Galileo in tune: first navigation signal transmitted to Earth

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Artist's impression of the Galileo IOV satellite. Credits: ESA

(PhysOrg.com) -- Europe's Galileo system has passed its latest milestone, transmitting its very first test navigation signal back to Earth.

The first two Galileo satellites were launched into orbit on 21 October. Since then their systems have been activated and the satellites placed into their final orbits, positioned so that their navigation antennas are aligned with the world they are designed to serve.
Last weekend marked the first orbital transmission from one of these navigation antennas. The stage was set, the singer in place and an audience – in the shape of engineers on the ground – was waiting eagerly.

The question was would the singer make music, and if so, would it be in tune?

The turn of Galileo's main 'L-band' (1200-1600 MHz) antenna came on the early morning of Saturday 10 December. A test signal was transmitted by the first Galileo satellite in the 'E1' band, which will be used for Galileo's Open Service once the system begins operating in 2014.

To prepare for the test, the payload power amplifiers were switched on and 'outgassed' – warmed up to release vapours that might otherwise interfere with operations – before transmission began.

A 20 m-diameter L-band antenna stood ready and waiting at Redu. The antenna is an essential ingredient of Galileo testing, able to assess the shape and quality of the navigation signals, even with the target satellite being 23 222 km up in orbit.

The signal power and shape was well within specifications. The shape is especially important because its modulation is carefully designed to enable interoperability with the 'L1' band of US GPS navigation satellites: Galileo and GPS can indeed work together as planned.

The test campaign is concentrating on the first satellite for the reminder of the year, with the focus moving to the second Galileo satellite from the start of 2012. The plan is to complete In-Orbit Testing by next spring.

The next pair of Galileo In-Orbit Validation satellites will also be launched next year, to form the operational nucleus of the full Galileo constellation. Meanwhile the next batch of Galileo satellites are currently being manufactured for launch in 2014.

Provided by European Space Agency