2020 December , 1st

Miguel ORTIZ
CEN-JTC5-WG1 convenor
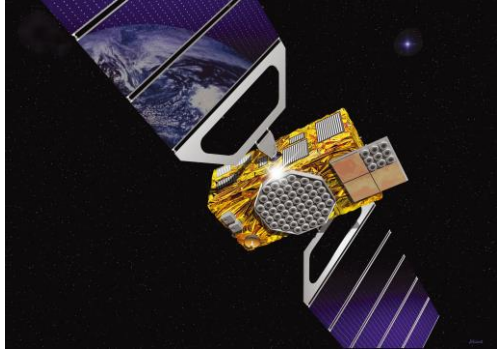
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BNAE Technical Director

User Consultation Platform 2020 (UCP)

CEN standards in GNSS for Road/Automotive
Benefits of using EN16803 series for the automotive sector

Université Gustave Eiffel

BNAE

1 Context :
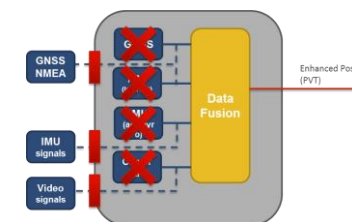## GNSS based positioning system for Road Domain

Mains GNSS applications for road domain

- Road User Charging
- Autonomous Vehicle
- Pay As You Drive
- Navigation systems
- Survey & Mapping
- Fleet management
- Cooperative ITS
- Dangerous goods tracking
- eCall
- Smart tacographs

Main issues/challenges related to the use of GNSS

- Adequacy between performances and needs
  - ACAI : Accuracy / Continuity / Availability / Integrity
- Standardization with « Record & Replay »
  - For GNSS device : EN16803 Part1-2-3
  - For hybrid GNSS : on going EN16803-4 / GPSTART2
- HD-Maps (ex:precise Mapping from space)
- Certification scheme for GNSS system (grey box)
- Type approval scheme for AV and or sub-system
- Use of new E-GNSS technologies :
  - PPP over E6 / multi-freq. / GALILEO
- Jamming / Spoofing / OSNMA

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2 EN16803 series :

"Use of GNSS-based positioning for road Intelligent Transport Systems (ITS)"

EN16803: publication status

- EN16803 : *Use of GNSS-based positioning for road Intelligent Transport Systems (ITS)*

- 1st Part published since 2016

- In 2020, 3 new publications:

  – Part1-Rev1: *Definitions and system engineering procedures for the establishment and assessment of performances*

  – Part2: *Assessment of basic performances of GNSS-based positioning terminals*

  – Part3: *Assessment of security performances of GNSS-based positioning terminals*
  *(addressing **jamming & spoofing issues**)*

- Future work:

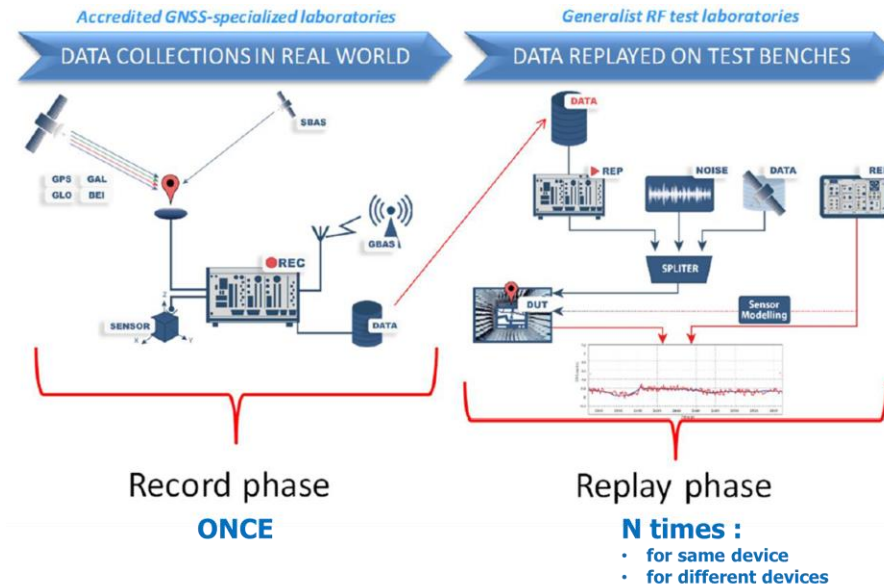 – Part4: *Definition & Validation of Test Scenario**
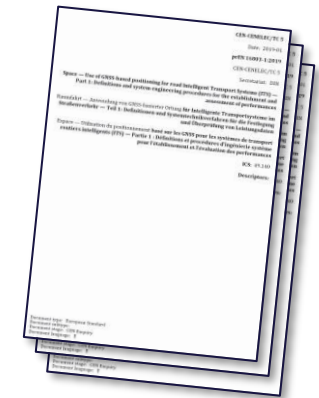
*temporary title

