

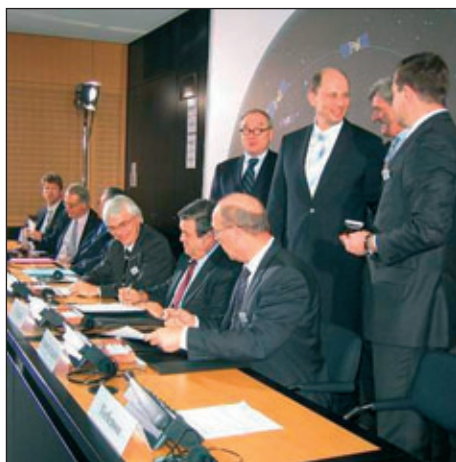
GNSS Update

Launch of New GNSS Receivers and Chipsets

At the moment GNSS product manufacturers are busy developing new products.

Chipsets are becoming available that are capable of receiving signals from all three GNSS systems. Furthermore the production of chipsets for the new GPS frequencies is coming up to speed. But the development of GNSS systems themselves is not at rest either. One fact is that GPS has become ten to fifteen percent more precise over the last few months.

By Huibert-Jan Lekkerkerk



Signing of the contract for the first four Galileo satellites (source: www.esa.int).

Egnos

In December 2005 the use of Egnos for controlling rail traffic was tested in South Africa. In this test only GPS, Egnos and train bound sensors were used, eliminating the need for expensive railroad based sensors.

Furthermore this was a test for calculating and broadcasting Egnos signals over Africa. It is expected that Egnos will be expanded towards the African continent in (near) future. March this year showed further testing in Portugal performed by Alcatel Alenia Space. This test was directed at localizing GSM telephones for better response to 112 emergency calls. It is expected that in the years to come over half of the mobile telephones will use the technology tested. This technology, which uses a combination of GPS, Egnos and GSM positioning, makes exact telephone location possible, both indoors and outdoors.



ESA's Director General, Mr Jean-Jacques Dordain, delivering his address at the contract signing ceremony. (source: www.esa.int).

Galileo

A contract between the European Union and Galileo Industries GmbH for the development of the first four Galileo satellites was signed in Berlin on the 19th of January this year. For the European Union Giuseppe Viriglio, director EU and industrial affairs from ESA, signed the contract. For Galileo Industries CEO Gunter Stamerjohanns signed the contract. This is an important step towards the development of an operational Galileo system. Furthermore the European Union and Korea signed a contract for mutual cooperation in the development of Galileo, after six months of negotiation. Korea is not the first Asian country to participate in the development of Galileo since earlier contracts were signed with both China and India.

GIOVE-A, which was launched December 2005, is fully operational and extensive tests are taking place. Ground stations in the Netherlands, Belgium and Great Britain are tracking the satellite and the broadcasted signals. The great radio telescope in Chibolton, Great Britain, is for example used to track the signals from GIOVE-A in order to gain insight into the radio environment in the satellite orbit. Furthermore tests are performed to check whether the Galileo satellite signals are interfering with other radio signals.

The first experimental receivers made by Septentrio, Belgium, are being tested with the use of GIOVE-A as well. This is an important aspect of the development of Galileo since this provides insight into the practical use of Galileo. The sister satellite of GIOVE-A, GIOVE-

B, is currently being put together at Alcatel Alenia Space in Italy. When complete, the satellite will be transported to Estec, the Netherlands, for testing in the laboratories under simulated space conditions. The launch of GIOVE-B is planned for the autumn of 2006.

GPS

The GPS satellite tracking system used by the American air force was recently updated. As a result twice as many orbital information is collected, resulting in an improvement of ten to fifteen percent of the precision of the GPS system. The first Block IIF satellite, which is being built at Boeing, has undergone the first radio tests with success. In January Boeing received an order for three additional Block IIF satellites. Including options this amounts to a total of nine satellites commissioned to Boeing. Boeing has a rich history in building GPS satellites since they also built the block IIA satellites. Of these block IIA satellites two have been in operational service for more than 15 years, twice the design life.

GLONASS

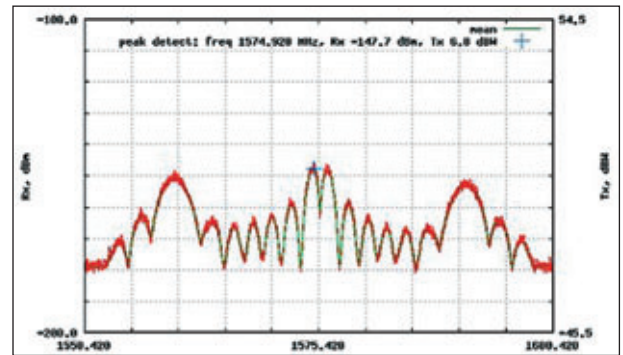
After the successful launch of three satellites in December 2005, Russian president Poetin

has decided to become personally involved in the GLONASS program. As a result four additional satellites will be built in 2006, resulting in three satellites to be launched in 2006, followed by seven in 2007.

Building additional satellites however is no luxury. In the last article we already mentioned the large amount of old(er) GLONASS satellites. Over the last few months, three have stopped functioning, bringing the number of active satellites down to 11. Of the satellites launched in December, two have not been activated yet so the number of active satellites can go up to 13 if no other satellites breaks down.

GNSS Receivers

It is good to see that GNSS systems are in constant development, but without the receivers there is little use for these improvements. However, the manufacturers of GNSS receivers and chipsets seem to realize this as well and at the moment we see one new system after the other.



First radiospectrum received from GIOVE-A (source: www.esa.int).

The GNSS market is not only preparing for Galileo, but even GLONASS seems back in grace after a number of years with virtually no GLONASS receivers (or satellites) available. Some highlights:

- Trimble recently introduced their new GLONASS and GPS combined receiver (R8 GNSS). Apart from being able to receive Glonass signals, this receiver can also handle the new L2C and L5 frequencies introduced into GPS. There is no sign of Galileo compatible receivers at Trimble at the moment;
- Leica launched a new series of receivers and reference stations as well as supporting full GNSS capability, including the new GPS frequencies, GLONASS and Galileo;
- Topcon, a company which has always been a full GNSS supplier, brings the G3 technology thereby choosing the same approach as Leica;
- Novatel chooses a different approach with the GPS+ technology for GPS and GLONASS L1/L2 on one hand and the Galileo / GPS technology on the other hand. The latter is capable of receiving both L1/L5 and E5 frequencies;
- Javad, who until half 2005 had an exclusive agreement with Topcon for the development of land survey GPS receivers, is currently producing GPS and GLONASS combined products only. They have however recently announced the first products based on the new GeNiusS chipset, which is capable of Galileo reception as well.

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Chilbolton Observatory in England where GIOVE-A tests are being performed. (source: www.esa.int)