

## Spaceplane HERMES: Europe's Dream of Independent Manned Spaceflight

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A great book! A necessary book!

As the author Luc van den Abeelen states in the introduction he was astonished that no comprehensive book about the European spaceplane project “Hermes” existed so far– so he decided to write it himself. What he came up with is a grandiose technological-archeological work. To write it required persistence, patience and understanding of the political background during the Hermes era and the dedication to read literarily thousands of documents and judge their significance in a fair, unbiased manner. The listed references easily add up to approximately 1000 ESA documents, technical specifications from industry as well as magazine and newspaper articles.

From 1984 onwards as a young engineer I myself was involved in this European enterprise from the “Columbus”-perspective. We also struggled from ESA ministerial conference to ESA ministerial conference always fearing which part of the “triad” package (Columbus, Ariane 5, Hermes) would survive or would be cancelled.

For me the book in its chronological order and panoramic picture of all the managerial, technological, and political aspects of the Hermes project lets me fill in many gaps and leads to a better understanding of decisions which were not clear at all at the time.

But the book doesn't stop there: it also provides a detailed description of the history of the development of “space planes” within Europe and worldwide (USA and Russia). This being described in a very detailed fashion against the background of the grandiose idea of the European In Orbit Infrastructure (IOI) from the very beginning.

What became the IOI was started with bilateral ideas in Germany, Italy (Columbus, IOI) and France (AR5, Hermes) on how to continue European human space exploration after the completion of the successful first spacelab mission. But it soon turned out that the IOI-ideas were too ambitious to be carried out by one single or even two nations. So ESA came into play.

The key statements to reach the European goals were:

...to achieve a comprehensive autonomous European capability for In-Orbit-Infrastructure (IOI), Space Transportation (STS) and Scientific Programs (ESA Long Term Plan, Rome, January 1985).

...to prepare autonomous European facilities for the support of man in space, for the transport of equipment and crew and for making use of low earth orbit (ESA Final Declaration, The Hague, 10th November 1987).

In order to illustrate the original plans the European IOI structure from an early ERNO/MBB study (1984) is shown here (not comprised in the book).

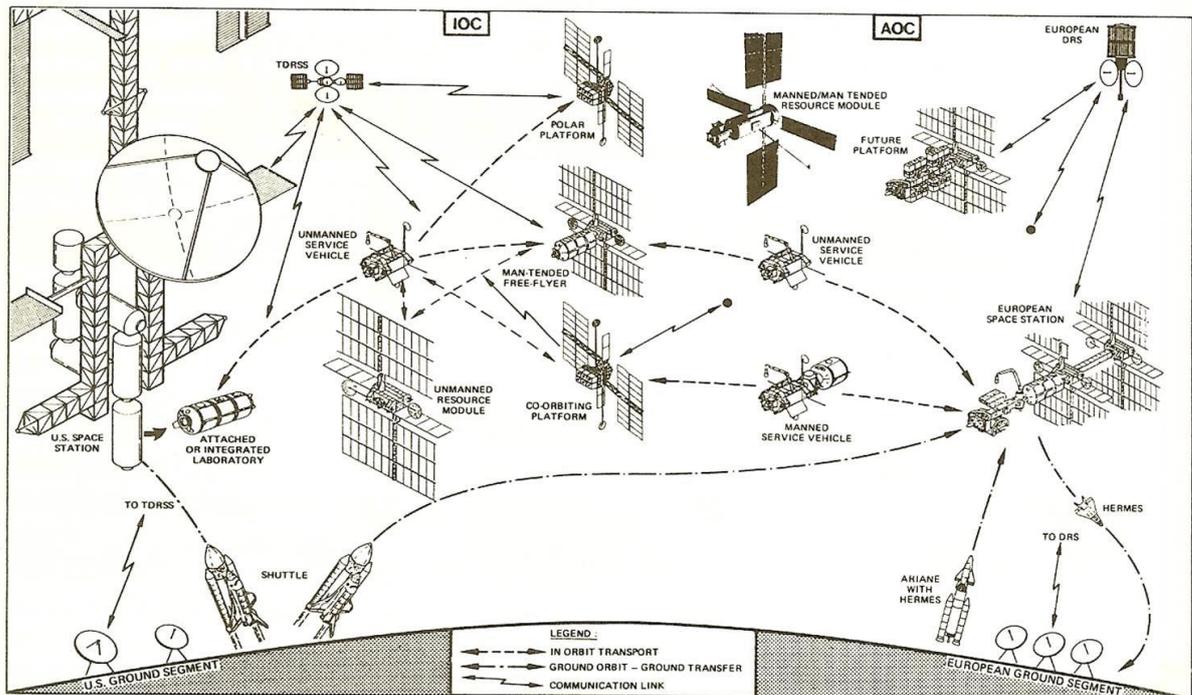


Chart 4 : COLUMBUS Overall System Concept

MBB/ERNO proposal, 1984 (H.E. Hoffmann, ERNO)

The trials and tribulations during the Hermes project phases through the years 1983-1993 are described unsparingly (“We don’t necessarily need German ingenuity. We need the German money” – M. Couillard) and can be considered as an “official” version since a foreword is provided by the long term ESA General Director J.J. Dourdain (2003-2015).

