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1010 DEFENSE PENTAGON  
WASHINGTON, DC 20301-1010**

**MAY 23 2016**

The Honorable Bill Nelson  
United States Senate  
Washington, DC 20510

Dear Senator Nelson:

Thank you for your letter dated April 22, 2016, regarding Secretary Carter's appearance and testimony before the Senate Armed Services Committee on March 17, 2016. Secretary Carter asked me to reply on his behalf.

Your letter expressed a desire to continue the discussion concerning the use of the Russian-made RD-180 engine in the Air Force Evolved Expendable Launch Vehicle (EELV) Program. The attached response addresses your specific list of questions. Please note that the responses reflect the views of the Department of Defense and not those of the National Aeronautics and Space Administration or any other executive agency.

As I and several members of the Department's senior leadership team have stated in testimony this year, transitioning from the Russian RD-180 engine is a priority for the Department and we seek to achieve it as quickly as possible in a way that is economically efficient and strategically sound. The Department believes its approach of incentivizing development through public-private partnerships with launch service providers strikes the right balance between cost and policy of alternatives not dependent on the RD-180 engine. An approach that seeks to buy a replacement engine alone is unworkable and jeopardizes competition.

Until we can accomplish this transition, we need authorization for United Launch Alliance's (ULA's) use of up to 18 Russian RD-180 engines as a reasonable starting point to enable competition through 2022. This request supports the Fiscal Year (FY) 2017 President's Budget that projects 34 competitive EELV Program launch opportunities funded from FY 2015 through FY 2022. In order to ensure competition, the Department estimated that 18 RD-180 engines would be required, which is one half of the 34 planned competitive launches, plus one RD-180 engine for flexibility.

If the Department were to lose, in the near term, access to the RD-180 engines, the cost impacts and disruption to launch schedules would be significant. To meet its statutory requirement of assured access to space, the Department would be forced to allocate missions to the Delta IV launch vehicle and the recently certified Falcon 9 launch vehicle. Competition

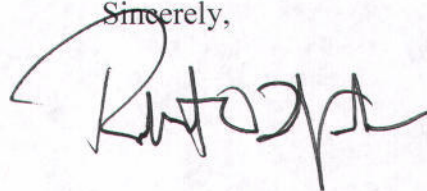




will not be possible as the Delta IV is much more expensive. The Department has assessed that the cost increase associated with the increased use of Delta IV, which ranges from \$1.5 billion up to \$5 billion depending upon the underlying assumptions used and time period covered, would crowd out other important national security investments in the defense budget and could have the unintended consequence of delaying our ability to enable development of new domestic launch capabilities and services.

Thank you for your interest in this important issue, as well as for your contributions to our Nation and your continued support of the Department of Defense.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert M. Gates", with a large, sweeping initial "R" that loops around the first part of the name.

Enclosure:

Responses to the 7 Questions from the April 22, 2016 letter

## **Enclosure**

### **Responses to United States Senator Bill Nelson Questions dated April 22, 2016, regarding the Evolved Expendable Launch Vehicle (EELV) Program**

**Question 1:** What are the national security ramifications of prohibiting the use of the RD-180 engines for use on Department of Defense (DoD) and other government agency launches?

**Response 1:** The impact of prohibiting the use of RD-180 engines ranges from minimal, if put into effect upon certification of a U.S.-built alternative to the RD-180 engine (currently estimated from 2021-2022), to severe if put into place immediately. Currently, United Launch Alliance (ULA) is the only certified launch provider capable of performing all eight National Security Space (NSS) missions for the Air Force Evolved Expendable Launch Vehicle (EELV) Program. Space Exploration Technologies Corporation (SpaceX), with its recently certified Falcon 9, can perform 4 of the 8 EELV reference orbits. With ULA Delta IV and Atlas V launch vehicles, and SpaceX Falcon 9, the Department maintains assured access to space with at least two launch vehicle options covering 7 of the 8 reference orbits.

The Atlas V is the only launch vehicle that uses RD-180 engines. Losing access to RD-180 engines therefore would leave DoD reliant on a single launch vehicle with no back-up for 4 of the 8 missions or require DoD to utilize the Delta IV, which the Department has assessed is economically inefficient and will produce unnecessary and potentially problematic national security tradeoff in a budget constrained environment. Without the Atlas V, a launch vehicle anomaly or failure by the remaining certified launch families could cause the U.S. to lose the capability to place the majority of its communication, missile warning, nuclear detection, and intelligence, surveillance, and reconnaissance satellites in orbit for up to 2.5 years. This is the DoD impact only and does not address the impact to the National Aeronautics and Space Administration (NASA), or other executive agencies, if these agencies lose access to RD-180 rocket engines.

**Question 2:** What are the cost implications of prohibiting the use of RD-180 engines for use on Department of Defense and other government agency launches?

**Response 2:** According to testimony by ULA during the March 17, 2015, House Armed Services Committee Strategic Forces Subcommittee Hearing on Assured Access to Space, the Delta IV launch vehicle is 35% more expensive than Atlas V for similar missions. For the Department of Defense, the Air Force's preliminary analysis suggests the additional costs for a Delta IV and Falcon 9 only launch services procurement manifest could be in excess of \$1.5 billion and up to \$5 billion, depending on the assumptions used. These funds are not in the Air Force budget. These estimates include the additional cost of using the Delta IV single core launch vehicle, and in some cases the Delta IV Heavy launch vehicle, for missions that otherwise would have been competed between the Atlas V and Falcon 9 launch vehicles. The estimates also contain the cost to maintain the Delta IV single core capability including launch service support, Delta fly-out support, and Delta obsolescence and production restart. The \$1.5B estimate is based on the continued use of the RD-180 engine for the Phase 1 Block Buy

contract and the four RD-180 engines allowed for competitive missions per the FY16 NDAA. The \$5B comes from the 2014 “Mitchell” study and is based on: an immediate loss of RD-180 engines; the re-manifest of planned launches, a lack of competition until 2022, and retention of Delta IV infrastructure despite ULA’s plans to retire the single core Delta IV launch vehicle. There is an ongoing analysis to update the amount of additional costs associated with the loss of the RD-180 engine being performed jointly by the Air Force and the Office of the Director, Cost Assessment and Program Evaluation.

