

EGNOS - Augmenting Satellite Navigation And its importance in civil aviation

Abstract

European Geostationary Navigation Overlay Service (EGNOS) is a satellite-based augmentation system that improves GNSS positioning (GPS, GLONASS, etc). The system uses 3 geostationary satellites and a ground network of 40 stations and 6 uplink antennas in 24 countries across Europe and beyond. It provides not only much better accuracy than a GPS alone but guarantees its integrity and reliability. The ground stations are monitoring continuously GPS signals and perform independent measurements which are then centrally processed. The accuracy of the original signals is determined and factors such as clock delays or ionospheric disturbances are taken into account. Each satellite of GPS constellation has its own corrector factor in real time.

EGNOS started to be operational in 2011 but it is not the only SBAS (Satellite Based Augmentation System) in the world. Additional equivalent regional systems that fully interoperate with the existing ones are either in operation (US, Japan, India, Canada). EGNOS was designed to make satellite navigation reliable enough for safety-of-life operations in civil aviation in Europe. With our own European SBAS now are allowed precision approaches LPV-200 to airports with vertical and horizontal guidance that before were only carried out by using cost-grounded radio systems like ILS (Instrumental Landing Systems). This is a major step on accessibility due to safety approaches can be done with bad weather or bad visibility in small airports with no ILS. Furthermore, it contributes to increase the number of possible detour airports when traffic jams and smoother approaches to any runways saving time and fuel.

But EGNOS also has a wide range of other uses, from agriculture to road, rail and maritime transport. By 2025 is expected that EGNOS v3 alongside GALILEO European satellite navigation system can achieve precisions of 1m and up to 20cm for encrypted signals.