HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
Enabling Technologies for Human Space Endeavours (2)

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THE ADVANCED RE-ENTRY VEHICLE (ARV) - A FIRST EUROPEAN STEP TOWARDS CREW TRANSPORTATION

Abstract

With the successful launch of COLUMBUS and ATV in 2008, Europe has demonstrated the capability and the political will to participate in the peaceful, cooperative endeavour of human spaceflight. While COLUMBUS provides a permanent research capability until the end of ISS, ATV lays the foundation for one-way cargo transport into LEO within a human spaceflight scenario. Although Europe has thus acquired a recognized competence level in the area of orbital infrastructure and its operation through its own assets, one key mission is still lacking a solution: the return of a large vehicle to Earth. Such capability would be required to further develop the ATV into a vehicle capable of bringing cargo from the ISS back to Earth. With a view to the lifetime of the ISS - expected to be operated until around 2020 - as the first obvious target for any cargo transport, Europe needs now to develop its two-way cargo transportation system, as part of its in-orbit infrastructure activities. Such a capability could pave the way towards transporting European astronauts to LEO in an era beyond ISS. To provide technical and programmatic information needed for the project evaluation, ESA has initiated two parallel technical support contracts with the two European system level industrial Prime Contractors, which has led to for the government approval of a phase A of the Advanced Re-entry Vehicle (ARV) in November 2008. This paper presents some study results of ESA, ASTRIUM ST, and Thales-Alenia Space, providing options on how Europe could acquire within reasonable time a self standing space transportation capability. Trade-off results and recent design proposals on various configurations based on the core mission requirements are given, and the underlying long-lead development approach towards crew transportation via a cargo return vehicle first is outlined. The related launch vehicle and ground infrastructure considerations are also presented.