

Scientific Community Considering Galileo Development and Use



The Fourth International Galileo Colloquium, taking place in Prague, Czech Republic, from 4 to 6 December 2013, will bring together leading members of the European scientific community and their international partners. They will propose ways of increasing Galileo's scientific uses to those in charge of operating and developing the system, and of contributing to future satellite navigation development based on scientific approaches.

The colloquium will address four main areas of research:

- Applications of the system for weather studies, measurement of Earth and its dynamic behaviour over time, geophysics and space physics, oceanography, land surface and ecosystem studies. Receivers on the ground, in aircraft or on satellites can employ either direct or reflected signals, perturbed signals or radio occultation, where signal refraction or delay can be employed to deduce characteristics of the atmosphere.
- Developments in physics applicable to future global satellite navigation systems, particularly in testing fundamental laws in astronomy and quantum communication, and the potential of relativistic positioning systems.
- Aspects of metrology – the science of measurement – such as reference frames, onboard and ground-based atomic clocks as well as precise orbit determination.
- Signal propagation through the atmosphere, including tropospheric and ionospheric corrections and the means to model and reduce unwanted reflected-signal multipaths and interference.

As Galileo takes shape, as well as offering precision navigation and timing services around the world it is also shaping up to become a promising tool for science.

The satellites orbiting Earth and the signals that will increasingly rain down upon it are useful new yardsticks for the measurement of our planet – from the supposedly solid Earth to its land surface and oceans, and the atmosphere surrounding it.

A differential-grade satnav receiver kept at the same point for a long time reveals very slight geological movements, down to centimetre scale. This is the basis of existing GPS networks, set to be bolstered by Galileo.

Combining orbital velocities with nanosecond-accuracy atomic clocks, Galileo should also allow for the study of fundamental physics questions – how space and matter behave at very high speed within very short timeframes.

The Czech Republic's Ministry of Transport is an appropriate venue for the discussions since Prague has played a major role in the history of physics.

Image courtesy: ESA.