



## MUNICH SATELLITE NAVIGATION SUMMIT 2008

### Session 11:

#### Chairman: Dr. Hermann Ebner

Chairman Dr. Hermann Ebner, Head of the Technical Department of GSA, opened the final session related to the industrial points of views on the evolution concerning the next generation of GNSS satellites.

Don DeGryse, Vice President Navigation Systems considered that the problem of funding Galileo is now solved means a big step forward. This new framework actually justifies serious talks on the interoperability of GNSS. DeGryse is convinced about the impact of GNSS on the entire infrastructure of the world mentioning that the worldwide navigation market is estimated to be 32 billion \$ in 2008 and is going to increase to 54 billion \$ in 2011. DeGryse gave some remarks on the procedure on implementing GPS Block III spacecraft. Generally, they will be capable of L1C signal and will have increased power. The programme will be divided into eight Block IIIA, eight Block IIIB and 16 Block IIIC satellites. Block IIIB satellites will provide network communications between spacecraft and Block IIIC will have implemented integrity functionality and regionally increased power by means of spot beam antennas. Before Block III will be launched from 2012 on, there will be a constellation of 20 satellites capable of L2C and 12 capable of L5. They will be located in slots in a way that an optimal distribution of spacecraft is provided. This will already deliver good conditions for L2C reception since 18 satellites is the magic number to have a sufficient coverage worldwide. However, the number of satellites capable of L5 will be too sparse as long as the Block III satellites are not launched. DeGryse's final comment was addressed to the healthy competition situation in the U.S. industry.

Dr. Fritz Merkle, Executive Board of OHB Technology AG started his presentation with a brief overview of his company's business. OHB is a satellite manufacturer located in Bremen, Germany and wants to bid for the Galileo satellites as prime contractor. It is intended to team up with Surrey Ltd. in order to make use of the experience that has been collected with GIOVE A. The experience of OHB comprises the

constellations of SAR-Lupe and OrbcComm satellites. Regarding the Galileo satellite procurement OHB appreciates the principle of competition decided by the EC. Furthermore, Dr. Merkle proposes a dual source procurement for Galileo satellites in accordance with the EU Council conclusions.



Lutz, Davies, Ebner, DeGryse, Merkle, Rizzo, Greco (left to right)

Phil Davies, Business Development Manager of Surrey Satellite Technology Ltd., the manufacturer of GIOVE-A, talked about the key role test bed satellites play in the deployment of next generation services. They can be used for on-orbit tests of new payload equipment, they allow experimentation with new signals and can thus aid the development of the receiving equipment. Test bed satellites are deployed quickly and designed using low-cost methods taking into account a shorter life than operational satellites. Davies presented interesting facts on GIOVE-A2, the successor of GIOVE-A, being the next opportunity for a new test and validation mission. In addition to a "standard" L-band navigation payload the flight of GIOVE-A2 will be an opportunity for flight test of developments in key payload equipment (NSGU, PHM), C-band payload (5010-5030 MHz) as well as SAR/SMS dual mode payload (C-band, S-band). The accommodation of these payloads is currently being analysed as part of the GIOVE-A2 work. The "way forward" decision will be taken by ESA after the launch of GIOVE-B.

Michael A. Rizzo, Director of Navigation Systems of The Boeing Co. presented his vision on the GNSS use in the forthcoming decades. He claimed that the users are not interested where



the navigation signal actually comes from, but they want that it works and meets their needs and cited a typical user statement: "I do not care about satellites, I just want my GPS". Rizzo considers the GNSS infrastructure evolution as critical to support entrepreneurs developing unique, innovative, value-added navigation services. He recommended not to forget new solutions that are appearing and mentioned improved MEMS, repeaters, TV signals and cell signals. From Rizzo's point of view it is essential to meet the market needs. The success also depends on vital cooperations with regulatory agencies to develop stable requirements to enable the future while safeguarding the public interest.



Munich Satellite Navigation Summit 2008 - Team

Dr. Sergio Greco, Senior Vice President and General Manager Thales Alenia Space tried to find an answer to the question what characteristics, quality of data and service we can expect from the next generation of GNSS satellites. He went on stating that the satellite evolution is mainly conditioned by two driving mechanisms: the technology trend and the satellite lifetime. The implementation of new technology trends allows the system to stay on the market improving or adding new services. Frequent innovations in technology will require a higher rate for the introduction of new technologies in the satellites. A long satellite lifetime keeps the launch and maintenance costs low and improves the continuity and availability of the services. However, a desired long satellite lifetime merely allows a lower rate for the introduction of new technologies in the satellites. Besides, Dr. Greco recommended that the satellite evolution shall take into account the two concepts of interoperability and backward

compatibility. Further on he tried to focus on the evolution drivers of GNSS. He addressed specific requirements like jamming rejection and integrity. Although the absolute number of users is limited in these fields, governmental applications are included here. Therefore, Dr. Greco is convinced of a future dual-use system, whose control will be shared by civilian and governmental parties.

Dr. Reinhold Lutz, Senior Vice President Earth Observation, Navigation & Science of EADS Astrium recalled the expected evolution with respect to GNSS in the next five years and followed on with a long-term vision that embraces interoperability of signals and services, the combined use of global, regional and local navigation systems especially for civil aspects, the combination and involvement of different space assets, the development of intelligent receivers and the hybridisation of navigation, telecommunication and geoinformation. According to this vision, Dr. Lutz mentioned the consequences for the space segment evolution. A sharing of add-on services like search and rescue or messaging between the different constellations will be one of them. This will probably also mean an enhanced autonomy of the satellites, the use of additional frequency bands and thus an increase of satellite power consumption. Dr. Lutz closed his speech pointing out the various user benefits that this development will induce.