



EGNOS System Test Bed SIS **Performances -** **Current status and potential** **improvement**

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ESTB Performances

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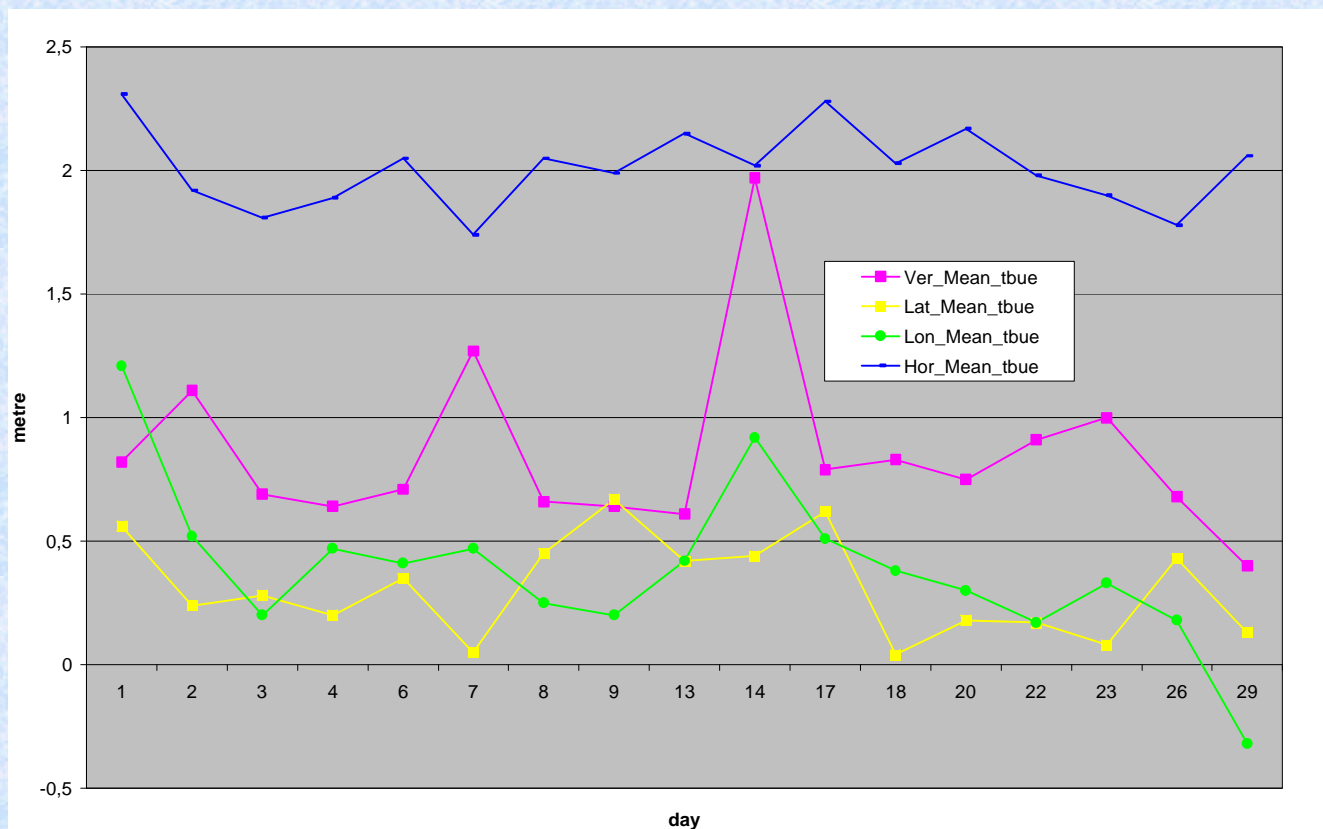
GNSS-1 Project
Office

