

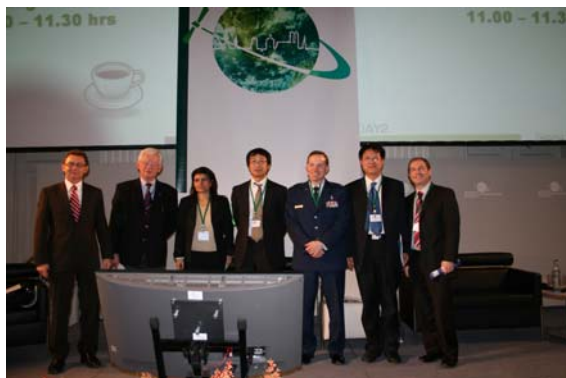


MUNICH SATELLITE NAVIGATION SUMMIT 2008

Session 1:

Chairman: Prof. Janusz Zielinski

Sylvain Loddo, System, Ground Segment and Operations Manager ESA Navigation Programmes presented the current status of EGNOS and Galileo. Starting with EGNOS he said that system stability of EGNOS has improved. He presented information on the current performance status providing an accuracy of better than 2 m. No integrity event has ever occurred to any user. For the near future an expansion of the coverage is scheduled and a certifiable release for EGNOS-based safety-of-life operations will be developed. He continued with a status report on Galileo describing the four steps from GSTB V1 phase in 2003 to the expected FOC phase in 2013. The next step will be the IOV phase that requires 4 satellites, 20 Galileo sensor stations and 5 uplink stations until 2010. For the IOV phase a new contract framework was negotiated with industry and implemented in December 2007. Sylvain Loddo reported on GIOVE A which is now operating in orbit for more than two years. GIOVE B is scheduled to be launched in April 2008 from Baikonur. Major outcomes have been presented on a GIOVE experimentation workshop. Important results so far are that the signal in space is very much in line to what has been designed. Furthermore, the orbit clocks meet all necessary requirements. Finally, he mentioned that the FOC procurement is delegated to ESA. This means there is a long term mandate for ESA with respect to responsibility for the Galileo programme.



Revnivykh, Zielinski, Gadimova, Kogure, Martin, Jing, Loddo

Lt Col Harold Martin, representative of the US Air Force Space Command presented the current status of GPS and its modernization activities. The last satellite launch took place just before Christmas 2007 providing a constellation of 30 healthy satellites in the orbit. Currently, there are five Block IIR-M satellites available which are capable of transmitting the civilian signal on L2 frequency as well as the military M-code on both frequencies. One of the forthcoming satellites will be equipped with the new L5 signal as a demonstration payload. This will become a regular feature from 2009 on (Block II-F). Recent modernization efforts do also include the ground segment. A new master control station was setup in September 2007. Besides, the technology and activities of the Space Operations Squadrons have been optimized and further improvements on the Operational Control Segment are still to come. He concluded that the current GPS constellation is the best in history with respect to accuracy and command operations.

Sergey G. Revnivykh, Deputy Head of Mission Control Center, presented the current status and the future of the Russian GLONASS System. He started mentioning the presidential decree of May 18, 2007. This decree fixes a binding use of GLONASS for governmental and strategic applications. GLONASS will remain a dual-use system and the access to civilian service will remain free of charge. He defined GLONASS as an essential element for the development of economy and national security. The second update of the Galileo programme aims to provide a GLONASS service competitiveness to other GNSS until 2011. Sergey Revnivykh regretted that currently the number of satellites is limited to 24 due to FDMA constraints. A system modernization that comprises new FDMA and also CDMA is envisaged. The associated requirement document is scheduled to be approved next week. Details on signal modernization will be presented on a forum in Moscow in April 2008. Currently, 16 GLONASS satellites are in orbit (14 healthy). It is intended to increase the number of healthy satellites to 18 till end of 2008. He reviewed the main events in 2007: There had been two successful launches.



The geodetic reference was improved that it is as close as 30 cm to ITRF and the first phase of ground control modernization has been initialized. Finally, he expressed the international cooperation principles and encouraged people to use GLONASS worldwide. A main objective is to promote GLONASS compatibility and interoperability and to intensify the cooperation with other GNSS service providers and states of the international community.

Dr. Jing Guifei, Head of Navigation Division of National Remote Sensing Center of China, presented the status of the Chinese BEIDOU/COMPASS system. There will be two global services: one free with limited accuracy and one authorized. These will be completed by two regional services dedicated to the Asia Pacific Area – a wide area augmentation service and a communication service. Dr. Guifei explained the frequency design consisting of four carrier signals. Two of them are narrowband and enclosing GPS L1 and two of them are broadband between 1200 and 1300 MHz and partially overlapping with Galileo. In order to limit the risk the system deployment takes place stepwise initially focusing on the Pacific region for which the funding is already guaranteed. He closed his presentation introducing the China Satellite Navigation Project Center (CSNPC) being in charge of the research, the implementation and the management of COMPASS.

Satoshi Kogure, Associate Senior Engineer of the Japan Aerospace Exploration Agency presented the status of the Japanese Quasi-Zenith Satellite System (QZSS). After giving general information on the system architecture, the space segment including the navigation payload and the ground segment, he showed a simulation that visualized the satellite coverage in a dense urban-canyon area of central Tokyo. Although the constellations GPS+Galileo and GPS+QZSS lead to significant improvements, the combination of all three is necessary to deliver constellations of four visible satellites during 90% of the time even to narrow streets. This improvement will be reached because one of the three QZSS satellites will always be located at a minimum elevation of 60° over Japan. Currently, the site surveying for installing the monitoring stations is being carried out.

Discussions on interoperability issues are ongoing with all GNSS providers. Satoshi Kogure announced that the user interface document has already been published and that the launch of the first satellite is expected by early 2010.



Sharafat Gadimova on the panel

Sharafat Gadimova of the United Nations Office for Outer Space Affairs started introducing the International Committee on Global Navigation Satellite Systems (ICG) that has been founded in 2004 as a successor of the “Action Team GNSS”. The objective of the ICG is to promote cooperation related to civil satellite-based positioning, navigation as well as timing and associated value added services. The compatibility and interoperability of GNSS as well as information dissemination focusing on education and training courses are very important items on ICG’s working plan. Annual meetings (the next will be held in 2008 in Pasadena) are intended to pave the way for a future GNSS system of systems. Currently, nine nations and 15 organisations are members of the ICG.