EUGIN - European Group of Institutes of Navigation

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UAS and GNSS signals

EUGIN is a non profit-making association entitled «European Group of Institutes of Navigation». Its main strength is the voluntary service and expertise of its members.

One of EUGIN's main activities is the organisation of the European Navigation Conference. In 2006 the conference was organised by ION-CH in conjunction with the EFTF conference. The amount of papers and participants indicated that ENC has an important role to fulfil in the navigation community with a view to advising European institutions in the fields of navigation, traffic management and related issues. Items of interest to the community such as e-Loran and the European Radio Navigation Plan were discussed. This fulfils EUGIN's aim to foster human activities in the area of navigation in combination with a contribution to the development of the science and practice of navigation and related information techniques. In the mid-1990s, the Institutes of Navigation of some European States decided within this framework to gather with a view to advising European institutions in the fields of navigation, traffic management and related issues, the word 'navigation' covering all modes of navigation, i.e. air, land, maritime and space navigation.

Originally established by the Institutes of Navigation of France, Germany, Italy, the Netherlands, the Scandinavian countries and the United Kingdom, the European Group of Institutes of Navigation (EUGIN) has since then welcomed the Institutes of Austria, Poland, Portugal, Spain and Switzerland, and the Swedish Radio Navigation Board.

EUGIN also comprises honorary members who are persons or entities appointed by the General Assembly and are able to assist in achieving the aims of the Association. At this moment UVS International and Galileo Services are honorary members. EUGIN is proud to be associated with UVS International. Working together where possible in the study of developments in navigation towards our common future.

One of the issues of importance is the availability of satellite signals. For some time there is been an increased awareness of the potential for natural, accidental and deliberate interference (and jamming) of satellite navigation systems. Some devices used in jamming the system can be very small and extremely effective. A jamming device the size of a dice can disturb the signal over an area of several hundreds of metres. Satellite navigation information is not solely used for the determination of geographical positions but also as an essential input for timing devices of land based and maritime infrastructure (such as AIS). It should be realised that there is still a continued availability of terrestrial electronic navigation systems (such as Loran) that can serve as an alternative source of input for the determination of position and time.

Connected with this issue is the possible use of phased array antennas. Phased-array antennas are made by adding a number of small (patch) antennas that electronically cooperate such that the radiation pattern can electronically be steered. Phased-array antennas may operate in two distinct ways. The most common method is to apply an antenna that is sensitive to all directions. To counteract interference, the antenna can be made 'blind' towards the direction of a jammer. Such 'null-steering' antennas fully automatically keep the jamming target in a null even when the antenna is mounted on a moving platform.

Rejecting jamming signals coming from different directions require multiple nulls which makes such antennas rather complex and costly. The second method 'builds' from the multiple antennas narrow beams that are automatically steered to the satellite. The strong advantage of this approach is that the narrow antenna beam results in gain which increases the signal-to-noise ratio of the tracked satellite while it is far less sensitive in all other directions. A phased-array antenna can be implemented that forms a number of beams simultaneously to track all satellites needed. The basic elements of a phased-array antenna are e.g. small patch antennas that can be flush mounted in the skin of an automobile or an aircraft leading to so-called 'smart skin' antennas.

Important for the determination of PNT is also the development of Galileo. The European Commission seems to have created a basis to implement the next phase of the European GNSS programmes the next phase to be carried out and financed by the Community including the operational availability of EGNOS1 within the next years as well as the procurement of Galileo and leading to a Galileo operational system by 2013. It would be in all our interests if such plans could indeed be made into reality within that framework to the benefit of UAS and other users alike.

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