ESTB User Workshop 12/11/01



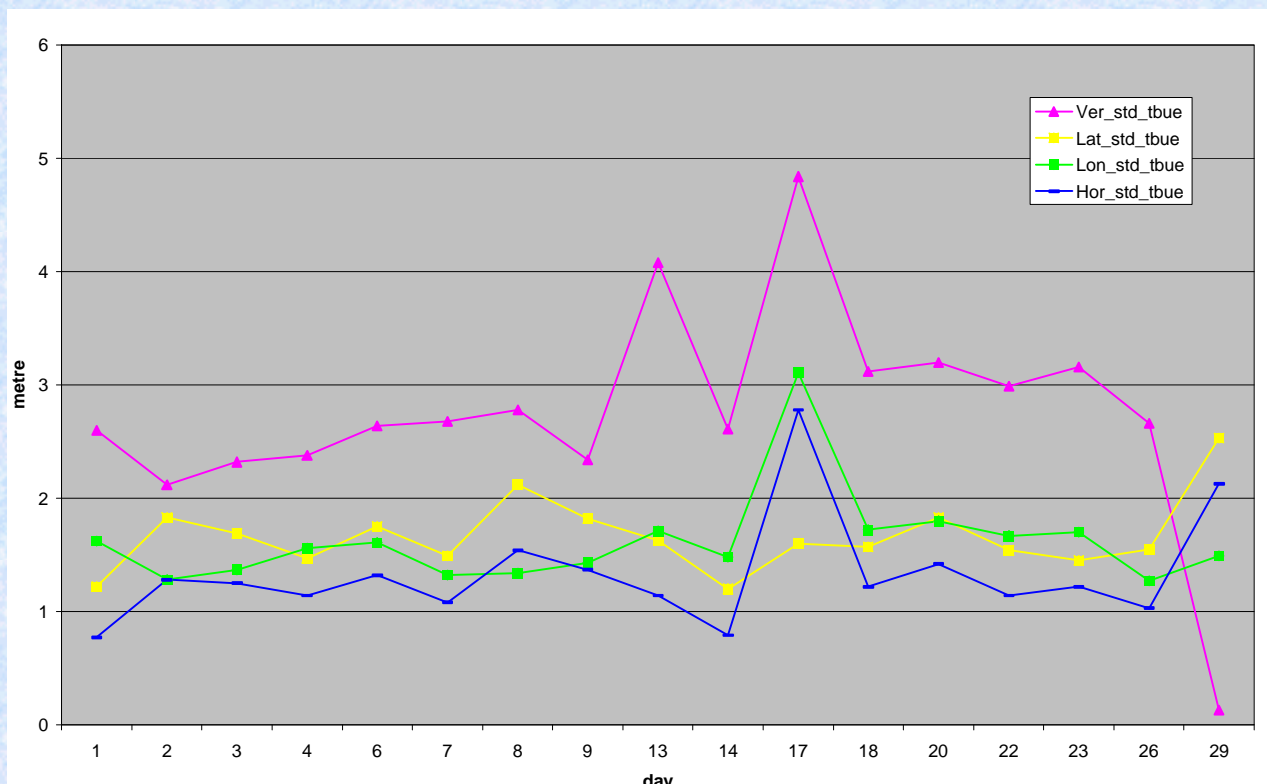
ESTB Performances : Current Status

- **Mean error per day over last August**
 - **TBUE output, 17 days, Toulouse records**