**Question 3:** If the costs to the Department of Defense associated with prohibiting the use of RD-180 engines are significant, what consequences would such costs have on the Fiscal Year 2017 Department of Defense budget?

**Response 3:** The Fiscal Year (FY) 2017 DoD budget would be negatively impacted if the Department was prohibited from using RD-180 engines, the degree to which would depend upon how many Delta IV launch vehicles were used for missions in place of an Atlas V or Falcon 9 launch vehicle. Cost for each Delta IV launch is 35% more expensive to build and launch than an Atlas V launch.

**Question 4:** What are the effects to the schedules of the Department of Defense and other government agencies launches if launch vehicles that do not require RD-180 engines must be used?

**Response 4:** The National Mission Model forecasts significant impact to NSS launches. If use of RD-180 engines by the Air Force is prohibited, and launch vehicles that do not require RD-180 engines must be used, the Department would be forced to rely on the Delta IV and Falcon 9 launch vehicles to perform NSS missions. Depending on when the RD-180 restrictions are imposed, the Department would sustain up to a 2.5-year delay for some medium/intermediate NSS missions not already assigned to Delta IV or Falcon 9, given the time required for ULA and SpaceX to increase production rates to meet the new demand. Additionally, the Air Force likely would be required to perform new early integration studies and satellite modifications to transition missions from Atlas V to Delta IV or Falcon 9. For budgetary reasons, some missions (Space-Based Infrared System (SBIRS), Mobile User Objective System (MUOS), and Advanced Extremely High Frequency (AEHF)) satellite interfaces were designed to launch on the Atlas V and would require time and additional funding to launch on a Delta IV or Falcon 9. Because Falcon 9 is not certified to perform the AEHF or MUOS missions, these satellites would require Delta IV launch vehicles, with MUOS requiring the significantly more costly Delta IV Heavy launch vehicle. Time and funding would be required to redesign some Phase 1 satellite and satellite-to-launch vehicle interfaces to ensure the satellite’s safety in the different structural, acoustic, and contamination control environments. In the future, satellite interfaces will be required to be compatible with all certified EELV launch vehicles. At this time, there are no technical impediments for utilization of Delta IV for future mission launches. However, as mentioned earlier, the Falcon 9 is only certified to 4 of the 8 reference orbits; the Falcon Heavy is required for SpaceX to meet the entire NSS launch manifest, but it is still in development.

**Question 5:** What are the national security ramifications of an extended or delayed launch schedule for the Department of Defense and other government agency launches?

**Response 5:** The specific impacts from an extended or delayed launch schedule for the DoD would depend on the length of the delay, as well as the payload or mission in question, based on such factors as constellation health, extended storage costs, delay of mission, etc. The impacts would vary for each DoD launch but losing/delaying the capability to place position and navigation, communication, missile warning, nuclear detection, intelligence, surveillance, and reconnaissance satellites in orbit would be significant. The Air Force's Current Launch Schedule Review Board (CLSRB) would work with partners from the National Reconnaissance Office (NRO), NASA, the Missile Defense Agency (MDA), and commercial launch providers to mitigate launch schedule impacts as much as possible.

**Question 6:** What level of confidence does the Department of Defense have in the ability of launch suppliers to produce launch vehicles that do not use RD-180 engines at a rate that allows the Department of Defense and other government agency launches to stay on current schedule?

**Response 6:** If use of RD-180 engines is prohibited in the near term, it would be highly unlikely that the Department could maintain the current launch schedule. The Department would work with the existing certified launch providers, ULA and SpaceX to determine the schedule and cost to ramp up production and operations to keep as many launches on schedule as possible. The revised launch schedule would be determined by how quickly satellite missions that would transfer from Atlas V could be integrated onto the other launch systems. For the long term, the Air Force intends to work with launch service providers in public-private partnerships to develop the next generation system in return for commitments to provide future launches. The Air Force is confident in the ability to produce domestic solutions, but anticipates a development timeline of at least five years. The Department requests Congress' support for this approach.

**Question 7:** In your opinion, what are the potential effects on research, development, test, and evaluation of future launch vehicles and engines should launch vehicles that use the RD-180 rocket engine be prohibited for current use?

**Response 7:** If the RD-180 engine is eliminated for current use, it is even more critical that the Air Force be allowed to award Public-Private Partnerships using Other Transaction Authority (OTA) agreements under section 2371b of title 10, United States Code.

It should also be noted that currently, ULA uses the Atlas V launch vehicle to perform services for NSS and non-NSS missions. The non-NSS missions include launch services for both NASA and for commercial launches. Because the ULA Delta IV launch vehicle is not price competitive, elimination of the RD-180 engine would in all likelihood restrict ULA's ability to compete for non-NSS missions that it would have otherwise bid on with an Atlas V launch vehicle. If ULA is no longer competitive for these missions, it is unclear whether ULA would have sufficient funds available to continue to invest in a next generation domestic launch vehicle, or even to stay in business.