THE SPACELAB PROGRAMME

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The SPACELAB generation has been a lucky generation Engineers, administrators, organizers, industrials as well as officials who were involved in this program could take advantage of a time which was right for a successful cooperative program between Europe and the United States. Technical success and excellent human relations were the pay-off.

The United States were serious when they offered Europe the cooperation in the POST APOLLO Program because the task of the development of a new space transportation system was too big even for the United States to develop besides the new vehicles other accessories, like a major payload for the Shuttle.

The ELDO - mission under Count Carrobio di Carrobio which went to the Unites States on October, 16th 1969 was therefore welcomed wholeheartedly by Tom Paine and the information given and the arrangements discussed were open and friendly and absolutely fair when one considers that the launch of SYMPHONIE was refused by the Americans because the satellite could be an operational and commercial success, thus a commercial competition to US-industry. More difficult, however, was the search for the European contribution in the POST APOLLO Program. Massimo Trella's, - then Italy's council delegate - special efforts to provide the wings to the Shuttle from Europe were turned down and also the second attempt of primary structure elements of the Orbiter were not accepted by NASA. For two years then, Europe looked into the TUG - development, spending more than 2 million dollars at that time to carry out a serious competition of two European TUG-teams.

A five line telex from the State Department terminated this hopeful effort and left an unforgotten impression in the Europeans that there were limits to this cooperation and the acceptance of European contributions.

Fortunately, in the shadow of the exciting events, which I have described so far, people on both sides of the Atlantic were dealing with the question of payloads for the Orbiter and the utilization of the Shuttle.

One of these efforts concerned a so-called sorti - RAM or sorti-lab.

Among others looked at in studies between ERNO in Bremen and General Dynamics in San Diego, this project emerged in 1972 like phoenix out of the ashes when we were licking our wounds from the turn downs of Orbiter contributions and TUG-development.

SPACELAB was born overnight and made the all-accepted European contribution to the POST APOLLO Program in 1972. ESRO and ELDO, the negotiation team of Causse, Dinkespiler, Ortner and Hoffmann made countless trips to all NASA and US industrial facilities in the United States, receiving warm welcomes and participating in the difficult decision-making process for the STS from a two stage fully recoverable vehicle, as it turned out finally to the one and a half stage solution. We were even present when Rockwell was selected over McDonnell Douglas as the Shuttle prime contractor. It was a time of an open spirit of cooperation with the respectful treatment of the junior partner from Europe.

In this hectic time, the just created ESA decided on an industrial competition for the SPACELAB in Europe which had never been carried out in this way for a project of this magnitude. The winner takes it all was the rule of the game.

Embedded in the so-called *"application program "* of ESA, SPACELAB became the partner of the ARIANE Program and the OTS/ MAROTS communication program, the famous tripod which proved to guarantee European Space a 10-year stability which we had never seen before and which unfortunately did not continue afterwards.

Completely unexperienced in manned space - flight projects, the European industry based their teams on the existing satellite consortia MESH and COSMOS under the leadership of ERNO and MBB, which had to be completed by companies from those countries which were participating in SPACELAB but being not members in the satellite consortia.

Proceedings of an International Symposium on 'Twenty Years of the ESA Convention', *Munich, 4-6 September 1995* (ESA SP-387, November 1995)

The contribution of the countries was clear and as far as the German initial share of 53% is concerned, a clear leadership existed, such that the prime contractors could be chosen and execute their work not only with the mandate but also with the clear amount of return such that true leadership was possible. In contrast to this relationship, the envisaged 38% for Germany in the COLUMBUS program are not enough to assure a strong and clear leadership.

Unforgettable for us are the months and weeks of the competition which was executed with unique fairness by all participants. Never had European Space seen an industrial fight for an attractive job of this magnitude. Nevertheless, the players kept a high - level of good human relation as well as sticking to the rules of the game. The final decision for the ERNO-led enlarged MESH consortium was widely uncontested and accepted and,in my opinion, in the future course of the development has proven not to have been a wrong decision.

It was, of course, tough for the loser - it had never happened before that a group of European companies was not participating at all in a very large project.

However, it must be stated that Germany i.e. MBB here in Munich developed with some excellent people out of the desperate situation of the loss new energies in the area of payloads for the SPACELAB and for the Shuttle. And we should not forget that two flights before SPACELAB, that is with STS - 7 SPAS was flown with an excellent result, a project which later on continued to live in the SDI-Program and EURECA.

Only very small concrete preparations could have been done by the industry up to the point of the decision of that competion, because the risk of a possible loss of the competion was too high. Therefore, the start of the project on June, 5th 1974 was really a start from scratch. I see the expression of this situation in the fact that in the later part in the month of June I laid the ground stone for the SPACELAB integration-hall which had to be built in order to house the project during the later years.We had waited with this act for the final decision.

Teams had to be built up and the difficult workshares had to be finally introduced. Austria joined us one year later with a 0.8 % share. On the industrial side, the group of companies that is the enlarged MESH - consortium which had won the contract moved closer together than foreseen. The so-called "*SPACELAB consortium*" was created and developed for the next nine years into a group of close friends.

Irrespective of size and responsibility in the project, many people worked very closely together with the sole objective to make SPACELAB a success.
The SPACELAB consortium created a Board of Directors and involved the top management of all companies in this project. Quarterly in a rotation mode of the board meetings, the top management showed up at the location of each partner in meetings, in which there were only equals and nobody was more important than the other. I count this association and the spirit which we were able to develop as one of the basic reasons for the success of this project on the industrial side.