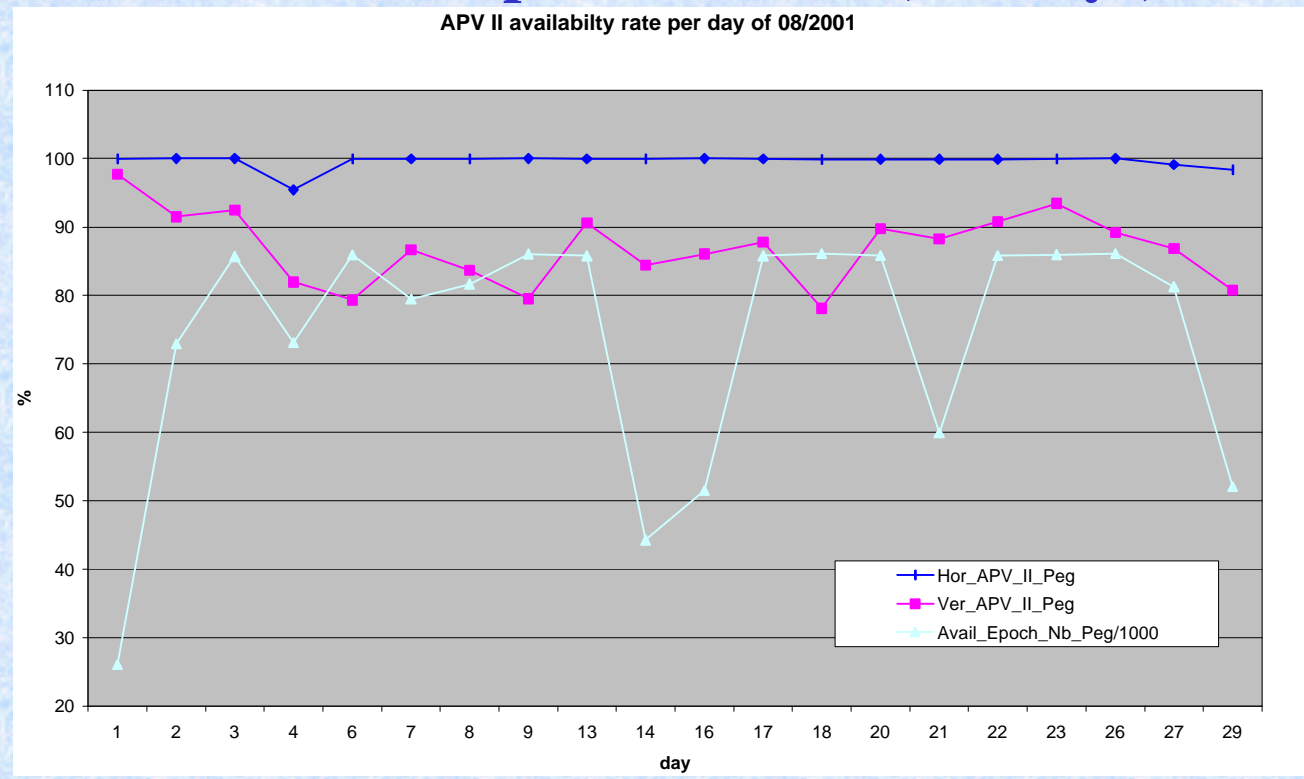
ESTB Performances : Current Status

- **Standard deviation per day over last August**
 - TBUE output, 17 days, Toulouse records



ESTB Performances : Current Status

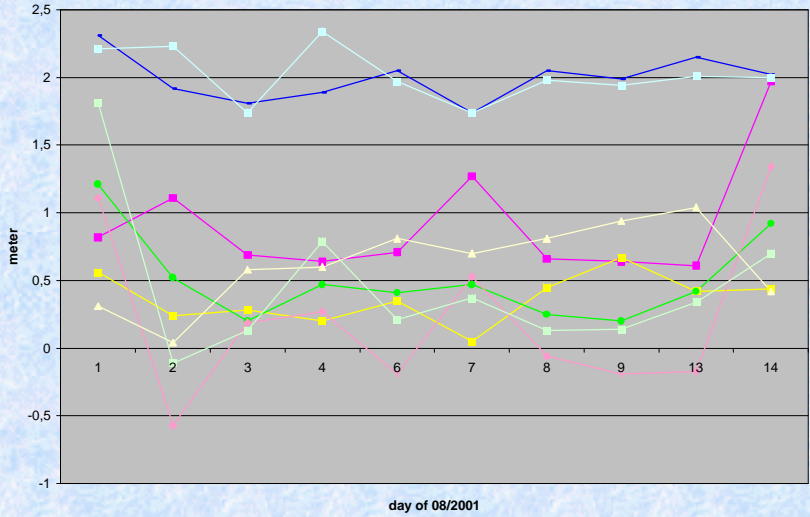
- **APV II availability when WAD corrections**
 - **Pegasus 1.8/1.6 MOPS A option / Novatel, 20 days, Toulouse**



