign reliance introduces obvious risk into the national security launch enterprise. Indeed, it was reported late last year that Russia's Security Council was considering discontinuing the supply of the RD-180 engine for the Atlas V over unrelated foreign policy issues with the United States.[20] As mentioned previously, Falcon 9 and Falcon Heavy are manufactured entirely in the United States and do not rely on foreign companies for major subsystems and components.

Much is made of the shrinking defense industrial base, specifically with respect to space industrial base. Competition is one remedy to this challenge. Excluding SpaceX, the U.S. industrial base averages only five liquid rocket engines per year capable of lifting a medium- or heavy-lift payload. In contrast, SpaceX produces 120 such rocket engines per year, with annual manufacturing capacity growing to 420 engines by the end of this year, far exceeding all other liquid rocket engine producers in the United States and Russia combined. This all-American production maintains critical skills in the U.S. and sustains important suppliers around the country.

In the monopoly cost-plus environment that has existed in the EELV program since just prior to the 2006 formation of ULA, there is little incentive for contractor innovation, and little has been seen. Any launch vehicle upgrades, most recently with the RL-10C, were initiated and paid for by the Government with little return to the taxpayer. Reestablishing competition in the program will return the spirit of self-funded innovation by forcing providers to consistently invest in launch vehicle improvements to win contracts, else they be awarded to their competitors. NASA has certainly benefited from this approach, with both companies in the COTS program putting their own capital into the program; as a result, Falcon 9 emerged as the lowest cost medium-to-intermediate lift launch vehicle in NASA's portfolio.

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Mr. Chairman, I appreciate your invitation to testify before the committee today. Leveraging SpaceX's current Air Force, NASA, and commercial contracts, SpaceX plans to demonstrate heritage, reliability, and safety over a relatively short period of time. SpaceX has demonstrated its commitment to support national security space launches with significant internal investments in launch vehicle improvements and launch infrastructure to support the full spectrum of EELV program requirements, as well as the commitment and allocation of resources to the Air Force New Entrant Certification process.

With fully American-made launch vehicles and launch sites on both East and West coasts, SpaceX's objective is to establish an enduring U.S. launch industry, consistent with the National Space Transportation Policy and the Commercial Space Launch Act. As a result, SpaceX seeks to provide the U.S. Government with true assured access to space with a new launch vehicle family and launch

[18] Wydler, Chang, and Schultz, 17.
[19] The Executive Office of the President, "National Space Transportation Policy," November 2013, 3.
[20] "Russian Rocket Engine Export Ban Could Halt US Space Program." RT, 27 Aug. 2013. Web.

infrastructure and without reliance on foreign suppliers for rocket engines, fairings or other major launch vehicle components.

With a mature commercial launch market ready to support national security launch needs, the time has come for the EELV program to live up to its name and *evolve*. Conducting competition in a fair and level playing field will significantly and immediately reduce costs for the Government, while enhancing vehicle reliability and national assured access to space capability.