PROB & PRST

Details of the seminar

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English only

Seminar of Probability and Stochastic Process

Tuesday, 16th March, from 10h15 to 11h00
MAA110, EPFL, Ecublens

Dr. Boubeker Belabbas

German Aerospace Center, Institute of Communications and Navigation

Satellite Navigation Error Propagation through Flight Dynamic Equations

Abstract:

The aviation community is investigating the use of satellite based navigation systems like GPS and Galileo as primary navigation system for all phases of flight. For En Route and up to LPV (Localizer Performance with Vertical guidance) with a decision height of 200 ft, GPS/Galileo with space based augmentation systems WAAS (Wide Area Augmentation System) in the US and EGNOS (European Geostationary Navigation Overlay Service) in Europe) and Receiver Autonomous Integrity Monitoring System is sufficient. For precision approach under low visibility conditions (CAT I to CAT III), GPS/Galileo needs to be augmented with local monitoring systems like LAAS (Local Area Augmentation System) in the US or GBAS (Ground Based Augmentation System) in Europe to guarantee integrity. In the case of precision approach under CAT IIIc conditions (zero visibility) the automatic landing system must fully rely on GBAS position. Therefore a sensitivity analysis of the aircraft dynamics to the navigation system errors is of the utmost interest.

This presentation will show a numerically based sensitivity analysis of the aircraft total system error to the GBAS position error. A sensitivity analysis using the formalism of error structures as defined by Prof. Nicolas Bouleau applied to the ordinary differential equations driving the flight dynamics of the

aircraft is presented and the results are compared with the Monte Carlo analysis.

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