The book starts with the inception of the Hermes idea around 1983 and provides on the following more than 500 pages a very detailed account of the design-, managerial- and cost-problems describing the “rise and fall” of the project over the years. The many Hermes configurations studied, the delays caused by technical and political reasons and the associated cost overruns are described in a neutral, unaffected technical way almost like searching the traces in a detective story but without answering the “whodunit” question. The problems which afflicted Hermes sound like classical problems which might occur in any project – but this project was different: all the elements were new and the main players like Ariane and Hermes were heavily influencing each other by their size, weight and unsolved technical problems. This is drastically illustrated by the many Hermes configurations studied by various project teams, 75 of them are counted in a not complete list at the end of the book. The interdependence is shown by the relatively small example of the “little hot point” on top of the cockpit windshield: “to protect this, you have increase the length of the nose, but then the crew cannot see the strip during landing. So you have to reduce the angle of attack, but that means you increase the landing speed. So you have to redefine the length of the landing gear, the wheels and the brakes – all these things are connected.”

The problematic technical matters were compounded by jockeying for national prestige – still lingering under the umbrella of ESA, the “not invented here syndrome” and the tremendous cost overruns. Hermes started out with a budget of approx. 2 billion AU (1AU equivalent to 1 € today) ending up with approx. 7 billion before cancelled.

So finally “the spaceplane Hermes died on the conference table during a Council Meeting held at ESA HQ (Paris) on Sept 5<sup>th</sup> 1992 ... when it became clear that even with the reduced (unmanned) Hermes version X-2000 the proposed long term plan (LTP) scenario could not be realized within

the proposed budget. X-2000 was rejected and the new LTP cost plan accepted”.

Jean-Marie Luton (ESA’s DG at that time) was quoted: “ESA is not abandoning Hermes. On the contrary [the agency] wants to make it operational more quickly benefitting from the contribution of the Russians....we are aiming for a reorientation of the Hermes Program, rather than calling it a cancellation”

The cancellation happened during the Granada ESA Ministerial Conference in November 1992.

Finally – as also outlined in the book, only two of the original elements AR-5 and Columbus survived. The Automated Transfer Vehicle (ATV) and the EURECA platform replacing the serviceable polar & co-orbiting platforms were added later.

As a result the book might help to keep the dream of “space-plane-ing” alive by respecting the obvious message from the book that such a big project cannot be tackled by Europe alone but must be done on an international basis – which, on the other hand will involve additional disadvantages like national interests (“not invented here”-syndrome or “flag-problem”) and sometimes unpredictable changes of long term political developments within the involved governments being in charge for only one or more legislature periods.

In chapter 25.1 of the book three different analyses are presented as compiled in the “Hermes Program Evolution File”: Martin Bayer’s analysis “Hermes lessons learnt”, Patrice Brudieu’s “Development of the Spaceplane Hermes- external Hazards and Crisis Management”, as well as “Opinions of a number of Hermes veterans”. They differ in detail but generally agree, so every reader can make up his own mind and find his own substantiated conclusion – all the material is provided in the previous chapters.

The book is definitely not intended to be read for entertainment only but is also meant to conserve the positive and self-confident spirit of Europe for “going into space” during the 1980’s and 1990’s and provide the lessons learnt - if the need arises, and is also intended as a monument for the thousands of engineers, technicians and managers who spent half of their lives on the European space dream.

On the other hand the International Space Station (ISS) would not fly under the current conditions if those totally unpredictable political changes (the collapse of the Soviet Union, Germany’s reunification) would not have occurred, so Hermes could be considered as one of “casualties” of those events.

Nevertheless, the book demonstrates the dream is alive and hopefully the next generation of politicians, managers and engineers will be educated by this “historical” book.

PS: During a press conference on January 18<sup>th</sup> 2017 the new ESA DG Johann-Dietrich Woerner announced a planned cooperation with Sierra Nevada’s “Dream Chaser” to be launched on Ariane-5 in a folded wing configuration.