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Defense Primer: National Security Space Launch

Introduction

The U.S. Department of Defense's (DOD's) Launch Enterprise consists of two programs: National Security Space Launch (NSSL), which acquires launch services for heavy and medium lift class national security satellites and other assets, and the Rocket System Launch Program, which "provides procurement of small launch and rideshare services, suborbital targets and experimental flights, and restoration of excess ballistic missile assets for reuse." This In Focus addresses only the first of these two programs. Congress has consistently demonstrated interest in conducting oversight of both the scope and execution of the NSSL program and is additionally involved in program authorization and appropriation.

Background

National security space (NSS) launches support the military and intelligence community. NSS launches have included commercial and military communications satellites—including Global Positioning System satellites, lunar and other planetary orbiters and probes, earth observation and military research satellites, weather satellites, missile warning and reconnaissance satellites, a tracking and data relay satellite, and the X-37B space plane (a military orbital test vehicle).

NSSL's predecessor in NSS launch services, the Evolved Expendable Launch Vehicle (EELV) program, was established in August 1994 with President Clinton's signing of the National Space Transportation Policy (NSTC-4). NSTC-4 assigned DOD with the responsibility for developing medium and heavy launch vehicles and "improving reliability, operability, responsiveness, and safety." NSTC-4 additionally directed DOD and the National Aeronautics and Space Administration to "combine their expendable launch service requirements into single procurements when such procurements would result in cost savings or are otherwise advantageous to the government."

Initially, two companies competed for EELV contracts: Boeing, which produced the Delta IV launch vehicle, and Lockheed Martin, which produced the Atlas V. In 2006, Boeing and Lockheed Martin formed a joint venture, United Launch Alliance (ULA), which combined the companies' mission management and support, engineering, vehicle production, and other assets. ULA was the sole U.S. provider of launch services from its establishment in 2006 to 2015, when DOD certified Space Exploration Technologies Corporation's (SpaceX) Falcon 9. (DOD certified a second SpaceX launch vehicle, Falcon Heavy, for NSS launch services in 2019.)

In response to rising program costs, the Air Force approved a new EELV acquisition strategy in November 2011, revising it in 2013. That strategy was designed to (1) sustain two major independent rocket-powered launch vehicle families to reduce the chance of launch interruptions and to ensure reliable access to space; (2) license and stockpile the Russian-made RD-180 heavy-lift rocket engine, a critical component of the Atlas V; (3) pursue a block-buy commitment to a number of launches through the end of the decade to reduce launch costs; and (4) increase competition to reduce overall launch costs.

Congress, in the FY2019 National Defense Authorization Act ([NDAA]; P.L. 115-232), renamed the EELV program to the NSSL program to reflect a wider mission that would consider not only expendable launch vehicles but also reusable launch vehicles. (Both Falcon 9 and Falcon Heavy are partially reusable launch vehicles.)

NSSL Program Today

The U.S. Space Force, the sixth branch of the Armed Forces, is responsible for the military space launch mission. The NSSL program is managed by the Space Systems Command, located at Los Angeles Air Force Base. DOD requested $2.1 billion for NSSL in FY2024.

According to the *FY2021 Selected Acquisition Report (SAR)*,

> the NSSL system includes launch vehicles, launch capability, a standard payload interface, support systems, mission integration (includes mission unique requirements), flight instrumentation and range interfaces, special studies, post-flight data evaluation and analysis, mission assurance, infrastructure, critical component engineering, Government Mission Director support, system/process and reliability improvements, training, and other technical support. The system also includes launch site operations activities, activities in support of assured access, systems integration and tests, and other related support activities.

DOD expects to achieve cost saving through acquisitions and operability improvements through use of common components and infrastructure, standard payload interfaces, standardized launch pads, and reductions in on-pad processing. To improve acquisitions, the NSSL program offers block buys of launch vehicles and competition between certified providers. The competitions are conducted through two contract vehicles: Launch Service Agreements (LSA) and Launch Service Procurement (LSP) awards.

LSAs are a set of Air Force Research, Development, Test, and Evaluation awards intended to facilitate the development and certification of NSSL vehicles. DOD

awarded LSAs to ULA, Blue Origin, and Northrop Grumman in 2018.

