

## From GPS to GNS

**Leading representatives of all three worldwide GNSS-Systems, GPS, GLONASS and Galileo, met in Hannover / Germany during the ALLSAT OPEN 2006 conference.**

"GPS+GLONASS+Galileo: 3 renewed Satellite Systems", was the motto for the ALLSAT OPEN 2006 conference which took place on 22 June in the picturesque, whale-shaped Expo-Building in Hannover / Germany. More than 100 representatives from nine countries made this conference on Global Navigation Satellite Systems (GNSS) a special and successful event. After a cordial welcome speech by Hannover's Mayor Ms. Ingrid Lange, InsideGNSS magazine editor-in-chief Glen Gibbons led through a top-class conference programme.



Up-to-date information on the state of the three world-wide navigation satellite systems and future developments were given by Col. Richard Reaser, Jr., Deputy System Program Director of NAVSTAR GPS Joint Program Office (GPS), Vyacheslav V. Dvorkin, Leader of GLONASS-development at the Russian Institute of Space Device Engineering, and Dr. Stefan Sassen, Managing Director of TeleOp GmbH, one of the consortia forming Europe's Galileo concessionaire. Other renowned experts made complete the highly condensed programme of this one-day conference. Among those were Dr. Javad Ashjaee, founder and Managing Director of Javad Navigation Systems Inc., Prof. Terry Moore, Director of the Institute of Engineering Surveying & Space Geodesy of the University of Nottingham, UK, and Thomas A. Stansell of Stansell Consulting, USA.



## GPS

The annual amount reserved in the US national budget for the further development of GPS over the years to come is one billion USD. The financial means will predominantly be used to replace old and "dying" GPS satellites, which have partly been in use since the 1970s. The GPS space segment presently consists of 28 operational satellites. The next launch is scheduled for 14 September 2006. With the new generation satellites the system will be completely modernised and the spectrum of signals provided will be enlarged. An estimated 95% of GPS users today are civilians. Nevertheless, from the point of view of the operator, GPS is still in the first place a system to support the US armed forces.

## GLONASS

Like GPS, the Russian Global Navigation Satellite System, or GLONASS, is in essence a military project that dates back to the days of the cold war. After the breakdown of the Soviet Union, little use was seen for several years in the system. Today, however, President Putin is giving top priority to completing and maintaining the system, and with the national income increasing significantly from oil and gas sells over recent years the Russian government disposes of the budget to put its plans into action. Presently, 16 GLONASS satellites are operational. The number is planned to be 18 in 2007, and the GLONASS space segment is scheduled to be complete with 24 satellites in 2009.

## Galileo

For the European Galileo, the world's first civilian satellite navigation system, the members of the operators consortium have now been selected. Details about implementation of the space segment are presently being stipulated. Ground locations for control centres and uplink stations have been specified. The Galileo space segment is planned to consist of 27 operational plus three backup satellites, distributed over three orbits. Dr. Sassen of TeleOp GmbH further reported on the structure of the five designated Galileo navigation services and the proposed user interfaces.

The ALLSAT OPEN 2006 conference was hosted by Germany's GNSS-specialists from ALLSAT, who also contributed significantly to the conference programme: a close to reality video prepared by ALLSAT's GNSS engineers demonstrated the significant advantages a growing number of satellites and navigation systems will have, in particular in difficult terrain situations.



In the final panel discussion conference participants concluded that many daily GNSS users and applications have a real demand for a growing number of satellites and independent systems. A fundamental prerequisite for success, however, will be technical interoperability and compatibility between the systems, and hence inter-organisational cooperation during their development.

In the end, ALLSAT Managing Director Jürgen Ruffer was highly pleased with the ALLSAT OPEN 2006 conference: "Frankly, I do not know how we can possibly beat the standard we have introduced with this year's ALLSAT OPEN in future events ..."

Conference Proceedings, including a low-resolution version of the ALLSAT video presentation are posted on the NAVSTAR Global Positioning System Joint Program Office website (<http://gps.losangeles.af.mil/jpolinks.htm>). The ALLSAT OPEN 2006 Conference Proceedings CD, including the original high-resolution video sequence, is available upon request from [info@allsat.de](mailto:info@allsat.de) against collection of a fee.

## About ALLSAT

ALLSAT GmbH ([www.allsat.de](http://www.allsat.de)), based in Hannover/Germany, was founded in 1991. Today the company is specialised in all aspects of GNSS applications in the professional surveying market. ALLSAT is the only German company that was selected by the European Commission during the 6th EU-Research Framework Programme to participate in both, the development of precision positioning and navigation applications and the development of a GALILEO receiver. ALLSAT activities are organised around three pillars: Sales, Services, and R&D.

**Sales:** ALLSAT is a sales partner of Topcon GNSS receiver equipment in the positioning market segment ([www.topconpositioning.com](http://www.topconpositioning.com)), and of Javad Navigation Systems in the navigation market segment ([www.javad.com](http://www.javad.com)).

**Services:** ALLSAT provides specialized services around GNSS applications. The most prominent example is the daily technical consulting and support the company gives to users of ascos®, the only German satellite positioning service covering the entire country. ascos is provided by E.ON Ruhrgas AG, Europe's largest supplier of natural gas. Another focus of ALLSAT services is the planning, implementation and monitoring of regional GNSS reference networks, including in the Middle East. From 1991 to 2005 ALLSAT provided high-precision field surveying consultancy and services in several large international boundary demarcation projects on the Arabian Peninsula, regarding the boundaries between the Kingdom of Saudi Arabia, the Sultanate of Oman and the Republic of Yemen.

**R&D:** ALLSAT has developed GART-2000®, a software that is used to control most GNSS receivers and surveying devices such as total-stations commercially available for the professional market. GART-2000® facilitates real-time storage of GNSS-data into most commercially available Geographic Information Systems (GIS).

ALLSAT R&D also includes development of hardware products. The latest example is come2ascos®, a wireless communication device presently marketed in Germany to greatly facilitate user access to GNSS correction data provided by ascos. Upon the press on a single button, come2ascos automatically dials into the ascos network via NTRIP-protocol and forwards ascos correction data to the GNSS receiver via a Bluetooth interface. Connection costs billed to ascos users are minimised because they are calculated by amount of data transferred instead of connection time.

## Coming ALLSAT activities in the Middle East

1. **Introductory GNSS Training (State of Kuwait).** In cooperation with KuwaitGIS ([www.kuwaitgis.com](http://www.kuwaitgis.com)), ALLSAT will carry out a three day introductory GNSS seminar and hands-on training in Kuwait in November 2006. For details, please write to [info@allsat.de](mailto:info@allsat.de)
2. **Water Middle East 2007 (Manama, Kingdom of Bahrain).** From 22 to 24 January 2007, Allsat water consult GmbH will participate in Water Middle East, the 4th International Exhibition and Conference for Water Technology to be held at Bahrain Inter-

national Exhibition Centre. ALLSAT organises its participation in this event in cooperation with Hansa Luftbild – German Air Surveys ([www.hansaluftbild.de](http://www.hansaluftbild.de)).



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