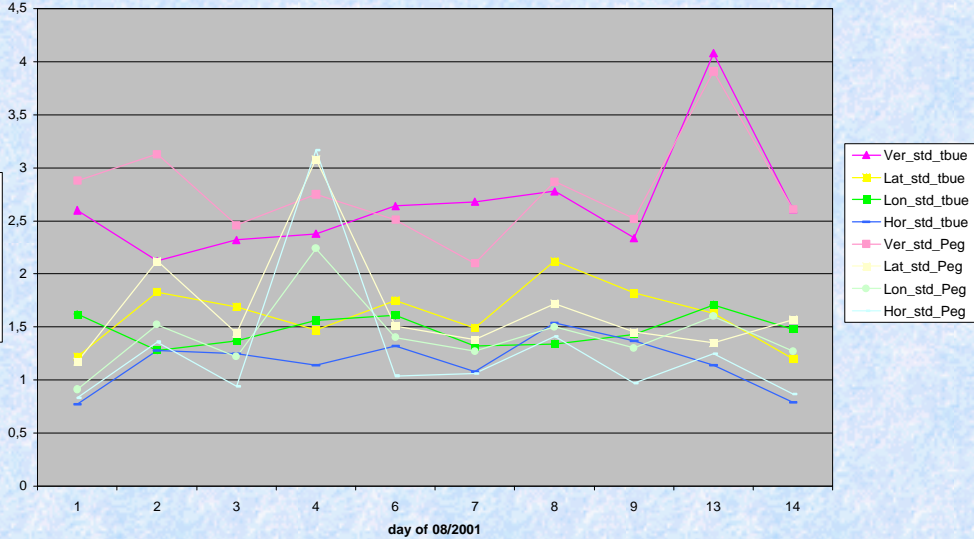
ESTB Performances : Current Status

• Where is the truth? TBUE versus Pegasus 1.8/1.6

Mean error : Where is the truth ?



Standard deviation : Where is the truth ?



- mean error and standard deviation, the day values (as instantaneous) are globally identical but not equal due to :
 - 8 channels (TBUE) towards 10 (Pegasus/Novatel) ?
 - same MOPS but not same implementation?

