Paper ID: 35536
oral

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

Author: Mr. Petrus Batenburg
Nederlandse Vereninging voor Ruimtevaart (NVR), The Netherlands

RESULTS AND RECOMMENDATIONS OF A MOON AND MARS HUMAN EXPLORATION READINESS GAP ANALYSIS AND ROADMAP COMPARISON

Abstract

With the end of the ISS programme approaching, the debate on what is next in human spaceflight is ramping up. In 2015 NASA presented it's "Journey to Mars" strategy while ESA and Roscosmos declared their intentions for a lunar base. While the public and media discussion seems to focus on whether it should be a base on the Moon or Mars and what the role of 3D printing will be, the matter of human space exploration faces several other challenges that should be faced and solved first.

These challenges include: why should we go to the Moon or Mars with human in the first place? Are the general public and governments' budgets willing to support this? What will the be the return for the general public? What science will be performed and do we need humans for it? Under what conditions are governments willing to support this?

Because the current political climate is different then during the sixties and budgets are much less then during earlier time periods, the long term political and budgetary commitment for a Lunar or Martian manned base programme, in scope even larger then Apollo or the ISS, is hard to achieve. A different approach is necessary to make an endavour to the Moon or Mars possible under the current political environment, available budget and public and scientific expectations. Both the NASA "Journey to Mars" and ESA "Moon Village" plans recognize these challenges but have not yet translated this into concrete steps and plans.

This paper presents the results and recommendations of an analysis that is intended to help define this alternative approach. The baseline for this study is a gap analysis between the current capabilities in human spaceflight and what is required for Moon or Mars exploration based on quantifiable scales and Technology Readiness Levels (TRLs). The results of this analysis are then translated into steps that are required to get to the point of sustainable Moon and Mars exploration.

These steps have been worked out into an 'end-goal-only-focussed' programme like Apollo and a 'step-by-step roadmap scheme'. The study is concluded with an analytical comparison of these two approaches resulting in analytical and structured argumentation proving the latter approach can achieve the same end results but with earlier return of investment, serving other programmes as well and is therefore easier to get support of governments, the scientific community and the general public.