

The Hermes Space Plane: The Paradox of European Human Spaceflight

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ABSTRACT

Human spaceflight, which was seen during the Cold War as the ultimate field of American-Soviet technological competition, was a field of expertise in Europe that was marked by international cooperation from its very beginnings. Since the inaugural flight of Jean-Loup Chrétien in June 1982, the presence of European astronauts in orbit has always depended on opportunities provided by bilateral and later international agreements with other space powers. However, an alternative was explored during the 1980s through the Hermes space plane project, whose abandonment in 1992 signaled the end of European ambitions in autonomous human spaceflight.



The Hermes space plane connected to the independent MTF-Columbus laboratory, artist's impression by D. Ducros. Source : Publication CNES, 1985.

After the grand moment of humankind in space beneath American and Soviet pennants, human spaceflight in the 1980s was the final challenge for a Europe that was henceforth competent in space applications (telecommunications and Earth observation), and possessed its own means for launching thanks to the prospects provided by Ariane. The end of the Apollo program in 1975 left the triumphant exploration of space by humans unresolved, lowering the celestial horizon to low Earth orbits and making way for the new era of their technological and scientific exploitation. The advent of the dual system of stations and shuttles forged new directions for human

spaceflight, namely the permanent occupation of space and the use of automatic infrastructure.

It was initially through bilateral cooperation that the Europeans began their trial run for this essential component of space activities that had not yet been explored: in 1977, the European Space Agency (ESA) recruited its first astronauts for an inaugural flight for Spacelab planned for 1983, while France sent its first *spationaute* (French astronaut) into orbit in 1982, making Jean-Loup Chrétien the first Western European in space during a flight to the Soviet station Saliout 7.

Awareness of a strategic independence to be acquired, which had already played out during the 1970s in the desire to possess a strictly European launcher, turned toward the domain of human spaceflight, which was so intensely felt in the popular imagination. The idea that a system for launching and in-orbit intervention—one that could preserve Ariane's competitiveness on the international market and conduct autonomous missions aboard space stations or automated platforms—gradually took shape. The project for a space plane that could crown a future version of Ariane like a satellite was proposed by Frédéric d'Allest, Launch Director at France's National Center for Space Studies. This new concept could launch both automatic satellites and human spaceflight, all while decoupling these two types of operation in order to avoid a substantial dispersion of means, especially considering the safety requirements entailed by an all-in-one system similar to the American shuttle.

Since the space plane option required the combination of space and aeronautic techniques within the same vehicle, in 1984 the CNES turned to its usual industrial architect, Aérospatiale, as well as another major French aviation company, Dassault. Faced with the difficulty of deciding between the two industrial actors, dual management of the project was finally adopted in 1985.

Hermes quickly evolved into an ambitious project that proved difficult to sustain on a solely national scale. Following the strategy previously adopted for Ariane in 1973, the CNES sought to include the space plane in the ESA's next long-term plan, and succeeded in garnering considerable political support. The arguments used for the project—combining the need for strategic independence, attractive technological prospects, and the fulfillment of a major political ambition—sought to bring forth a coherent system of in-orbit intervention consisting of the Ariane 5 launcher, the means for space transport in the form of the Hermes space plane, and an orbital module that could be visited, namely the Columbus laboratory, which was jointly created with Germany and Italy.

The project was recognized by the ESA in 1985, and formally Europeanized in 1987, driven by the astounding technological and industrial development it could potentially generate during its developmental phases. President Reagan's 1984 announcement of a new American station open to cooperation bolstered the project's opportunities by creating the possibility of a lasting Euro-American partnership. Initiation of the first developmental phase nevertheless met with reluctance, as German and British partners in particular expressed their concerns regarding the program's long-term feasibility and financing.

Despite the continued advancement of work since 1987, there was a first loss of momentum between 1989 and 1991 due to the convergence of structural difficulties. There were continued ergonomic hesitations, while adapting the plane to the launcher caused highly problematic overload problems, and safety remained a complex issue, one that was highlighted by the Challenger shuttle in 1986. The creation of new infrastructure and numerous technical reconfigurations led to dangerous cost inflation, and the program's overall operation suffered from sometimes inefficient management, endangering the definitive validation expected in late 1991.

Its political basis was also gradually shaken by a partial defection of public opinion, especially within Germany to protest France's alarming desire for leadership. This doubt cast over the project was also present in France, where scientific protest over human spaceflight intensified: the French Academy of Sciences published a number of reports that were highly unfavorable to European engagement in autonomous human spaceflight to the detriment of budgetary mobilization in sectors more connected to fundamental research. The debate also implicitly touched

on the opposition between humans and machines, between human operators and automatic systems.

Hermes thus had to contend with a lack of synchronization on the European level starting in 1990, as backing disappeared and difficulties mounted. On the international level, two profound changes had a critical impact on the program: the collapse of the USSR, which opened the way in the medium term for the internationalization of human spaceflight, and the ensuing German reunification, which led to the reallocation of national resources. On the programming level, the ESA took these reconfigurations into consideration and adapted its long-term space plan for the 1992-1995 period to new prospects, which were more centered on scientific missions, technological applications, and Earth observation. The validation that was expected in 1991 was postponed to the following year, an unexpected setback on the program.

Finally, on November 10, 1992, after taking note of phase 1, the ESA Council announced a three-year reorientation period for the Hermes program. This reorientation—ending in quiet abandonment—of the only attempt to establish an autonomous human spaceflight sector in Europe confirmed the continent's decision to pursue Extra-European cooperation, which was seen as a driver of expertise and experience.

Beyond the outward signs of a choppy decision-making process, which was impacted by an incisive debate on the very utility of humans in space, the Hermes project offers fascinating perspectives on how Europe undertook human spaceflight, as well as the role it sought to play as a space power on the international stage. By prompting reflections about the management conditions for space programs in connection with the indomitable “role of dreams” that former CNES President André Lebeau associated with space activities, this aborted ambition bears witness to the importance of a shared vision, as well as an effective convergence of actors in the successful pursuit of major European technological projects. Finally, the abandonment of Hermes also echoed the fate of other major technological projects—the civilian supersonic Concorde plane, which was retired in 2003, or the Superphénix breeder reactor in Creys-Mépieu, which was closed in 1998—thereby raising the question of institutional and industrial management, as well as potentially inordinate technological ambitions.

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