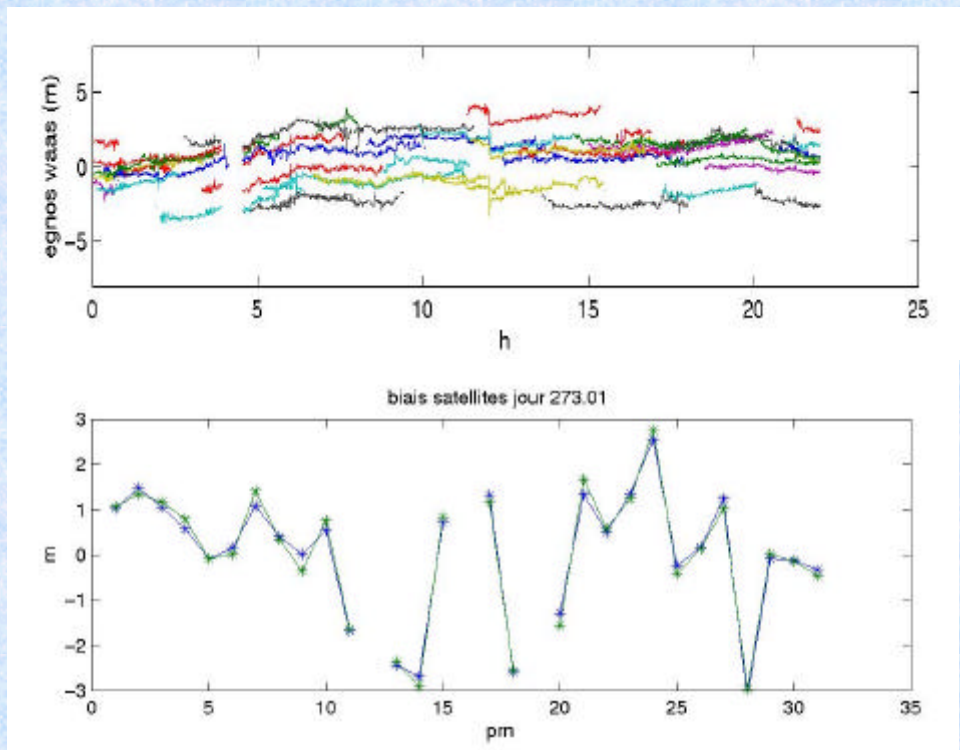
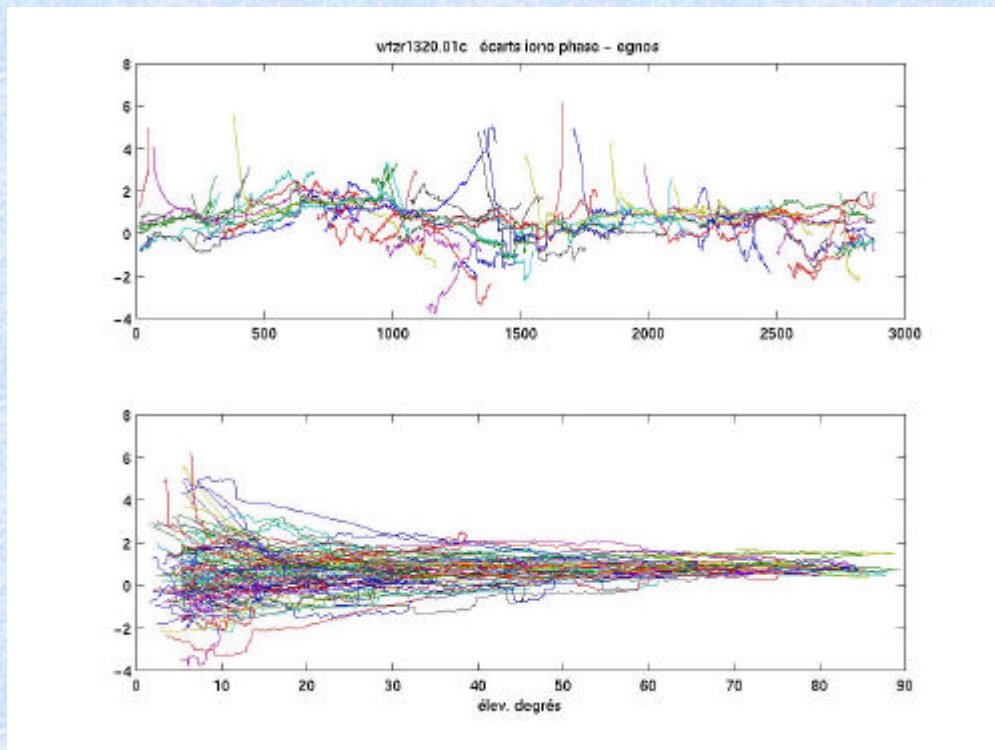