First test reports using EN16803 "Record & Replay"*

- Principle of the methodology:

- Examples of use of EN16803 realized by GUIDE this year:
  - Ublox F9P : 50 replays (standalone / urban env.)
    https://www.youtube.com/watch?v=AdcxsSzw_F4
  - Septentrio MosaicX5 : 20 replays (standalone / sbas / urban env.).
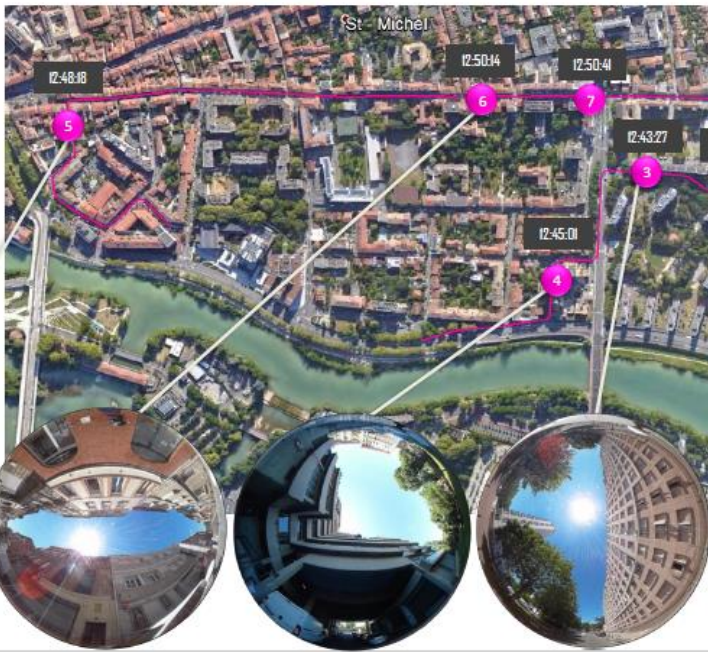   Download report for free :
    https://guide-gnss.com/guide-gnss-test-reports-septentrio-mosaicx5/

also known as "Record and Playback"

