

Galileo Constellation Expanded with Satellites 11 and 12



Europe's latest navigation satellites have been officially commissioned into the Galileo constellation, and are now broadcasting working navigation signals. Galileos 11 and 12 were launched together on a Soyuz rocket from Europe's Spaceport in French Guiana on 17 December 2015. The satellites' navigation payloads were submitted to tests, centred on ESA's Redu centre in Belgium, which possesses a 20m-diameter antenna to analyse the satellites' signals in great detail.

For users to navigate with metre-level accuracy, Galileo must keep extremely accurate time. Because light travels at a fixed speed – just under 30cm every billionth of a second – the time it takes for Galileo signals to reach a user's receiver on the ground can be converted into distance. All the receiver has to do is multiply the travel time by the speed

of light, pinpointing its location from at least four satellites. The satellites' onboard atomic clocks – while the most precise ever flown for navigation purposes – must be kept synched by Galileo's global ground segment, which also keeps track of the satellites' exact positions in space. The tests were essential to ensure these latest additions to the fleet met their performance targets while also meshing with the global Galileo system.

Further Galileo Expansion Scheduled

Coordinated from the Galileo Control Centres in Oberpfaffenhofen in Germany (which controls the satellite platforms) and Fucino in Italy (which oversees the provision of navigation services to users), the success of these tests mean these satellites have now been integrated into the Galileo constellation. Four satellites have now completed commissioning since the beginning of this year – satellites 9 and 10 joined the constellation in February.

Two more satellites will be launched by Soyuz from French Guiana in May 2016 and, for the first time for Galileo, four will be carried on a customised Ariane 5 this autumn. If all goes as planned, Galileo will end this year with a total of 18 navigation satellites in orbit.