

EUROPEAN MANNED SPACE PROJECTS

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The presentation focuses on the European participation to the ISS program with COLUMBUS and the ATV, and plans for manned space transport systems such as HERMES, SÄNGER, SPACELINER, HOTOL/SKYLON. Initially a short overview is given on the manned space achievements of the USA, which originated after World War II from European research work and rocket development by Werner v. Braun and his team and resulted in the APOLLO program. The projects SPACELAB and ARIANE 5 / HERMES -which the author joined from 1972 to 1987 at industry and from 1987 to 1998 at ESA- are addressed in more detail.

Key words (in chronological order): Hypersonic Research, Apollo, Skylab, Shuttle-Spacelab, Ariane5-HERMES, ARD, Sänger, ATV, Columbus, Orion, Spaceliner, Skylon.

Presentation Outline

The first rocket capable of space transport was developed in Germany by Wernher v. Braun, who conceived and directed after the war the APOLLO program of the USA. Later on the USA confirmed their leadership in manned space with the SPACE SHUTTLE, the International Space Station ISS, plans for deep space missions such as ORION and recently the Mars human settlement plans of Space X.

As part of the NASA SPACE SHUTTLE program NASA proposed 1972 to Europe to participate with the research laboratory SPACELAB as main SHUTTLE payload. SPACELAB was then developed and built in Europe from 1974 onwards and flew in 22 successful manned scientific research missions with the SHUTTLE. SPACELAB had a modular design with a manned module and so-called “pallets” capable of carrying a variety of payloads exposed to open space. The SPACELAB module was to a large extent an autonomous space habitat. Two SPACELABs were delivered to NASA in the 80’s, with the first mission of the manned laboratory in 1983. SPACELAB was a success story providing Europe the competence for manned space systems design and construction, enabling Europe to join 1995 the ISS program with the COLUMBUS scientific research laboratory attached to the ISS. The ATV, another European contribution to the ISS program, although unmanned, proved Europe’s capacity to build vehicles meeting manned safety standards allowing direct docking to the ISS.

Initially, from 1985 onwards Europe developed, under the leadership of ESA, plans for an independent manned space and ground infrastructure with a free-flying microgravity research laboratory called MTF (Man-Tended-Free Flyer), based upon SPACELAB technologies. The MTF should be serviced by the manned spaceplane HERMES.

While the MTF was abandoned in favor of COLUMBUS, HERMES achieved a quite detailed definition status based on design and predevelopment work performed between 1980 and 1992 under the leadership of CNES and ESA. In 1992 the HERMES program was terminated along with plans for an independent European manned space infrastructure, in the political turbulences after the “fall of the iron curtain” in 1989. HERMES technology related research, fabrication and test continued however up to 1998, with an Atmospheric Reentry Demonstrator (ARD) developed on the basis of HERMES technologies. 1998 the ARD was successfully launched by ARIANE 5, demonstrating Europe’s capacity for a reentry vehicle similar to the APOLLO capsule.

Europe remained however always engaged in manned space transport in the area of hypersonic research and the conception of manned space planes. The participation in the NASA ORION deep space program with the European Service Module ESM, studies on the large spaceplane SÄNGER performed in Germany from 1988 to 1992, and the ongoing studies of the manned space transportation systems SPACELINER and SKYLON underline Europe’s interest and competences in conceiving manned space transportation systems.

References

- 1- Technical and programmatic documents stemming from work of the author at industry and ESA
- 2- Numerous data and images retrieved via internet incl. from WIKIPEDIA

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