Using EN16803 : example in an Urban Environment

2 Replay phase

3 Analysis
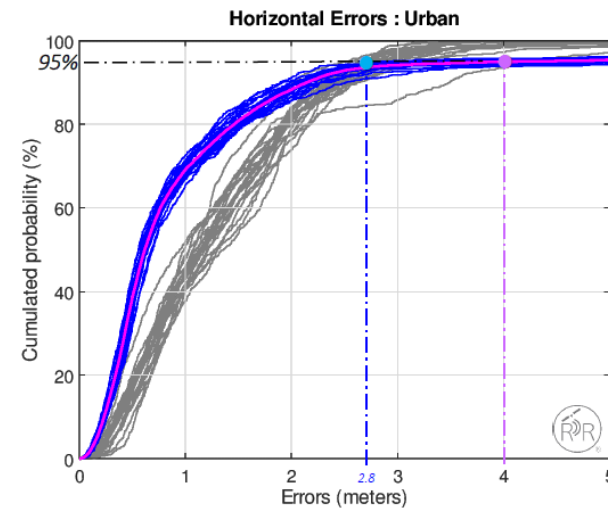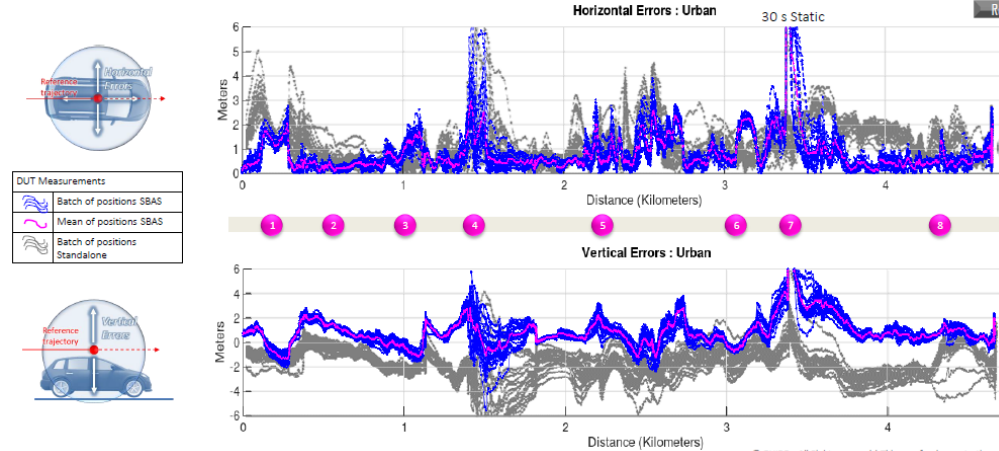
1 Record phase

3 CEN-CENELEC JTC5-WG1:
on going & future works

On going work: GPSTART2 project

- Design & Validation of "Record & Replay" scenario that could define a future EN16803-4
- Refinement of the PVT error model for the Sensitivity analysis method standardized in EN 16803-1
- Integrity assessment for GBPT (needed for Autonomous Vehicles)
- Assessment of hybrid GNSS device (needed for Autonomous Vehicles)

Future work

Which qualification schemes for which needs ?

Type Approval
(regulation 2017/79 for eCall) →

Certification (EN16803) →

*: ESC : *Electronic Stability Control*. AEB : Autonomous Emergency Braking

Toward a new regulation for "positioning system" or "auto guidance system" ?

Promotion of CEN-JTC5-WG1 work

4 Promotion of EN16803 at international level

EN 16803 series promoted at international level

The idea is to transform the EN 16803 series into a series of ISO standard in order to gain international recognition.

ISO TC20 SC14 WG1 is currently developing standard related to the use of GNSS assets for different kind of applications. Some examples :
- ISO CD TS 22591 : Space-based service for a positioning system with high accuracy and safety support applications in low visibility due to weather conditions
- ISO AWI 24245 : Global Navigation Satellite System (GNSS) receiver class codes
- ISO AWI 24246 : Requirements for Global Navigation Satellite System (GNSS) positioning augmentation centers

EN 16803 series promoted at international level

ISO TC20 SC14 lacks standards on performance assessment of localization systems integrated in road vehicles

We, as French member of ISO TC20 SC14, believe that the international standardization community would benefit from a series of standards which:

- Enables to have an objective methodology to assess receivers performances in road vehicles and more broadly for road transport applications
- Defines clearly concepts such as integrity
- Provides sound ways to perform affordable, repeatable tests, including for hybridized localization systems.

For these reasons, we advocate for the transfer of EN 16803 series in the ISO system, especially in ISO TC20 SC14.

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Accredited GNSS-specialized laboratories