On the ESA side, also a team was created and an excellent relationship between industry and the customer was established. We executed a high degree of discipline in our information systems and of course in our delicate relationship to the big brother NASA. In my opinion, over the many years of this development up to the final verification of the SPACELAB System and the first flights NASA learned to respect the European performance and to tolerate and accept the European way of doing this delicate technical job.

It helped that there was the *"no exchange of funds"* basic rule such that money did not become the overriding issue between the two partners. With their teams Doug Lord and Jim Harrington did an excellent, unique job from the American side, recognizing the benefit for both partners by making the project a success. NASA's international cooperation had its high point in this project.

In countless meetings, the two partners moved ahead, considering the fact that also on the US-side the Shuttle was still under development and not yet ready. Both sides had delays so nobody could blame the other to stop the program. On the industrial side, it has always been my policy not to hesitate to count on consultants if you hit points where you really do not have own experience.

As we were the people who " *learned lessons from SKYLAB*", we took the decision to engage quite a number of consultants from McDonnell Douglas and TRW. This paid-off in all respects. It helped to smoothen the relationship between the United States and Europe. It helped to solve delicate technical problems and I think it helped to create the atmosphere of a very good human cooperation between all the very different parties involved. The consultants became an important ingredient for communication and balanced out shortcomings between the partners. Many friendships created at that time last until today.

Of course, if you look back everything seems to have been rosy or without severe problems. SPACELAB had also very severe problems.

There was e.g. the 120 % rule according to which the member states could leave the project when the total cost estimates were reaching 120 % of the originally proposed baseline costs.

The day had to come where we reached this point and for those who participated in the icy atmosphere in the ERNO canteen it will be unforgettable when the then German Science Minister, Volker Hauff, had come to terminate the program.
It was one single man who saved the Program in this moment.

It was Roy Gibson who, as the Director General of ESA, at that time took large part of the responsibility on his shoulder thus diverting Mr. Hauff's attacks against the industry. Roy Gibson then produced the famous paper in which he put his hand into the fire that the project could be terminated with 140 % successfully. With this brilliant move, we bypassed the hypercritical moment by the general spirit of mutual confidence, trust and estimation. We did not let him down but finished the project within the limit he had set at that initial moment. I don't know excactly - estimating, guessing, planning, calculating or just trusting us to be able to do our job.

Of course, we were proud that we could contribute our hard mock-up in the 1976 Bicentennial Celebrations in the VAB in Cape Caneveral, sending thus the first piece of European hardware to the US just 2 years after the project start . Shortly thereafter in the first Orbiter flights the unplanned participation of the OFT pallets were a next exciting step from the European side in which we showed flexibility and quick reaction with originally unplanned actions.

Although full of work and burdened with a contribution scheme, the European countries fulfilled their tasks with a large team which gained experience, which knew each other very well and knew how to count on each other. Michel Bignier on ESA's side was the ideal leader for us in Europe and a good and reliable partner for our American friends. With Jim Beggs and Jim Abrahamson in the final period of the SPACELAB development on the American side, two personalities gave the joint project the final touch this great project deserved in the spirit of the cooperation and the high degree of technical success.

Looking back on what we know and have today, we altogether made the mistake that we underestimated the importance of the payloads for the SPACELAB and the utilization. Once the excitement of the development of a laboratory for space with a shirt sleeve atmosphere 300 km above the earth in the environment of microgravity had passed, the general attention of the public turned to the question of *"what it is for"*.

The blue book from MSFC defining SPACELAB's performance was not a user requirement but a theoretical data collection not backed by a single user interest.

Here we, the excited and enthusiastic space system developers, showed our weakness. Inspite of some admirable efforts and inspite of the fact that maybe a few people had recognized the shortcomings, no necessary actions were taken. SPACELAB was given away. Not few people were glad that we could give it away and while the sister project ARIANE emerged into a brilliant, clearly defined future with ARIANE 5, the COLUMBUS project became a SPACELAB-successor which obviously nobody wants to have.

Of course, we should have put a lot of money into this question of utilization in the last years of the SPACELAB development to come up with convincing arguments for laboratory work in space.

To overcome this problem in this time now, we need people who work with their heart again on both sides of the Atlantic 21 years after the SPACELAB decision, we cannot repeat all the details which were important at that time and what we can learn from the experience. To solve the problems of today we need new solutions, new forms of our cooperation.

But there is still a good basis of experience in Europe. Every year I make a visit with Kenny Kleinknecht in Denver who was one of the gentlemen who came to us young people to tell us about the "*lessons learned from SKYLAB*". Maybe we should have some people who tell today's Columbus teams the " *lessons learned from SPACELAB*". In the very short space history of mankind, the project is, up to now, unique. It emerged out of a past space development in the world in the sixties and finally in 1983 became a great success.

For the launch, my mother had as a surprise for me a special china plate made to commemorate the big event. This plate contained a mistake: She had the originally planned flight duration engraved, not knowing at that time that when we finally flew, we could extend the first flight of SPACELAB by one full day unscheduled, with the decision made in Houston on the 7th day of the mission when the resources in the lab and Shuttle proved to be so good that an extra day could be added to the flight.

Of course, I could continue for a long time now with many details to describe this great project. Time does not allow to do so. Interesting enough and that speaks for this great team success - the book written about SPACELAB was done by our American friend Doug Lord -not an European - sponsored by NASA !
So it was a true partnership after all.