40 Years Later, The Final Frontier Ain't What it Used to Be

Jason Lomberg, Technical Editor

"*I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth.*"

- President John F. Kennedy

May 25, 1961

40 years ago, Neil Armstrong emerged from the Lunar Module *Eagle*, and stepped into history. He became the first human being to step foot on the moon, forever changing the scientific and engineering communities. And yet, 40 years later, the space program is a shell of its former self. Funding is a fraction of what it was. Disasters abound. Public enthusiasm is at an all-time low. How did we get to this point?

The iconic image of Buzz Aldrin, the second man on the man, with Neil Armstrong reflected in his visor.

In the past, the Cold War was reason enough to secure funding and get the public excited. We had to beat the Soviets and prove that our way of life was superior. The “Space Race” became the primary motivating factor for securing political support. But after we beat the communists to

the moon, and accomplished President Kennedy's goal, the program was destined to lose focus. A paper written by the Aerospace Technology Working Group titled, "Sustainable Space Exploration and Space Development - A Unified Strategic Vision [1]," analyzes this phenomenon. The authors opine that, "*due to the space race, the Apollo program started without much strategic vision or planning from the get-go, so America's space program was destined to lose direction soon after winning the space race*."

In 1972, President Nixon chose Apollo's replacement, the Space Shuttle. He did so for economical reasons. As Nixon said [2], "*This system will center on a space vehicle that can shuttle repeatedly from earth to orbit and back. It will revolutionize transportation into near space, by routinizing (sic) it. It will take the astronomical costs out of astronautics. In short, it will go a long way toward delivering the rich benefits of practical space utilization and the valuable spinoffs from space efforts into the daily lives of Americans and all people.*"

Space Shuttle Discovery launches at the start of STS-120.

It was thought that reduced overhead would enable more missions. Many thought of this as the precursor to commercial and/or civilian space travel. Some even thought it would lead to a manned Mars mission before 1980. We all know how that turned out. Of the five space-worthy Space Shuttles, two ended their tours in disaster. Challenger [3] disintegrated 73 seconds after launch in 1986. Columbia [4] disintegrated upon re-entry in 2003. The first post-Columbia mission, STS-114 [5], experienced the same malfunction as its predecessor, though thankfully it didn't end in disaster. Referring to the reliability of the Shuttle, physicist Richard Feynman observed [6], "*an enormous disparity between the management estimate and the judgment of the engineers.*" He noted

that, "*It would appear that, for whatever purpose, be it for internal or external consumption, the management of NASA exaggerates the reliability of its product, to the point of fantasy.*"

The Columbia Accident Investigation Board (CAIB [7]) noted that NASA was trying to do "*too much with too little.*" It also mentioned that "*NASA remained a politicized and vulnerable agency…dependent on key political players who accepted NASA's ambitious proposals and then imposed strict budget limits…Policy constraints affected the Shuttle Program's organizational culture, its structure, and the structure of the safety system. The three combined to keep NASA on its slippery slope toward Challenger and Columbia.*" Among other things, CAIB recommended recertifying or retiring the aging Space Shuttle fleet. Then President George W. Bush took these recommendations to heart and made them part of his "Vision for Space Exploration [8]," announced in 2004. Major objectives included retiring the Space Shuttle by 2010, completing the International Space Station by 2010, returning to the moon by 2020, and putting a man on Mars. The Space Shuttle's successor was also chosen, the Orion spacecraft. Together with the Ares I launch vehicle, the ensemble is known as Project Constellation [9], and is based substantially on the Apollo model. The project is still under development.

Mock-up of Orion capsule on display at the Kennedy Space Center visitors complex

But how to renew public interest? I think that clear policy goals, such as returning to the Moon, and better still, Mars, will light the old spark. But what's the *Raison d'être*? The Cold War is ancient history and we stand alone as the world's only superpower. China has set a goal of putting a man on the moon by 2020, but the China National Space Administration lags far behind NASA. A report by MIT titled "The Future of Human Spaceflight [10]," lays out the non-tangible "primary objectives" of: exploration, national pride, and International prestige and leadership. As the paper states, "*exploration is an expansion of human experience, bringing people into new places, situations, and environments, expanding and redefining what it means to be human.*" Exploration, alone, should be an adequate "reason for being." The MIT paper also recommends renewed cooperation with international partners, including China.

Though I'm a huge proponent of NASA, I stand opposed to extensive international cooperation—not because of jingoistic sentiment, but because, in general,

"groupthink" is a deleterious factor when it comes to engineering-related ventures. Also, competition can be a good thing. Without the Cold War-era Space Race, we may never have landed a man on the moon, or it would have taken much longer. Eight years after President Kennedy made his fateful announcement, we landed a man on the man. That kind of speed and sense of purpose is inconceivable without a strong motivating factor, including international competition. We can and will return NASA to its former glory. There is still wonder to behold in mankind's "Final Frontier."

Source URL (retrieved on *06/19/2013 - 4:25am*):
http://www.ecnmag.com/news/2009/12/40-years-later-final-frontier-aint-what-it-used-be

Links:
[1] http://www.spaceref.com/news/viewsr.html?pid=30702
[2] http://history.nasa.gov/SP-4221/ch9.htm
[3] http://en.wikipedia.org/wiki/Space_Shuttle_Challenger_disaster
[4] http://en.wikipedia.org/wiki/Space_Shuttle_Columbia_disaster
[5] http://en.wikipedia.org/wiki/STS-114
[6] http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/Appendix-F.txt
[7] http://caib.nasa.gov/
[8] http://history.nasa.gov/Bush%20SEP.htm
[9] http://www.nasa.gov/mission_pages/constellation/main/index.html
[10] http://web.mit.edu/mitsps/MITFutureofHumanSpaceflight.pdf