

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)  
Joint Session on Future Human Space Endeavours (5.-A5.3)

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FUTURE OF HUMAN SPACECRAFT IN EUROPE

**Abstract**

As of today, the Russian federation, the United States and People's Republic of China are able to launch astronauts to space by their own means. Since 1972, the activities of humans in space have been limited to the close vicinity of Earth, the International Space Station being the focus of the human space activities since the late nineties. Other major space powers, India, Japan and Europe, are contemplating the possibility to develop their own crew transportation system. Meanwhile, the United States and Russia have started the process to replace their vehicles by a new generation. Such systems, given the long development time of a crew transportation vehicle, will start their operational life in a much different context from the one which prevails right now. The International Space Station will be near or even past the end of its operational life. From the example of the Shuttle and Soyuz, it can be forecast they will be exploited during possibly two or three decades. The present paper will discuss the possible overall architecture of a crew transportation system for the 2020-40 timeframe, which would retain the capability to service an infrastructure in Low Earth Orbit but would have the growth potential to venture beyond Earth orbit in the course of its lifetime. In terms of overall architecture, the modularity of such a vehicle is a key way to offer this potential. The number of modules, their versatility, their functions and evolution along the lifetime of the vehicle will be addressed. The choice of the shape and aerodynamics characteristics, as well as the performance target (i.e. target mass) will also ensure the growth potential to go for lunar or Lagrangian point missions. The key subsystems, thermal protection, power, thermal control, launch escape and descent and landing systems will be addressed.