

Hello,

First I wanted to say that after reading Exploration Beyond LEO, I am confident that the Augustine Panel is definitely asking the right questions!

Please excuse my lack of eloquence.

In addition to the questions raised, I would further add the desire to identify and understand the unsolved "hard" problems associated with each of the paths outlined in the document. For example:

- the fuel depot / fuel transfer technical issues
- the impact of lunar dust on the human body & equipment during long duration moon exploration
- the impact of Martian dust on the human body & equipment during long duration Mars exploration
- radiation shielding. Lifeboat is "easy". What if they are trying to grow food, or do live experiments?

I suppose another way to look at it is to consider splitting the hard issues into two categories 1) technical issues of transport (getting there) and 2) technical issues of duration (staying there).

Also, I understand that many problems are not just technical, but political. What are the political implications of the various scenarios? Is there enough "will" to drive any/all given paths through to the end? I understand this is a tough one, but it does seem to fit into the scope of the Panel.

Having said all of that... I am in favor of "Mars First". If that goal ends up unobtainable, I would be in favor of "Flexible Path".

I believe the plan of record should be: One-way missions, using a variant of Mars Direct (MD), with an end goal of colonization. There are plenty of people willing to go under such conditions, and plenty of reasons for people to stay there. Launches would be using heavy Delta IVs, Atlas Vs, and Jupiter Direct 3.0. For the latter, this is assuming further investigation deems it viable. If not, use the Shannon plan. I am guessing at some point NASA will want/need to put up more volume than a side mount system can offer.

Where needed to drive innovation (or even just to spark public interest) X-prize style contests should continue to help generate better mission components / vehicles.

Thank you for your time.

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