

The Pioneers: Future Made in Munich

The following text was translated and edited by Joachim Kehr in June 2018 as a salute to the “magical” GSOC-year 2018, the year of so many significant GSOC-anniversaries:

The 50th anniversary of DLR’s German Space Operations Center (GSOC), established in 1968, the 30th anniversary of the construction start of the new control center for “Manned SpaceLaboratories (MSCC) at Oberpfaffenhofen in November 1988 with a completion target date of 1992 (100th anniversary of Columbus sailing into the new world), the 25th anniversary of the launch and completion of the successful D-2 mission in February 1993 and the 10th anniversary of the launch and docking of the European Columbus module to the ISS (February 2008).

The salute is dedicated to all the engineers and contractor companies without we couldn’t have made it!

The article below was written in October 1990 - just after the inauguration of the new Manned SpaceLaboratories Control Center (MSCC) by Bavarian Minister President Max Streibl.

It might be coincidental that in 2018, 33 years after an enthusiastic Franz-Josef Strauß attended the D-1 mission at the (old) control center resulting in a substantial investment (“advanced funding”) by the Bavarian ministry to secure a leading role of GSOC at Oberpfaffenhofen in the European human spaceflight program – the newly elected Bavarian Minister President Markus Söder announced in May 2018 an innovative civil space research initiative called “Bavaria-One”.

Now, enjoy the article reflecting the spirit and the Bavarian contributions in the 1990’s – when space exploration was enthusiastic and exiting.

Soon it will be possible: A little Adventure Ride into Space.

Munich, 1st October 1990, AZ Reprint

In the space center Oberpfaffenhofen Joachim Kehr plans reaching out into planetary space.

The future has already begun: large companies, clever inventors, global-oriented entrepreneurs plan for the year 2000. Who are the makers? Who has the best chances in the race of ideas and possibilities? The Munich author Holger Fuss, a permanent contributor to the business magazine "Forbes" describes in a series called "Future-Made in Munich". (AZ, Monday, October 1, 1990), people and companies shaping the future.

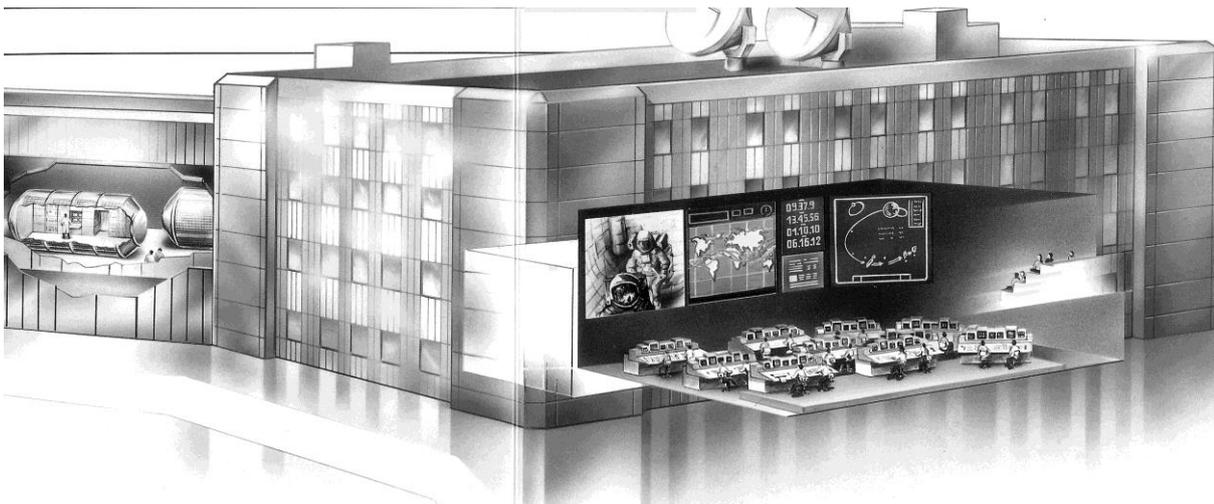


Fig. 1: The “intensive care center” for space operations in Oberpfaffenhofen is packed with state-of-the-art electronics: The operations center for manned space laboratories, inaugurated on 20 September 1990 by Prime Minister Max Streibl on the DLR premises at Oberpfaffenhofen will monitor and support the two German science astronauts during their D-2 mission in September 1992.

Again and again, Joachim Kehr has imagined this experience: to leave the Earth behind in a spaceship and take into space and then, to look back - and savor the impressive and majestic view from above, a view which even might influence the future of mankind. Such a look certainly would radically change a person's

attitude, reassuring him that he never really would fall out of the universe, out of life. And what should a man with this unique experience be afraid of? There are enough astronauts having changed their lives after venturing out into space.

