Augustine Committee - Review of U.S. Human Space Flight Plans

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(Corrected Version)

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This document offers a detailed step by step response to this *Statement of Task*, in the form of analysis and recommendations for the continuation of manned space flight activities in support of the advice by the National Academies Space Studies Board of the National Research Council report - *America's Future in Space : Aligning the Civil Space Program with National Needs*.[1]

Statement of Task

This Statement of Task establishes and informs a review to be conducted in support of planning for U.S. human space flight activities beyond the retirement of the Space Shuttle. The purpose of this effort is to develop suitable options for consideration by the Administration regarding a human space flight architecture that would :

· *Expedite a new U.S. capability to support utilization of the International Space Station.*

Since any decisions will be presidential, there are two time frames for consideration here - now through 2012, and now through 2016. Any decision to extend the ISS beyond 2016 will be out of these time frames and a problem of the next administration, so there is no reason to consider that. I recommend extension of the ISS to 2020, and leave it to the next administration to reverse it.

Elon Musk has stated that he could deliver a rescue version of the Dragon on the Falcon 9 to the ISS in 18 to 24 months, just about the time the Space Shuttle is finished flying out its manifest. Thus I recommend extending manifested shuttle flights one year, through 2011, in order to help facilitate the transition to any new rapidly evolving launch vehicle development with the SSMEs.

Small lightweight LEO and ISS only capsules are easily launched by medium all liquid fueled EELVs, the Delta IV Medium, Atlas V, and COTS vehicles such as Falcon 9 and the Taurus II. Since every low Earth orbit mission delivers its upper stage, engine and cargo to its destination, the development of space rated upper stage retrofit requirements and procedures is indicated, and the immediate investment and assistance with commercial capsules and escape towers is desired.

· *Support missions to the Moon and other destinations beyond low Earth orbit (LEO).*

Since it hasn't been previously planned by the Vision for Space Exploration to land any humans on the moon before 2020, manned missions beyond LEO would still be by presidential directive. The primary products of your committee are the various architectural design paradigms allowing extraterrestrial operations to proceed, while satisfying the recommendations of the NRC to better align manned space flight capabilities and operations with urgent critical national imperatives.[1] You already understand the architectural paradigm I propose is one of reusability through design.

· *Stimulate commercial space flight capability.*

Recovered, retrofitted and reused upper stages of commercial EELV and COTS vehicles will serve as fuel depots for the pyramidal space infrastructure envisioned by the flexible approach. Should the president choose to continue a second generation launch vehicle architectural design program at NASA, it should necessarily involve space rating of vehicle cores and upper stages. Such a program should be compatible with and complementary to existing commercial offerings. The vehicle scale should be of a minimum size such that scaling it to larger capacities is simple and straightforward so development may proceed in a timely manner. SSME reuse is mandatory. Ultimately commercial spaceport processing of various launch vehicle elements will be routine.

· *Fit within the current budget profile for NASA exploration activities.*

The goal of the flexible approach is the production of small scale, all liquid powered, research only reusable flight test launch vehicles, using existing SSMEs and standard Ares upper stage fabrication technology in lieu of heavy expendable and expensive launch vehicle development. Commercial launch vehicles and emerging capabilities are utilized to the fullest extent possible. Existing propulsion efforts can then be stretched out and new propulsion programs (re) started. The ability to scale up into heavy lift class reusable launch vehicles in the future is thus retained.

The review will be led by an independent, blue-ribbon panel of experts who will work closely with a NASA team and will report progress on a regular basis to NASA leadership and the Executive Office of the President. This independent review will provide options and related information to involved Administration agencies and offices in sufficient time to support an August 2009 decision on the way forward. As necessary and appropriate, the team may seek early decisions from the Administration on some of these options. A final report containing the options and supporting analyses from this review also will be released.

It is important to continue to stress that your expectations not exceed your resources and abilities, and that any future human space flight architecture addresses the president's stated priorities of energy, environment, national security, economic growth, human health and STEM education.

References

1. *America's Future in Space : Aligning the Civil Space Program with National Needs*, The National Academies Press : http://www.nap.edu/catalog.php?record_id=12701

You may download, view and distribute papers I have written addressing these problems at :

http://webpages.charter.net/tsiolkovsky/

Best Regards,

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