

1                   **Major General Howard “Mitch” J. Mitchell (USAF, Retired)**  
2           **Testimony to the House Armed Services Subcommittee on Strategic Forces**  
3                   **Hearing on “Assured Access to Space”**  
4                   **March 17, 2015**

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

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

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

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

- 37  
38 • The defense space sector was most interested in cost-effective, medium-class  
39 launches for its force enhancement payloads, while seeing future needs for  
40 improved operability, dependability, and responsiveness.

- 41 • The intelligence space sector's top concern was a reliable heavy lift capability for  
42 its large and expensive payloads.
- 43 • The civil space sector focused on safe, reliable human spaceflight to assemble the  
44 Space Station and on the need to reduce the costs of space transportation by  
45 pursuing a reusable space launch system.
- 46 • The commercial space sector was synergistic with the defense space sector  
47 because both were interested in lower prices and dependable launch schedules, and  
48 both saw limited opportunities to expand the launch market.

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

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

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61 However, much has changed since I completed the RD-180 Mitigation Study:

- 62 • The Congress approved a \$40 million FY14 reprogramming action to increase  
63 funding for technology maturation.
- 64 • The Congress allocated \$220 in FY15 to accelerate rocket propulsion system  
65 development with a target demonstration date of fiscal year 2019
- 66 • The Congress included language in the FY15 NDAA that restricted the purchase  
67 of RD-180 engines to those that are already on contract.
- 68 • SpaceX's Falcon 9 v1.1 is expected to be certified as an EELV New Entrant in  
69 the June 2015 timeframe.
- 70 • ULA has announced a partnership with Blue Origin to produce a new launch  
71 vehicle using the Blue Origin BE-4 engine.
- 72 • ULA has announced that they are also pursuing the Aerojet Rocketdyne AR-1  
73 engine and will make a decision between the AR-1 and the BE-4 in late 2016.
- 74 • ULA has announced that they will discontinue producing the Delta IV Medium  
75 the Delta IV Medium-Plus with launches of those vehicles ending in the 2018/2019  
76 timeframe. Thus ending the original Assured Access to Space capability of two  
77 families of launch systems, Atlas V and Delta IV.
- 78 • ULA has also announced that they will continue producing and launching the  
79 Delta IV Heavy as long as National Security Space missions require them.
- 80 • Additionally, ULA announced they will study reducing the number of current

81 EELV launch pads from four to two in the Next Generation Launch System  
82 (NGLS) timeframe.

- 83 • The SECAF tasked AFSPC/CC to conduct a review of the EELV New Entrant  
84 Certification process and General (Ret) Larry Welch, Former Air Force Chief of  
85 Staff is leading that effort.
- 86 • The DoD IG conducted an audit to determine whether the Air Force implemented  
87 the recommendations in the RD-180 Availability Risk Mitigation Study.
- 88 • SpaceX is expected to submit a revised Statement of Intent (SOI) for the Falcon 9  
89 Heavy to enter into the EELV New Entrant Certification process later this year but  
90 has not yet done so.

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

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

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

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

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116 • No Delta IV Medium or Delta IV Medium-Plus launch vehicles-- ULA's current  
117 plan
- 118 • No Atlas Vs due to restrictions on the use of RD-180s -- Congressional language
- 119 • No certified Falcon 9 Heavy -- Potential as a revised Statement of Intent to enter  
120 the EELV New Entrant Certification process has not been submitted.

- 121 • No Next Generation Launch System (NGLS) -- NGLS engine is under  
122 development and, as I see it, has a high risk schedule. It is the ULA plan but not  
123 available until 2022/2023.
- 124 • Only Falcon 9 v1.1 and Delta IV Heavy available to launch the National Security  
125 Space missions
- 126 • The result would be that NSS missions currently flying on Atlas V, that are  
127 too large for Falcon 9 v1.1, would have to fly on Delta IV Heavy or be  
128 delayed until a Falcon 9 Heavy or NGLS becomes available. If they fly on a  
129 Delta IV Heavy the cost will increase substantially.

130

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

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

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