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SUBCOMMITTEE ON STRATEGIC FORCES
HOUSE ARMED SERVICES COMMITTEE
UNITED STATES HOUSE OF REPRESENTATIVES

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE
SUBCOMMITTEE ON STRATEGIC FORCES
HOUSE ARMED SERVICES COMMITTEE
UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: Joint Space Launch

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Assistant Secretary of the Air Force (Acquisition)

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Introduction

Chairman Rogers, Ranking Member Cooper and distinguished Members of the Subcommittee, it is an honor to appear before this Subcommittee to discuss the Air Force's strategy to end our nation's reliance on the Russian-made RD-180 rocket engine and how we plan to introduce more competition along the way. As General Hyten stated, our military satellites have been a key element of warfighting for over 30 years. The Evolved Expendable Launch Vehicle has been a critical part of this enduring capability by safely delivering those satellites to their intended orbits. Indeed, the EELV program has an unprecedented record of success over all eighty of its launches, supporting all aspects of our nation's military operations, on land, air, and sea. Having said this, we fully support eliminating our reliance on the RD-180 rocket engine, but this will not come without significant technological challenges. Simply replacing the RD-180 with a new engine is not the answer. We know from our prior experience in developing rockets throughout the past several decades that a rocket engine and its associated launch vehicle must be designed concurrently. In essence, we build the rocket around the engine. Technical challenges that must be addressed include vibrations from the engine that ripple throughout the vehicle during its travel, potentially damaging the satellite; ensuring the launch vehicle structure can withstand these ripples and loads without breaking; optimizing fuel storage and flow for the

engine's performance characteristics; and one of the greatest challenges, combustion stability of a high-performance engine.

The Air Force must tackle these technical challenges to eliminate our use of the RD-180. Further complicating this effort, we will also attempt to maximize competition in an environment where the inventory of our current provider's most cost competitive launch vehicle is limited. The question then becomes how do we as a nation most effectively apply the necessary resources required to surmount these challenges.

Restrictive Language

As a result of the 1 February 2014 invasion of Ukraine by Russia, the FY15 National Defense Authorization Act (NDAA) prohibits the use of the Russian-made RD-180 rocket engine. Further, the act directs the Secretary of Defense to develop a US-made rocket propulsion system no later than 2019. The Air Force agrees that we need to transition off of the RD-180 as quickly as possible, however, the objective of 2019 is very aggressive, and it does not result in what is ultimately required, a launch vehicle and the supporting infrastructure so the Air Force can order launch services from industry. To echo the words of Secretary James, it truly is rocket science. Based on historical rocket engine development timelines, developing a new engine from scratch has taken six to eight years and

then another two years to integrate the engine into a launch vehicle. There have been engine development programs that were completed in about five years, but those systems were upgrades based on existing engines.

The act also prohibits the Secretary of Defense from awarding or renewing an EELV contract if it is performed using Russian-made engines. Of course, there is an exception for the current 36-core contract with United Launch Alliance as well as an exemption if the Secretary certifies, upon advice from the General Counsel of the Department of Defense, that the Russian engine was either fully paid for prior to 1 February 2014 or included in a legally binding commitment to fully pay prior to 1 February 2014.

While the intent of this exception language may have been to provide sufficient use of RD-180 engines on order to bridge the gap until a new engine and vehicle were ready, it appears that only a small number of engines actually meet the statutory language, based on the documentation provided to the Department. This prohibition therefore severely limits market driven competition due to the loss of the Atlas V as the most price competitive, certified launch vehicle. Without relief from this language, coupled with ULA's recent decision to retire the non-price competitive Delta medium-class launch vehicle, we will no longer meet our long standing assured access to space policy, where we attempt, to the maximum extent practicable, to have two paths to space for each of our satellites. Just as

importantly, we will likely be forced to trade one sole-source provider for another. One of the Air Force's top priorities has been to reinvigorate competition in the launch arena, and the restriction delays meaningful competition until we reach our ultimate goal of two domestic, commercially competitive launch service providers able to support the entire National Security Space manifest.

Four-Step Transition Approach

We are refining a four-step approach to meet this goal, and the $220 million addition in the FY15 NDAA for a new rocket propulsion system will help to transition off of RD-180. As General Hyten mentioned, we must maintain mission success and assured access to space for our national security space assets by ensuring this effort results in a launch system. Industry feedback from our August 2014 request for information assisted in our development of the four-step approach to accomplish this, and we will continue to refine this approach as we gain further insight from expertise across government, academia, and industry.

The approach involves shared investment with industry towards the ultimate goal of two or more domestic launch service providers in innovative public-private partnerships, selected through competition, and able to support the entire NSS manifest. As a start, we released a second targeted request for information last month which will help the Air Force shape this investment approach. We also

anticipate receiving initial approval for the acquisition strategy in the coming weeks. Additionally, we will provide a report on the strategy to Congress in June of this year.

The first step will be to complete technology maturation and risk reduction activities for the most challenging, highest risk aspects to developing a rocket propulsion system. This is already underway, using the FY14 and FY15 funds to accelerate investments in NASA's Advanced Booster Engineering Demonstration and Risk Reduction program and our own Air Force Research Laboratories' hydrocarbon boost project. The results of this technology maturation will be made available to industry and are intended to advance the early stages of rocket propulsion development and reduce risk. It is in this first step that the Air Force is reducing risk on the most pressing challenge, which is combustion stability in a high-performance engine. Engines of this caliber, which have not been fully developed in the US, can literally explode during test and operations, destroying critical test infrastructure as well. We are ready to make a broad area announcement that will call on industry and academia to assist in developing software tools for modeling combustion stability, advances in heat-resistant coatings, and fuel injection components, the results of which will be made available to industry to the maximum extent possible.

In the second step, we will be reaching out this spring to industry through a shared investment approach to partner in their rocket propulsion system solutions starting with the remaining FY15 funds. Based on our market research and previous requests for information, we have a strategy in place to structure this public-private partnership that is dependent on the level of maturity of the prospective rocket engines. To the maximum extent practicable, rocket propulsion systems developed from these investments will be open to any launch provider for use in their launch systems.

In the third step, the Air Force will invest starting with the FY16 funds in industry's launch solutions, based on advances made in rocket engine development programs from step two. This will result in fully developed launch systems powered by US-made propulsion systems. The goal of step three is to have two or more US-produced commercially competitive launch systems that meet NSS requirements and are also available for commercial use. As much as possible, we will work certification efforts in parallel when applicable during the development efforts in steps two and three.

In our final step in this approach, the Air Force will hold a full and open competition for launches that will occur between 2020 and 2024. The initial awards will use existing systems and then transition to the newly-developed systems once they are fully certified. The key to the success of this strategy is our

ability to use Atlas, Delta, and the soon to be certified Falcon 9v1.1 during this demonstration period. This will result in using all new launch systems powered by American-made rocket engines that would be capitalizing on the competitive commercial viability of the launch system to help offset the overhead of capability.

Conclusion

In conclusion, I hope I have been able to convey to you some of the challenges and complexities in developing launch systems, including rocket engines. Additionally, I'm confident the four-step approach I've outlined today will result in an American-made launch system that meets the needs of our nation and ends our use of the Russian-made RD-180. Also, I would like to reiterate the implications associated with the language in the NDAA and how that both limits the Air Force's ability to compete as many launch missions as possible during this transition and limits our nation's assured access to space. And lastly, I would be remiss if I did not emphasize the tremendous success the EELV program has had and continues to have for our nation. We are committed to making EELV even more resilient and ushering in a new era of competition and continued assured access to space.

We thank the Subcommittee for their support and look forward to coming back to you with reports on our progress.