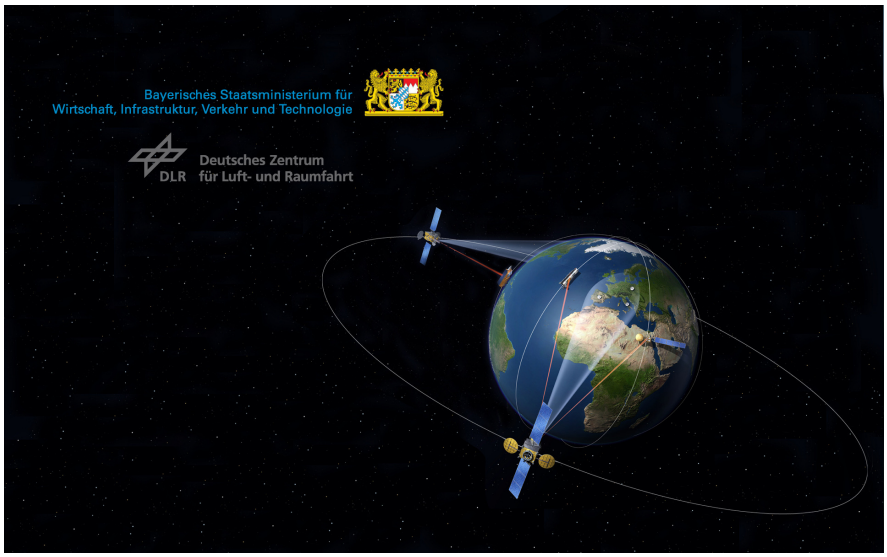

Ka-band "Wave of the Future"?

(Oberpfaffenhofen (Sept. 6, 2012)
During an official ceremony at the German Space Operations Center (GSOC) Martin Zeil, Bavarian State Minister for Economic Affairs, Infrastructure, Transportation and Technology handed over a permit decision for the expansion and modernization of the existing infrastructure of DLR's (German Aerospace Center) sites at Oberpfaffenhofen and Weilheim with an associated funding of €7.5 million by the ministry. **"Bavaria is one of the five largest aerospace regions in the world. We aim to provide any assistance necessary to retain and expand this position."**

The funding is earmarked for the construction of two new Ka-band antennas and their appropriate control and maintenance infrastructure at DLR's central antenna park at Weilheim/Bavaria as well as for the improvement of the GSOC communications infrastructure between the Weilheim ground station and the control center at Oberpfaffenhofen.

Among many other projects GSOC is also in charge of controlling the communication infrastructure of the European Data Relay Satellite (EDRS) which employs two key communication technologies: Ka-band RF and optical/Laser links. The final design of the EDRS program led to the combination of Laser Communication Terminals (LCT) for the transfer from low earth orbiting satellites to the EDRS relay satellite and Ka-Band technology for the downlink of the data to the ground (Weilheim).

"Broadband satellites using Ka-band frequencies are the wave of the future"

Ka-band Technology

Currently, there are several commercial satellite missions worldwide which provide high rate communication services at Ka-band frequencies (18-40 GHz) to various ground-based users. Putting in service higher frequencies offers several advantages. For example, Ka-band brings up to 600% link advantage over X-band. This advantage could be translated either into high data rate communication, longer distance of communication or antenna dishes smaller in size and therefore much more cost effective ground stations.

Additionally, the smaller antenna beam of a Ka-band ground station considerably reduces RF interference with other systems. In this respect the Ka-band technology is an inevitable part of the modern ground station complex which could be employed for future data relay satellites.But still a lot of effort is required to design, install and operate such a system.

With the expanded Ka-band facilities GSOC will also provide development support for commercial companies (e.g. SES in Luxembourg). Gerd Gruppe, head of DLR's Space Administration pointed out: "The provision of satellite data is currently an expanding market. The task is to establish standards and we are on top of the new development activities. The funding provided by the State of Bavaria enables DLR to be in an excellent position for competing for future scientific and commercial missions. The position of Oberpfaffenhofen as the European satellite data center will be fortified significantly."

At the next ESA Council of Ministers in November 2012 the ESA member states will be asked to participate in a partnership with Astrium Services in an additional data relay node in a geostationary orbit to relay Earth observation satellite data and unmanned aerial vehicle data (UAV) to civil and public users to become the third part of the EDRS system.

Interestingly enough satellite equipment builders have recognized the Ka-band potential as well. The Canadian satellite electronics manufacturer Com Dev International reported in September a 6% increase in revenue, stating "broadband satellites using Ka-band frequencies are the wave of the future".

Editor SpaceOps News, Joachim J. Kehr (October 2012)

DLR's Central Antenna Park at Weilheim (Bavaria)