DATA COLLECTIONS IN REAL WORLD

Generalist RF test laboratories

DATA REPLAYED ON TEST BENCHES

SBAS

GPS GAL
GLO BEI

GBAS

REC

SENSOR

DATA

DATA

REP   NOISE   DATA   REF

SPLITER

DUT

Sensor
Modelling
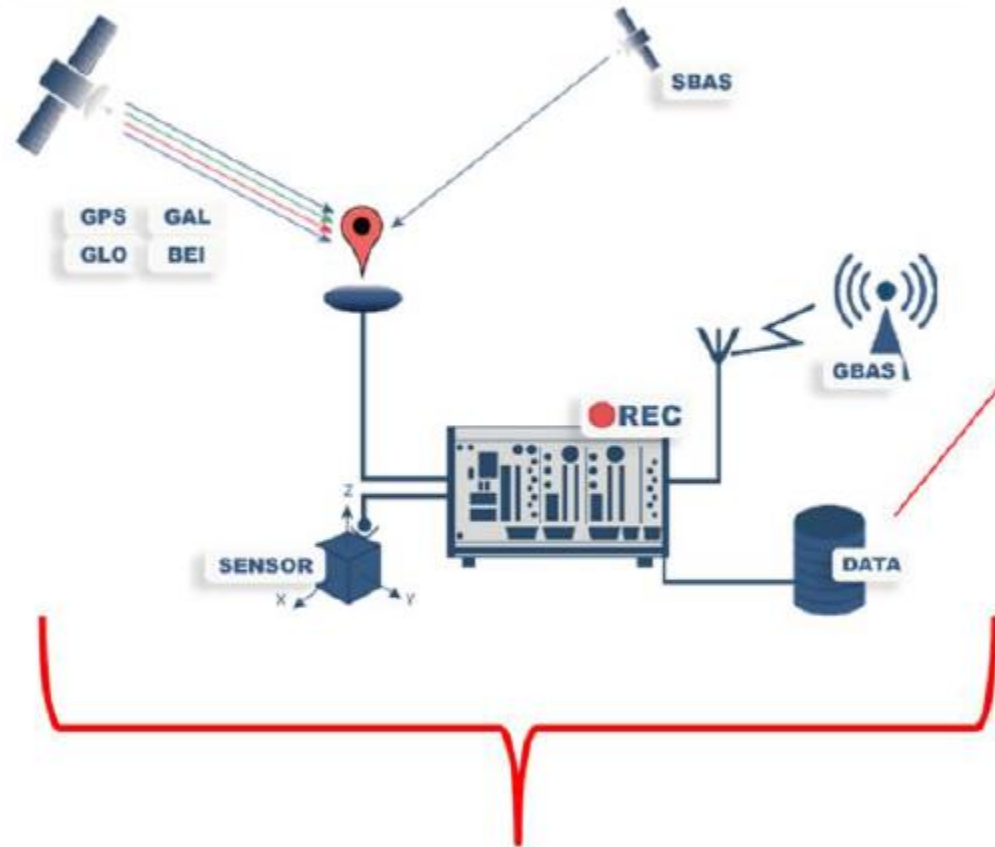
Record phase

ONCE
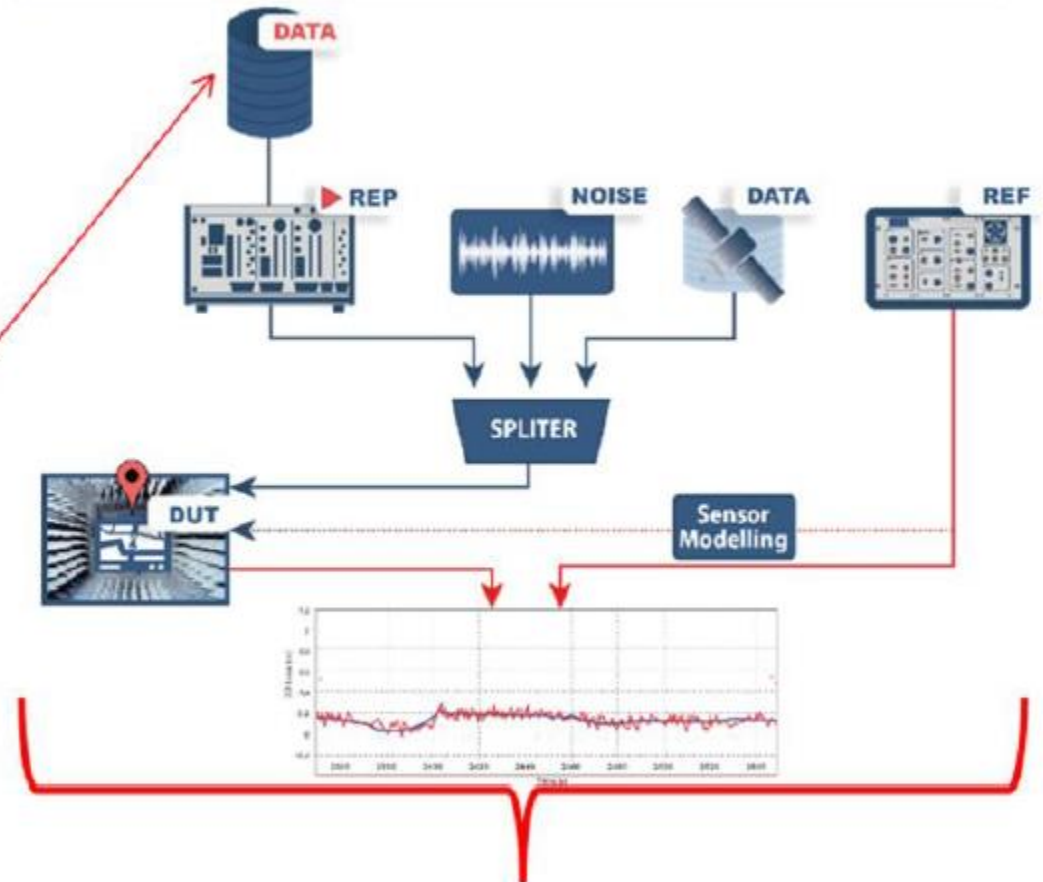
Replay phase

N times :
- **for same device**
- **for different devices**

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