

# Galileo Satellites 11 and 12 Join Fleet



Europe's latest navigation satellites, launched last December, 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.

The satellites' navigation payloads were submitted to a range of tests, centred on ESA's Redu centre in Belgium, which possesses a 20m-diameter antenna to analyse the satellites' signals in great detail.

## Accurate time

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' on-board 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.

## Essential

The tests were therefore essential to ensure these latest additions to the fleet met their performance targets while also meshing with the global Galileo system.

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.

## Launch