Joachim Kehr would like to learn about this comprehensive overview himself. Not as an astronaut, "I would have to sacrifice too much of my life-time alone for the preparations", but as a regular cosmic space traveler. A not so distant vision: "Space tourism, I think will become a new leisure attraction in the next 20 years," says Joachim.

Freedom in orbit costs 60 billion.

He has to know: as head of the new operations center for human spaceflight, the Manned Space Laboratories Control Center (MSCC) of the German Aerospace Center (DLR) in Oberpfaffenhofen, Kehr is in charge of operations for all "manned" European space laboratories.

In the new, approximately 53 million Mark expensive control center building, which was inaugurated on 20 September 1990 by the Bavarian Prime Minister Max Streibl, Kehr's specialists will be the first to control the second German Spacelab mission D-2 in September 1992.

Two German science astronauts will then board the Spacelab, a reusable US Space Laboratory developed in Europe, orbiting the Earth for nine days during which they will conduct 85 experiments. In addition to celestial and Earth observations, especially the behavior of humans in space, microorganisms, materials and liquids are to be explored in the weightlessness, overseen by over 400 scientists stationed at the Oberpfaffenhofen Control Center during the mission. The experimental data are transmitted to Oberpfaffenhofen, processed in real time and made available to the scientists in separate user rooms for analysis. This allows the direct (online) influence of the experts on the further course of experimentation. The D-2 mission is in preparation of the Columbus space program, the Europeans want to participate in. The invitation to the participation in the construction and operations of the multinational space station Freedom was initiated by former US President Ronald Reagan in the 1990s. Columbus, adopted in 1985 by the 13 member states of the European Space Agency (ESA), is to complement the planned space station with three elaborate elements: (1) a manned space laboratory attached to the space station, especially for experiments in weightlessness, (2) a free-flying laboratory for precision experiments with very low micro-gravity, which does not have to be manned all the time, but only visited every 6 months for servicing and "harvesting", (3) and finally an unmanned platform in polar orbit for Earth- and space observations.



Fig.2: Franz-Josef Strauss with Ulf Merbold at the VIP-console at GSOC in Oberpfaffenhofen during the D-1 mission (5th November 1985)



Fig.3: Brown-gray carpeting, black and yellow walls and green letters on the computer screens: from here, the controllers at the Space Center Oberpfaffenhofen will have the space lab under control 24 hrs per day, 7 days a week.

By 1998, these elements should be transported to orbit with the European Ariane 5 launcher and, from 1999 onwards, maintained and serviced with the yet to be constructed European piloted, mini-space-shuttle "Hermes". Accordingly, the Oberpfaffenhofen operations center will be upgraded to a control center for combined (manned and unmanned) missions until 1996. The total package will cost ESA at least 60 billion DM, approximately one quarter of this amount is to be paid by the Federal Republic of Germany. Is it worth it? For Joachim Kehr, the question of economic profitability is not actually allowed for space

research. First of all, people's scientific curiosity will be satisfied. On the other hand, space exploration for a high-tech industry nation is simply a "must" today, because this research drives almost all technology developments enormously, much faster than it would be the case without space research: One example is the miniaturization of computer systems which, by now, each of us is profiting from these ever smaller and ever more powerful computers. But above all: the money is not disappearing into space, but it remains on the ground and creates new jobs in our countries. This is also true in Kehr's own team: when ESA delegated manned space laboratory operations to the German Space Operations Center (GSOC), a subdivision of DLR in Oberpfaffenhofen, Joachim Kehr began the planning and preparations for the new building and operations infrastructure ("man-rate" security) in April 1987 with only 16 full-time assigned engineers. Despite this initial shortage of staff, the operations center was ready with its basic infrastructure and offices to be moved in after just three and a half years. "Because we were so efficient," he says and laughs.

So, giant computers gradually became dwarfs in size.

However, he wants to quickly ramp up his team to approximately 200 operatives, "mostly highly qualified technicians, half of them are surprisingly from England, maybe because they speak the "official" space language". By mid-1991, the four control rooms of the new building will be packed with state-of-the-art electronics and communications infrastructure, the various computer systems brought together and tested. "Then we have just one more year until September 1992 to prepare and launch the D-2 mission. Until then, the staff must be trained and the control mechanisms between control systems and the D-2 Spacelab be tested. For this purpose, a Spacelab simulator is available at the Cologne headquarters of DLR premises where the D-2 crew is being trained".

The workplace of a spaceflight controller is submerged in a subdued light during his 8 hour shift – with half an hour overlap, to be continued by the next shift engineer ... around the clock, 7 days a week.

In terms of equipment, Kehr has devised his operating center down to the smallest detail. Beginning with the conductivity of the carpet to the movable partitioning walls, allowing to adjust the size of the four control rooms as needed. Even the room colors have been selected according to practical and psychological aspects. Brown-gray carpeting, black longitudinal walls, "so that in large-screen video broadcasts from space no reflections will occur", yellow transverse walls, beige operator consoles, green digit characters on the computer screens, because "that is less aggressive". After all, controllers need a stress-free atmosphere in order to control the flight activities under full concentration.

