Review of Positioning Services and User Requirements for Machine Guidance Applications in Australia

Luis Elneser Gonzalez (Australia)

Key words: GNSS/GPS; Positioning; Requirements, machine control, precision agriculture, GNSS/GPS

SUMMARY

Performance requirements for PNT end-user applications have been studied in the aviation and maritime context since the advent of GPS navigation. The Standard Positioning Service and Wide Area Augmentation Service cover the required navigation performance criteria of accuracy, availability, reliability, integrity and coverage in these industries. For applications requiring high accuracy navigation such as Machine Guidance in Civil Construction and Precision Agriculture, users rely on dual-frequency carrier phase augmentation techniques to achieve cm-level accuracies. Augmentation techniques in these environments have evolved from ad-hoc radio RTK operations for single owners, to subscription-based Network RTK covering regional areas, and global PPP delivered by L-band satellite communication. Additionally, the fully operational multi GNSS world promises future high-accuracy Commercial Services provided by GNSS operators such as Galileo, Beidou & QZSS as part of their basic operation. While several services are functioning in Australia, uniform performance standards for utilizing them have not been specified in high accuracy applications.

In an effort to standardize GNSS positioning services and end-user requirements, this paper provides a systematic review of the augmentation services available in Australia in the context of high accuracy PNT applications for Machine Guidance in Civil Construction and Precision Agriculture. A section is dedicated to defining the required navigation performance criteria for existing machine guidance and automation tasks and future application trends and developments. The results of this review aim to inform the end-user of available PNT solutions to meet high accuracy applications within Australia, where the country's geographic location, size & population density make a challenging environment for delivering consistent PNT services.

Review of Positioning Services and User Requirements for Machine Guidance Applications in Australia (8280)
Luis Elneser Gonzalez (Australia)

FIG Working Week 2016
Recovery from Disaster
Christchurch, New Zealand, May 2–6, 2016