



Assessing the Options: the Augustine Committee Review of U.S. Human Space Flight Plans

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The George Washington University
Space Policy Institute

Bretton Alexander
President, Commercial Spaceflight Federation



The “Original” Vision for Space Exploration

- U.S. Space Exploration Policy (NSPD-31), Jan. 14, 2004
 - § “Develop a new crew exploration vehicle [Orion] to provide crew transportation for missions beyond low Earth orbit
 - § “Acquire crew transportation to and from the International Space Station, as required, after the Space Shuttle is retired from service
 - § “Pursue commercial opportunities for providing transportation and other services supporting the International Space Station and exploration missions beyond low Earth orbit”
- President’s Commission on Implementation of U.S Space Exploration Policy (the “Aldridge Commission”), 2004
 - § “The Commission recommends NASA recognize and implement a far larger presence of private industry in space operations... most immediately in accessing low-Earth orbit [LEO]”
 - § “The Commission believes that NASA should procure all of its low-Earth orbit launch services competitively on the commercial market”

Government *beyond LEO*
Commercial *to LEO*



A Natural Evolution

- Commercial launch industry has a proven record of success:
 - § Trusted to fly multi-billion dollar national security missions
 - § ULA has flown 69 successful Delta II, Delta IV, and Atlas V missions since 2002
 - § Orbital has flown 11 successful Pegasus and Taurus flights since 2002, and Taurus II is under development
 - § SpaceX has flown 2 successful Falcon flights since '02, with Falcon 9 heading to the Cape shortly
 - § NASA signed contracts for \$3.5 billion in cargo services to ISS

Committee's endorsement of commercial human spaceflight is a natural evolution, not a dramatic leap

Safety is Paramount

- NASA will be there every step of the way
 - § Design must meet NASA human rating requirements (8705.2B)
 - § NASA will play a role in design, development, and operations
- Human spaceflight is almost 50 years old
 - § Technical requirements are well understood and U.S. industry has been a part from Day One
- “Human-rating” of ELVs is a non-issue
 - § Mike Griffin, in testimony to Congress in 2003: “What, precisely, are the precautions that we would take to safeguard a human crew that we would deliberately omit when launching, say, a billion-dollar Mars Exploration Rover (MER) mission? The answer is, of course, ‘none’.”
- Rendezvous and prox ops done by U.S., Russia, Europe, Japan
- Astronauts on commercial flights will not fly on unproven vehicles
 - § Atlas has a demonstrated track record
 - § Falcon 9 and Taurus II will have conducted cargo flights to ISS
- Veteran NASA astronauts work at commercial space companies

**NASA will be there
every step of the way**



Ares I or Commercial? – *A False Choice*

- “The Committee found that, because of technical issues and budget cuts, the Ares I schedule no longer supports the ISS”
 - § Critically, the Committee determined that even with an extra \$3 billion, NASA could not afford both Ares I and ISS life extension to 2020
 - § All of Augustine’s Integrated Program Options that included Ares 1 did not include ISS life extension to 2020, enhanced R&D, and enhanced ISS utilization
- Also, Commercial Crew/ISS is a separate issue from the debates about exploration architectures beyond Earth orbit
 - § As Mike Griffin has pointed out, the CEV [Orion] capsule intended for exploration beyond low Earth orbit and is not optimized for ISS servicing
- NASA needs commercial crew to extend ISS
 - § Current plan is to outsource to Russia at \$51m per seat

Augustine’s Real Choice:
Ares I or ISS

