

Third Galileo satellite begins transmitting navigation signal

December 5 2012



ESA's Redu centre in Belgium used for Galileo In-Orbit Testing. On 1 December 2012 this is where the first test navigation signal from the third Galileo satellite, FM3, was received from. Credit: ESA

(Phys.org)—Europe's third Galileo satellite has transmitted its first test navigation signals back to Earth. The two Galileo satellites launched last October have reached their final orbital position and are in the midst of testing.

The third Galileo [Flight Model](#), known as FM3, transmitted its first test navigation signal in the E1 band on 1 December, the band being used for Galileo's freely available Open Service interoperable with GPS.

Then, on the morning of 4 December, the [satellite broadcast signals](#) across all three Galileo bands – E1, E5 and E6.

Galileo is designed to provide highly accurate timing and [navigation services](#) to users around the world. So the testing is being carried out in addition to the standard satellite commissioning to confirm that the critical navigation [payloads](#) have not been degraded by the violence of launch.



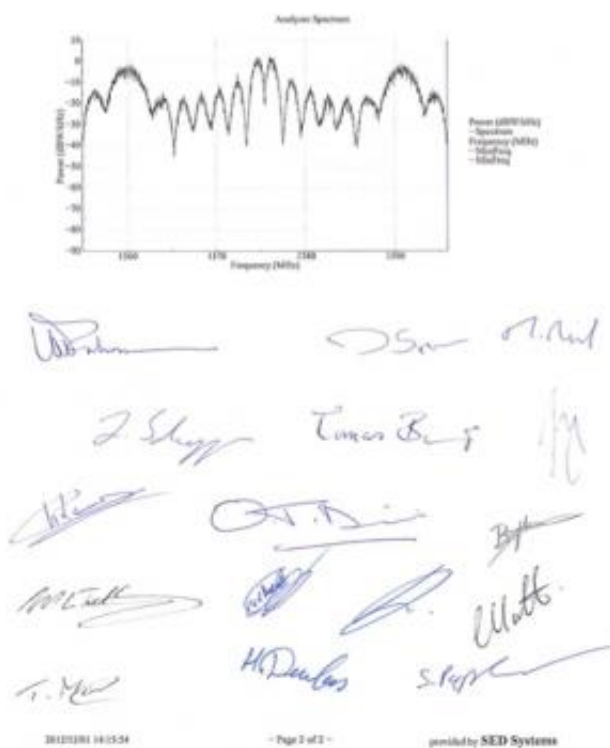
Four Galileo In-Orbit Validation satellites in medium-Earth orbit, the minimum number needed to perform a navigation fix. Credit: ESA – P. Carril

While the satellites are run from Galileo's Oberpfaffenhofen Control Centre near Munich in Germany and their navigation payloads are overseen from Galileo's Mission Control Centre in Fucino, Italy, a separate site is used for the in-orbit testing.

Located in the heart of Belgium's Ardennes forest, Redu is specially equipped for Galileo testing, with a 15 m-diameter S-[band antenna](#) to

upload commands and receive telemetry from the satellite, and a 20 m-diameter L-band dish to monitor the shape and quality of navigation signals at high resolution.

"This marked the very first time that a Galileo payload was activated directly from ESA's Redu centre in Belgium," explained Marco Falcone, overseeing the campaign effort as Galileo's System Manager.



The first test navigation signal from the third Galileo satellite, FM3, received at ESA's Redu centre in Belgium on 1 December 2012 and signed by the In-Orbit Test team. Credit: ESA

"We have now established an end-to-end setup in Redu that allows us to upload commands generated from Fucino's Galileo Control Centre to the

satellite payload whenever the satellite passes over the station, while at the same time directly receiving the resulting navigation signal through its main L-band antenna.

"The result is our operations are much more effective, shortening the time needed for payload in orbit testing."

Operating at an altitude of 23 222 km, the Galileo satellites take about 14 hours to orbit our planet, typically coming into view of Redu for between three to nine hours each day.

The fourth Galileo flight model, FM4, was launched together with FM3 on 12 October. The two satellites shared the same Soyuz launcher from French Guiana.

Both have now been manoeuvred into their operational orbits: at the same altitude but in a different orbital plane to the first two Galileos, launched in 2011, in order to maximise the global coverage.

Now that FM3's payload has been activated, FM4 is set to begin transmitting test navigation signals later this month. The first two satellites have already passed their in-orbit testing.

Provided by European Space Agency

Citation: Third Galileo satellite begins transmitting navigation signal (2012, December 5)
retrieved 7 May 2024 from <https://phys.org/news/2012-12-galileo-satellite-transmitting.html>

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