An Introduction to the EGNOS Central Processing Facility

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Presentation Overview

- EGNOS Overview
- CPF Functionality
- EGNOS Integrity Provision
- Performance apportionment
- Performances
- Challenging Issues
- Development team
RIMS Data Processing
CPF Correction Generation

Preprocessing & NOF Validation

Sv & RIMS-clock-det.

Orbit-det.

Iono-det.

Fast & Slow clock corr.

ENT sync. param.

Ephemeris corr.

GIVD/GIVE

Raw-Meas. & Status, Nav.-data, NOF-SIS from RIMS A

PRs (iono-, tropo-, H/W-bias-free)

Pred. orbits

RIMS antenna coordinates

Sv pos, vert. tropo delays

H/W biases, Geo iono slant delays

Sv pos, L1/L2 meas.,

PRs (iono-, H/W-bias-free), Sv-pos
Check Before Uplink

1. **Apply NOF**
   - Input: preproc'd PRs, Sv-positions
   - Output: NOF store (incl. history)

2. **Check NOF Format**
   - Inputs: NOF-SIS & 4 last broadcast NOFs from NLES, Operational NOF from PS
   - Output: NOF store (incl. history)

3. **Check incorporation of flags**
   - Inputs: NOF store (incl. history)
   - Output: integrity flag

4. **Estimate RIMS clk biases**
   - Inputs: fully corr’d PRs, corr’d Sv-pos
   - Outputs: clk biases

5. **Compute PR residuals**
   - Inputs: clk biases
   - Output: PR residuals

6. **Check in pos. domain (AIV)**
   - Inputs: UDREs, GIVEs
   - Outputs: integrity flag

7. **Combined Check UDRE/GIVE (no isolation)**
   - Inputs: RIMS antenna coord.
   - Outputs: integrity flag
Check Set (ii) - Check After

Check After In Operational NOF Lane

- RIMS Antenna Coordinates
- From Preprocessing
  - Raw S/V Positions
  - Iono / Tropo / IFB free PR's
- From Message Dec. & Route
  - NOF SIS
  - L1 / L2 Combination (Iono Observables) and measurement time

Check After

- Apply NOF (long term position corrections)
- Apply NOF (fast, & long term clock corrections)
- Check & Decode NOF
- NOF Store
- Check UDRE (incl. Isolation)
- Check GIVE (incl. Isolation)

Estimate RIMS Clock Bias
- Clock Bias Estim. / Projection Matrix
- Compute PR Residuals (Post Adjustment)
- Fully Corrected PR's

Fully Corrected PR's
- UDRE's
- GIVD/GIVE's

To NLES
- CS Integrity Flag
  - Self Status
  - Don't Use / Not Monitored Flags
  - Not Monitored Flags

To Processing Set
To Check Before
Performances (i)
Performances (ii)
Performances (iii)
Integrity and Continuity
apportionment
Ionospheric Experts Team
Challenging Issues

• Hard Real time system
• Large Software development
• Certification of Software
• Integrity and Continuity apportionment
• Ionospheric Integrity - IET
CPF Development

- Large European Industrial Consortium
- Alcatel Space - EGNOS Prime
- Astrium - CPF Prime
- GMV - PS Development
- IfEN - Check Set Algorithms
- Racal - Clock and Iono Algos
- Logica - Check Set SW and COTS
- SENER - Proc Set SW and COTS
Development Schedule
Additional Slides
EGNOS and GALILEO Integration Overview

2000

EGNOS AOC Development

EGNOS Operations

2003

2008

Galileo Definition

EGNOS + Development

GALILEO DEVELOPMENT

Full Capability

EGNOSAOC