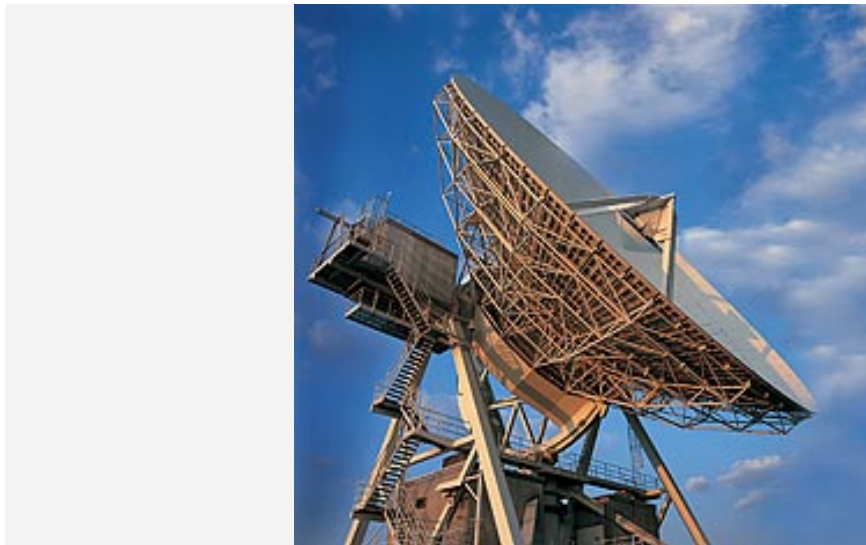

News Archive Weilheim

DLR scientists receive next-generation GPS signal for the first time

16 April 2009



DLR's 30m parabolic antenna at Weilheim

The Global Positioning System (GPS) is to be modernised and will provide a navigation service that is even more reliable and accurate in the future. On 24 March, a GPS satellite carrying a special test payload for transmitting a new navigation signal in the L5 frequency band was launched. Shortly after the switching on of the test payload, scientists from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) succeeded for the first time in receiving this navigation signal, using the 30-metre antenna at the German Space Operations Center (GSOC) in Weilheim. The scientists conducted a high precision analysis of the signal and proved, independently of the US operator, the additional benefits of the L5 signal.

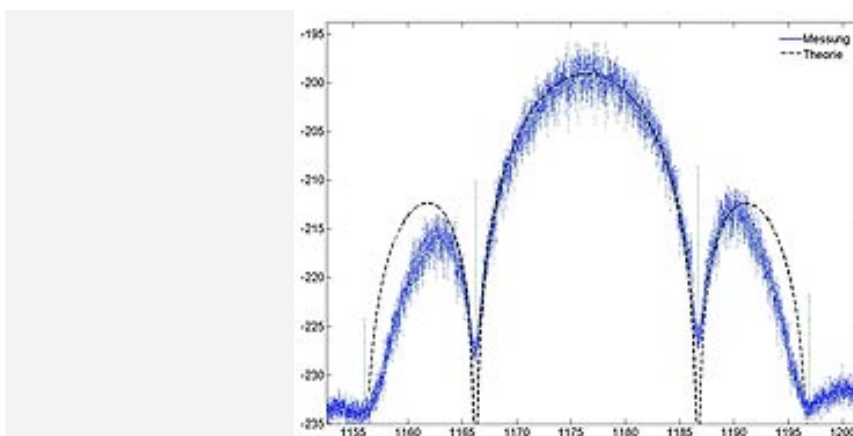
A signal that will enable even more precise and robust navigation



Signal analysis equipment

In future, the L5 signal will play a central role in satellite navigation and in areas of application where safety is critical, such as aviation. This is the second signal transmitted by GPS in the Aeronautical Radionavigation Services frequency band. In combination with the navigation signals already in use, it will allow ionospheric propagation errors to be corrected significantly more robustly and accurately than would be possible with the current signals alone.

The signals received on Earth from satellite navigation satellites have an extremely low power level and are masked by noise when received using conventional GPS antennas. GPS navigation receivers can, however, filter out signals buried in noise and use them for the purpose of navigation, as they are able to exploit the properties of the GPS signals. If the characteristics of a new navigation signal need to be examined, it is not possible to do so with a normal antenna. For this reason, the scientists at DLR's Institute of Communications and Navigation used the 30-metre parabolic antenna in Weilheim to enhance reception of the L5 signal, raising it above the noise. The analyses, conducted by DLR in cooperation with University of New Brunswick in Canada, prove that the new GPS signal possesses improved signal characteristics, in particular with regard to its bandwidth, and therefore will allow locations to be determined even more reliably and accurately.



The new GPS L5 signal

L5 signals will be transmitted as standard by the next generation of GPS satellites (IIF), which will begin entering service at the end of 2009. The European satellite navigation system –Galileo –

transmits a similar signal as part of its Safety-of-Life service; the two systems will complement each other in this area.

The methods developed by the DLR researchers for the highly accurate measurement and analysis of satellite navigation signals deliver evaluation results that are some of the most accurate of their type in the world. The expertise that was developed in DLR will be also be used in cooperation with the European Space Agency (ESA) for the verification and optimisation of the navigation signals used in the Galileo satellite navigation system.

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