

**STANFORD PLOT**

In navigation and particularly aircraft vertical guidance on precision approach the four concepts which enter almost every specification are accuracy, integrity, continuity, and availability.

Integrity risk is defined as the probability that the Position error (PE) exceeds either the Horizontal or Vertical Alert Limits (HAL and VAL) and the navigation system alert is silent beyond the time-to-alarm. An epoch where the Position Error (PE) exceeds a maximum allowable limit, called the Alert Limit (AL) while no alert is generated within an allowable time period, called the Time to Alert (TTA).

The true error must not exceed the protection level more than once in  $10^7$  seconds. If the computed protection level exceeds the corresponding alert limit then the alarm is dropped and the operation cannot proceed. If the operation has already begun this condition is a continuity breach and a missed approach must be conducted. Otherwise the system is declared unavailable for that epoch.

Stanford plot is used to indicate system’s integrity. The horizontal axis is the true error in the EGNOS navigation solution with respect to the surveyed antenna location. The vertical axis is the protection level computed for each and every navigation solution. Each bin tabulates the number of occurrences of a specific (error, protection level) pair and the color of each grid indicates the total number of epochs that pair occurred.

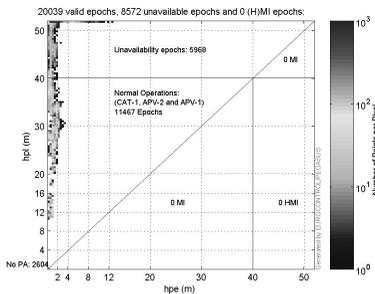


Fig.1. Horizontal Stanford plot

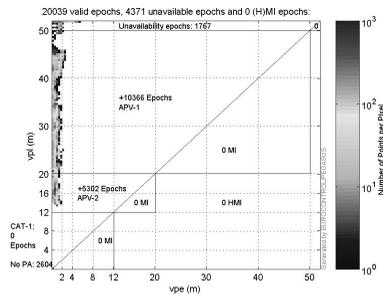


Fig.2. Vertical Stanford plot

The histogram of fig.1 reports the horizontal system metrics. Fig.2 shows the vertical system performance corresponding to the horizontal data.

The primary objective of the work consists in collecting integrity data on EGNOS in Ukraine and building Stanford plots for further integrity issues consideration and comparison of them to such plots produced in Europe. For this purposes specially designed by EUROCONTROL software PEGASUS is used, which allows to analyze the EGNOS data.

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