Chairman Rogers, thank you and good morning. Members of the committee, good morning, and thank you for the opportunity to discuss Assured Access to Space, a critical component of our National Security.

I will discuss my views of the current state and strategy for the Evolved Expendable Launch Vehicle (EELV), including challenges, opportunities, risks and perspectives related to our national security space launch activities. These are my personal observations and do not represent either The Aerospace Corporation’s position or the position of any member of the RD-180 Mitigation Study team.

Let me begin by saying I have been involved in the evolution of the Assured Access to Space policy since the phrase was coined in late 1983 by the Honorable Edward C. Aldridge, who, at the time was dual-hatted as the Under Secretary of the Air Force and Director of the National Reconnaissance Office (NRO). His concern was that the Nation needed to have Assured Access to Space to mitigate the risk of the “Shuttle only” policy in place since the late 1970s. The concept was to procure ten Commercial Expendable Launch Vehicle (CELV) that could be used in the event of a Shuttle problem. The program started with a study phase in 1984 and led to a contract award to Martin Marietta in 1985 for what became known as the Titan IV.

I have been involved with the EELV program since its inception in 1994. In fact, I was responsible for implementing the Congressionally directed, Space Launch Modernization Plan, led by Lt. Gen. Thomas S. Moorman, Jr., then the Vice Commander of Air Force Space Command. In the November 2006 High Frontier Journal (Volume 3, Number 1), he wrote an article entitled “Framing the Assured Access Debate: A Brief History of Air Force Space Launch”; an excerpt from that article follows; “One of the first things the study group examined was the “differing views and interests in this area” and the underlying causes that had led to “an inability to maintain consensus within the executive branch.” These differing interests and perspectives are summarized below:

- The defense space sector was most interested in cost-effective, medium-class launches for its force enhancement payloads, while seeing future needs for improved operability, dependability, and responsiveness.
- The intelligence space sector’s top concern was a reliable heavy lift capability for its large and expensive payloads.
- The civil space sector focused on safe, reliable human spaceflight to assemble the Space Station and on the need to reduce the costs of space transportation by pursuing a reusable space launch system.
- The commercial space sector was synergistic with the defense space sector because both were interested in lower prices and dependable launch schedules, and both saw limited opportunities to expand the launch market.

I would contend that as we discuss Assured Access to Space today differing interests and perspectives still exist, albeit slightly modified in the NASA case since the Space Station now exists and the Space Shuttle has been retired.

I also chaired the RD-180 Mitigation Study in March and April of 2014 under a Terms of Reference signed by the Assistant Secretary of the Air Force (Acquisition). A version of the briefing was released to the Committee and to the contractors that supported the study, so I will not go into detail today. I would only say that the major recommendation, to have Liquid Hydrogen, Solid Rocket Motor and Hydrocarbon propulsion systems available to rocket designers, is still valid.

However, much has changed since I completed the RD-180 Mitigation Study:
- The Congress approved a $40 million FY14 reprogramming action to increase funding for technology maturation.
- The Congress allocated $220 in FY15 to accelerate rocket propulsion system development with a target demonstration date of fiscal year 2019.
- The Congress included language in the FY15 NDAA that restricted the purchase of RD-180 engines to those that are already on contract.
- SpaceX’s Falcon 9 v1.1 is expected to be certified as an EELV New Entrant in the June 2015 timeframe.
- ULA has announced a partnership with Blue Origin to produce a new launch vehicle using the Blue Origin BE-4 engine.
- ULA has announced that they are also pursuing the Aerojet Rocketdyne AR-1 engine and will make a decision between the AR-1 and the BE-4 in late 2016.
- ULA has announced that they will discontinue producing the Delta IV Medium the Delta IV Medium-Plus with launches of those vehicles ending in the 2018/2019 timeframe. Thus ending the original Assured Access to Space capability of two families of launch systems, Atlas V and Delta IV.
- ULA has also announced that they will continue producing and launching the Delta IV Heavy as long as National Security Space missions require them.
- Additionally, ULA announced they will study reducing the number of current
EELV launch pads from four to two in the Next Generation Launch System (NGLS) timeframe.

• The SECAF tasked AFSPC/CC to conduct a review of the EELV New Entrant Certification process and General (Ret) Larry Welch, Former Air Force Chief of Staff is leading that effort.

• The DoD IG conducted an audit to determine whether the Air Force implemented the recommendations in the RD-180 Availability Risk Mitigation Study.

• SpaceX is expected to submit a revised Statement of Intent (SOI) for the Falcon 9 Heavy to enter into the EELV New Entrant Certification process later this year but has not yet done so.

With that as the background let me now discuss my views of the current state and strategy for the Evolved Expendable Launch Vehicle (EELV), including challenges, opportunities, risks and perspectives related to our national security space launch activities.

The EELV has been the most successful launch system in history with an outstanding record of mission successes -- only the Delta IV Heavy Demo (no payload) and a 2007 Atlas V have failed to place their payloads in the correct orbit at the required time (on the Atlas launch the mission was declared to be successful). Additionally, the EELV family of launch systems has met all the requirements documented in the Key Performance Parameters (KPP) of the 1998 Operational Requirements Document (ORD).

That being said the EELV program is in the midst of major restructure, that if not properly resourced and carefully thought through (from both an acquisition and operations perspective), will add significant risk to Assured Access to Space for National Security Space missions in the 2020 timeframe and may not result in a competitive environment. Depending on the interpretation of the RD-180 restrictive language even the current Phase 1a EELV competitions could become sole source procurements.

If the success oriented schedules of the contractors and Government are not met the 2020 EELV program could look like the following:

• No Delta IV Medium or Delta IV Medium-Plus launch vehicles– ULA’s current plan

• No Atlas Vs due to restrictions on the use of RD-180s – Congressional language

• No certified Falcon 9 Heavy -- Potential as a revised Statement of Intent to enter the EELV New Entrant Certification process has not been submitted.
• No Next Generation Launch System (NGLS) -- NGLS engine is under development and, as I see it, has a high risk schedule. It is the ULA plan but not available until 2022/2023.

• Only Falcon 9 v1.1 and Delta IV Heavy available to launch the National Security Space missions
  • The result would be that NSS missions currently flying on Atlas V, that are too large for Falcon 9 v1.1, would have to fly on Delta IV Heavy or be delayed until a Falcon 9 Heavy or NGLS becomes available. If they fly on a Delta IV Heavy the cost will increase substantially.

This potential 2020 EELV program would result in two “monopolies” - one for the Heavy missions (ULA) and one for everything else (SpaceX). Obviously this is not the desired end state for competition but is certainly a plausible outcome based on the risk profiles of the current and planned activities.

Given this potential outcome the Government needs to take ownership and 1) define the desired end-state for Assured Access to Space for National Security Space missions, 2) take action to get on the path to achieve that end-state, and 3) adequately resource the plan to ensure this critical component of our National Security is in a healthy state. I recommend that a Space Launch Modernization Plan like effort, led by a senior Government official, be conducted with all the stakeholders participating to assess the risks of the current and planned activities and make recommendations to the Administration and the Congress on how to mitigate them so that the Nation does not have an end state as described above.

As a colleague and friend stated to me “Currently no stakeholder has a credible plan that 'closes.' Each stakeholder has a different endgame solution, and each stakeholder's current 'non-closing' game plan has ‘and then a miracle happens’ as the last element of their plan....and ALL the miracles are different.”