ESTB Performances : Improvements

- **Study on ESTB corrections accuracy**
 - **Comparison of PR residuals when**
 - using precise IGS ephemeris (clock & orbit) + dual frequency ionosphere corrections,
 - and
 - using broadcast ephemeris + ESTB corrections (PRC and iono)
- **Observations (figures on next slide):**
 - good quality of ESTB ionosphere delay corrections (error is less than 2 m if Site angle $> 20^\circ$)
 - identification of bias depending of each SV, independent from site observation or GPS passes or day used in comparison

ESTB Performances : Improvements

- **Some Results**



ϑ

Iono error residuals per SV
versus time or versus site angle

Λ

Clock&Orbit error residuals per SV
versus time or versus PRN & 2 stations

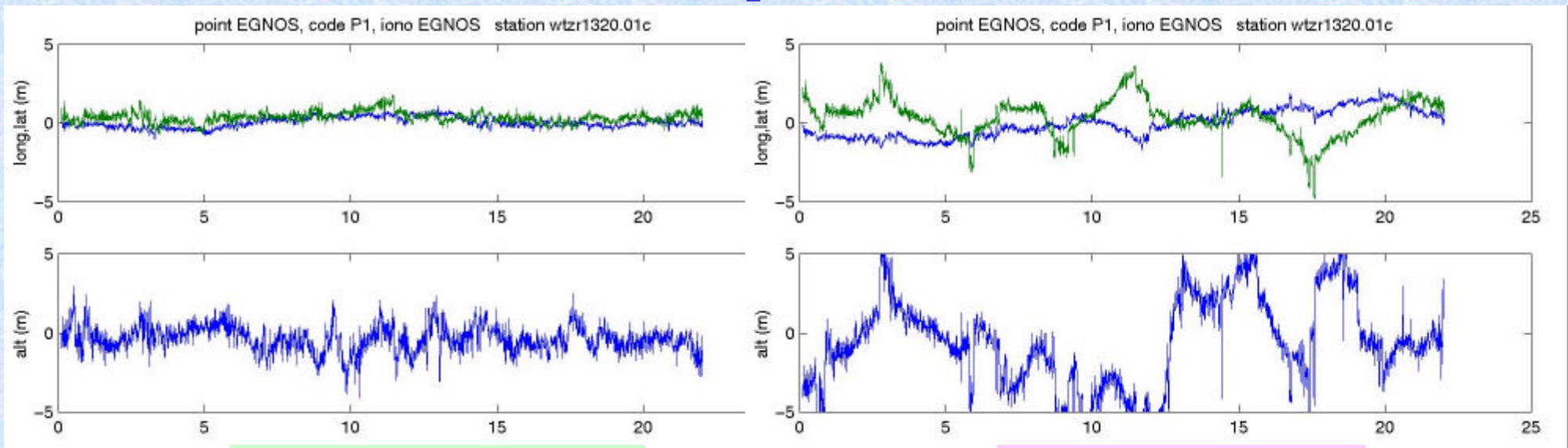




ESTB Performances : Improvements

- **Investigations**

- on going - 2 ways are analysed to solve these bias :
 - 3 years ago, broadcast TGD were wrong & implementation of workaround but today broadcast TGD are compliant with GPS ICD
 - time basis in MOPS (ΔT_{sv} , $(\Delta T_{sv})_{L1}$) regarding to notations and definitions given in SPS signal specification
- if solved, the ESTB user position :



Could be like that

instead of

this current status



ESTB Performances



Conclusions

- **ESTB User level of service**
 - 80 to 90% for APV II (H + V) when GIC/WAD corrections are broadcast (80% of the time)
 - quasi 100 % for APV I when GIC/WAD corrections are broadcast (80% of the time)
 - caution : limitations due to tools used to process ESTB SIS and figures given in this presentation for a user located at Toulouse
- **Accuracy :**
 - will be better when bias problem solved: standard deviation could be in the scale of :
0,5 m instead of 1,5 m (Latitude and Longitude)
0,7 m instead of 2,5 m (Vertical axis)