Paper ID: 32622
oral

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Governmental Human Spaceflight Programs (Overview) (1)

Author: Dr. Oliver Romberg
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, Oliver.Romberg@dlr.de

Mr. Dominik Quantius
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, Dominik.Quantius@dlr.de
Prof. Hansjörg Dittus
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, Hansjoerg.Dittus@dlr.de
Dr. Hans Schlegel
European Space Agency (ESA), Germany, hans.schlegel@esa.int
Dr. Ingo Retat
EADS Astrium Space Transportation GmbH, Germany, ingo.retat@airbus.com
Mr. Rodrigo da Costa
Airbus Defence & Space, Germany, Rodrigo.dacosta@airbus.com

THE ORBITAL-HUB: LOW COST PLATFORM FOR HUMAN SPACEFLIGHT AFTER ISS

Abstract

The International Space Station ISS demonstrates long-term international cooperation between 15 partner governments as well as significant engineering and programmatic achievement mostly as a compromise of budget, politics, administration and technological feasibility. A paradigm shift to use the ISS more as an Earth observation platform and to more innovation and risk acceptance can be observed in the development of new markets by shifting responsibilities to private entities and broadening research disciplines, demanding faster access by users and including new launcher and experiment facilitator companies. A review of worldwide activities shows that all spacefaring nations are developing their individual programmes for the time after ISS. All partners are basically still interested in LEO and human spaceflight as discussed by the ISECG. ISS follow-on activities should comprise clear scientific and technological objectives combined with the long term view on space exploration. This includes key competences like robotics, internal and external space structures, module/facility and experiment operations as well as supply systems (e. g. ATV). Giving financial feasibility priority, DLR started to investigate future low cost options by evaluating various LEO infrastructure concepts including opportunities for national realisation and international cooperation. Scientists and users from various disciplines were involved to assess the usability of corresponding options. Resulting payloads were based on their Mir and ISS experience with respect to future scientific fundamental and technological research questions. Together with US and European industry, NASA and ESA astronauts, operation specialists, current ISS users and scientists, DLR conducted an extensive concept study using the DLR Concurrent Engineering facility (CEF). The present paper describes the results of these activities with a Phase A design called Orbital-Hub based on a small low cost manned LEO platform including a man-tended free flyer. The first flying H/W components could be realised in the frame of moderate budgets in the next eight years. The Orbital-Hub would guarantee a smooth transition between ISS and further space activities in and beyond LEO and would represent an important step regarding long-term space research, Earth observation respectively monitoring and human space exploration.