The critical mission period, also from a controller's point of view is the launch. If the giant rocket fails, all the painstaking preparatory work was in vain - not counting the incalculable consequences for the lives of the crew nor the progress of the entire space program as a whole. In fact, every controller is tense, just to make no mistake. But after a few days, a more routine mode of operation settles in.

Joachim has his office still in the elongated two-story aluminum-clad 1960s-building of the "old" GSOC. The four-floor, reflecting entrance façade of the new control center glistens through his office window. Kehr looks chronically under time pressure, in his face the sign of a two-days beard is visible. He wears a black polo shirt and American chinos with matching brown shoes. The dark, short-cut hair is slightly grayed out. Below he wears adaptive, optical glasses. Well-trained physique, in his spare time he enjoys windsurfing on the Bavarian lakes.

The ambiance of the office is functional: white walls, white veneered filing cabinets black wood desk full of paperwork and a small tropical Ficus benjamina tree. Apart from a multi-line touch-tone telephone for conferencing and the latest model of a small portable computer, there is no trace of high-tech here.

At his job, only the payment bothers him. "It is inappropriate, but in contrast to the free economy the absolute production- and profit-constraints fall away, which I find agreeable." And as an engineer in the civil service, he enjoys after about 20 years of employment a certain irrevocability. "This is an advantage".

A dream job, but without dream salary.

He was born near Nuremberg in 1942, studied electrical engineering in Karlsruhe, married in 1969 and went to DLR in Oberpfaffenhofen the same year. There he earned his doctorate on the long term degradation of the efficiency of solar cells in orbit. Kehr was actually involved in all facets of German unmanned space flight activities. In 1969/70 he joined the project Azur, the first German-American cooperative satellite project in a low Earth orbit. And from 1974 through 1984 he was responsible for the operations of the Helios sun probes, the first German-American interplanetary twin mission with an unprecedented close approach to the Sun (1/3 of the Sun-Earth distance) no other satellite ever dared before. "I was fascinated by the possibility of always tackling something completely new - working in a laboratory somewhere as a development engineer was not as appealing to me as discovering the new territory of space flight." In addition, we can now contribute our experience to the new space programs. Judged from the operations side, "we do not develop any kind of hardware but crucial technology".

With arms production the defense sector industry is promoted.

This was also the opinion of the former Bavarian head of government Franz-Josef Strauss, to whom the Oberpfaffenhofeners owed the entrusting of all the European human space flight control activities by ESA at the time. Strauss, "the motor of German spaceflight activities" (Max Streibl), had made an decisive effort for this location in order to expand the high-tech industrial center Munich with a seminal building block. Max Streibl knew in the best tradition of his predecessor, when he emphasized at the MSCC inauguration, "I am firmly convinced that the millions we spend here in Oberpfaffenhofen, are well-invested money, because it is investment in our own scientific-technical and economic-industrial future ".

The race of industrialized nations for the box seats in orbit is in full swing. According to ESA Director-General Professor Reimar Luest, it is all about "very tangible economic interests", therefore government institutions such as DLR in Germany, are extensively served with taxpayers money. Non- profit tasks such as environmental research are "more of a passive stocktaking" (Kehr). "To change something is a political process that has nothing to do with space research at all". The great final goal of our work, defined by Joachim Kehr, is "to develop the individual research disciplines into production facilities and ultimately salable products". This has already been achieved in communications technology, and we are in the process of developing an "earth observation" market Although there are some approaches to microgravity, the production price is still so gigantic because of the high transport costs and we have not found anything profitably to be produced in space today, only basic research foundations can be established. "There is still a long way to go before orbiting economic production sites become real."

Kehr has no qualms about such undisguised contributions from the international space agencies to the private sector. "The whole defense sector basically always was a subsidy of large-scale to industry,-in America as it is over here." It is also the task of the state of keeping large-scale industry meaningful alive. "In the meantime, the reduction of the military sector is replaced by increased space research projects, and, considering the alternatives I consider the latter much more attractive."



Joachim J. Kehr, born in Lauf an der Pegnitz, studied communications technology at the technical university (TH) in Karlsruhe, and from 1969 was a member of the founding engineering staff of the newly established DLR center for spaceflight operations (German Space Operations Center, GSOC). He trained and worked for many years at various NASA centers, and earned a doctorate in 1987 under Professor Harry O. Ruppe (Technical University of Munich - TUM) as an expert in the operations of interplanetary space vehicles. From 1984 to 2005, he was in charge of the implementation and management of human spaceflight missions (D-2, EUROMIR96) controlled from the Manned SpaceLaboratories Control Center (MSCC) at Oberpfaffenhofen and throughout this time was responsible as DLR Columbus project manager. In 2006 he was honored with the newly established International SpaceOps Distinguished Service Medal, the very first time awarded in that year.