In contrast, LSP awards are an ongoing procurement competition. DOD awarded the Phase 1 LSP contract to ULA in 2013 and later expanded the contract to include SpaceX under Phase 1A of the program. In 2019, the Space and Missile Systems Center (later renamed Space Systems Command), together with the National Reconnaissance Office, released a request for proposals to award two Phase 2 LSP contracts. ULA, Northrop Grumman, SpaceX, and Blue Origin submitted bids for Phase 2. ULA and SpaceX were selected and are to share the responsibility for NSS launches through FY2027. DOD awarded 60% of the launch services orders to ULA and 40% to SpaceX.

DOD issued requests for proposals for Phase 3 of NSSL in October 2023. Phase 3 is to adopt a two-lane approach: the first lane is to provide smaller launches and is to be open to any provider that has successfully completed a mission to orbit, while the second lane is to provide heavy-lift launches and is to be open to certified providers. The solicitation notes that DOD may award contracts to up to three launch service providers.

Potential Issues for Congress

Although both Congress and national space community stakeholders broadly support the NSS requirement to promote robust competition and assured access to space, challenges to meeting these requirements remain—particularly with regard to controlling costs while ensuring launch reliability and performance.

Competition

Some analysts have questioned the Space Force's decision to award only two LSP contracts in NSSL Phase 2. For example, a 2020 RAND Corporation study concluded that the "current acquisition plan is unlikely to provide sufficient supply of launch vehicles certified to carry U.S. NSS payloads in the 2022–2025 time frame." The Space Force responded, however, that its acquisition plan was "deliberately [focused] ... on mission assurance to sustain 100% mission success but [that the Space Force will] work to minimize the risk to Assured Access to Space to the maximum extent practicable."

Congress may consider the implications of the Space Force's current acquisition strategy for competition. Since any company not selected for Phase 2 LSP contracts could not continue receiving LSA funding, those not selected—Northrop Grumman and Blue Origin—were faced with the choice of either (1) ending NSSL development to focus on competing in the commercial launch sector, or (2) investing significant company reserves to self-fund development. Blue Origin, which had been eligible for up to $500 million under its LSA, elected to continue development of its New Glenn rocket, while Northrop Grumman, which had been eligible for up to $792 million, elected to end development of OmegA. In November 2022, Blue Origin signed a Cooperative Research and Development Agreement with Space Force to enable the company to proceed with certification activities for New Glenn.

Congress may monitor the execution of Phase 3 of NSSL to determine whether the two-lane approach has successfully increased competition and/or led to a greater number of launch service providers.

Reliability

DOD identifies mission success as the NSSL program's foremost priority. The FY2021 SAR notes that NSSL has had "100% mission success and now stands at 91 consecutive successful NSS launches over the program's existence." Some analysts have previously argued against expanding the NSSL program due to concerns that new entrants or launch vehicles could increase program risks and the potential for mission failure. Other analysts have argued that greater competition could lead to lower program costs and greater innovation. Congress may consider these potential tradeoffs as it evaluates the NSSL program.

Supply Chain Security

Congress has expressed sustained interest in conducting oversight of supply chain security for NSSL launch vehicles. For example, in the FY2014 NDAA (P.L. 113-291), Congress placed certain restrictions on DOD's acquisition of the Russian-made RD-180—the rocket engine used by ULA's Atlas V. In the FY2017 NDAA (P.L. 114-328), Congress authorized DOD to acquire a total of 18 RD-180s. This number was intended to allow the Atlas V to continue NSS missions until ULA's Vulcan launch vehicle could be certified. However, "technical and funding challenges" will reportedly require DOD to use the RD-180 through around 2025.

In March 2022, in response to growing tensions between the United States and Russia due to Russia's invasion of Ukraine, Russia announced that it would no longer deliver RD-180s to the United States. Russia additionally stated that it would no longer service the 24 RD-180s remaining in the U.S. inventory. Both ULA and Secretary of the Air Force Frank Kendall responded that they did not expect Russia's decision to impact U.S. NSS launches. However, some analysts have argued that Russia's actions, in combination with growing commercial demand for launch services, could challenge DOD's ability to execute NSS launches as planned. Congress may monitor the Atlas V program and encourage DOD to explore alternative options for NSS launches, if necessary (e.g., accelerating Vulcan certification [assuming technological feasibility], shifting a portion of Phase 2 launch service orders to SpaceX, accelerating the Phase 3 competition).

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