



SBAS Timescale Description EGNOS



ICG-10

Boulder, 1st-6th November 2015



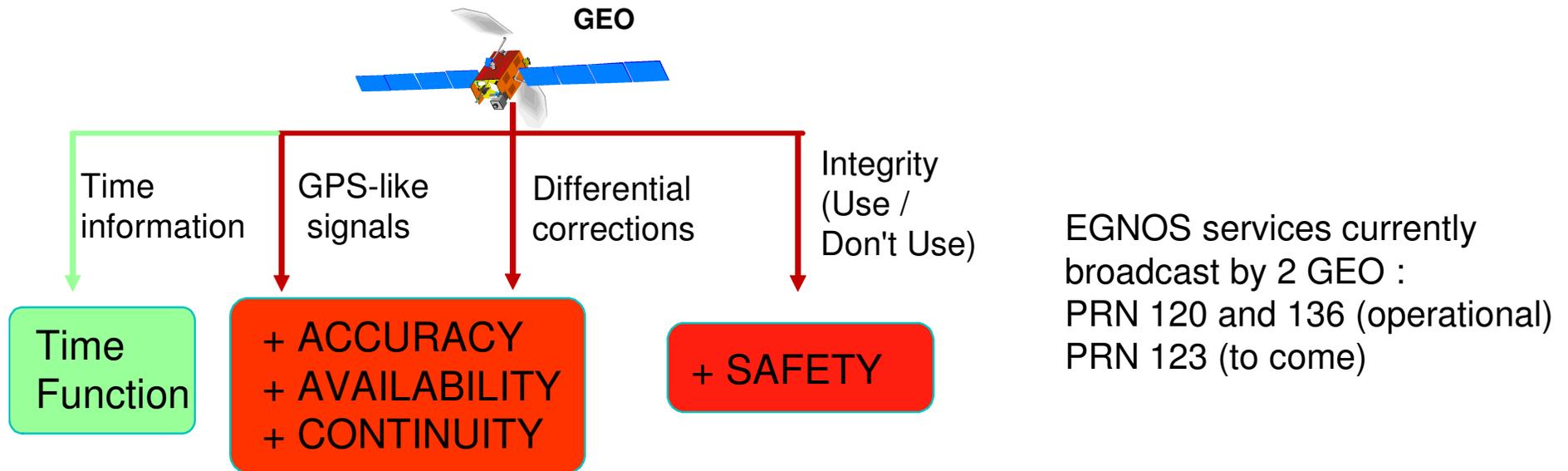
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Outline

- EGNOS overview
- EGNOS Network Time (ENT)
- ENT timing template for ICG

EGNOS overview

- EGNOS = European Geostationary Navigation Overlay Service
GPS SBAS over Western Europe



EGNOS Open Service : October 2009
EGNOS Safety-Of-Life service : March 2011

EGNOS Network Time

- EGNOS system time = ENT
- ENT is computed by comparison of the clocks in the EGNOS ground stations (GPS Common View)

- ENT is steered to GPST

ENT – GPST < 50 ns (5 σ) – cf. EGNOS SRD

- ENT performances are part of EGNOS OS
 - EGNOS OS Service Definition Doc (Issue 2.2 - 12/02/2015)
 - Part of the independent EGNOS Service Performances Monitoring Support (SPMS) to GSA

EGNOS Network Time

- Link between ENT and UTC in Message Type 12
 - Offset between UTC [or one UTC(k)] and SBAS system time
 - Max update time : 300 s
 - Validity time : 86400 s

EGNOS requirement

ENT – UTC(OP) accuracy
< 10 ns (3 σ)



UTC identifier	
0	UTC(CRL)
1	UTC(NIST)
2	UTC(USNO)
3	UTC
4	European UTC(k)
5-6	Reserved for future use
7	Not provided



(see MOPS Annex A)



Navigation solutions powered by Europe

Link to UTC(OP)

- An EGNOS station at Observatoire de Paris
 - Physically connected to UTC(OP)
 - Time delays within this station
 - calibrated in real time through the use of dedicated GPS-like signals
 - transmitted to EGNOS system
- ENT-UTC(OP) comes as output of the composite clock algorithm
(but UTC(OP) is not used to form ENT)
- MT12 is uploaded to the EGNOS satellites and broadcast in each EGNOS PRN navigation frame
- The EGNOS user shall be aware that applying EGNOS corrections to its GPS measurements will turn its time reference from GPST to ENT and therefore to UTC(OP) if MT12 is applied

Basics

1. System timescale: ENT (EGNOS Network Time)

2. Generation of system timescale:

Paper clock

Independently computed by the EGNOS CPFs (Control and Processing Facilities) using the clocks of the RIMS (Ranging and Integrity Monitoring Stations).

Steering

3. Is system timescale steered to a reference UTC timescale?

No, ENT is steered to GPST

but an estimation of its time offset to a reference UTC timescale is broadcast (cf. §5). Note that ENT – GPST is not broadcast.

a. To which reference timescale:

GPST

b. Whole second offset from reference timescale?

No whole second offset from GPST

c. Maximum offset (modulo 1s) from reference timescale?

Offset between ENT and GPST < 50 ns (5σ)

System to GNSS Time Offset

5. Corrections to convert from system time to reference UTC?

Yes. The reference UTC timescale depends on the broadcast UTC identifier broadcast in Message Type #12.

Currently MT #12 contains ENT – UTC(OP)

ENT – UTC(OP) accuracy < 10 ns (3 σ)

9. Availability of System to GNSS Time Offset (GGTO)

No