The Contribution of the GNSS EPOS-IP to Manage GNSS Data and Associated Products for Solid Earth at European Scale

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## Objectives EPOS-IP (Implementation Phase)
### WP10 – GNSS Data & Products

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>construct the future governance of TCS GNSS Data &amp; Products in EPOS;</td>
<td>Agreement of Governance Structure</td>
</tr>
<tr>
<td>interact with the geodetic community in Europe, at national and Pan-European (EUREF) levels;</td>
<td>Communication channels with Geodetic Community established.</td>
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<td>ensure interoperability between EPOS GNSS services (data and products) and EPOS ICS;</td>
<td>Detailed DDSS to be implemented during the EPOS-IP phase defined.</td>
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<td>promote multidisciplinary interoperability with other disciplines within EPOS;</td>
<td>Contacts with WP09 (Near-Fault) and WP11 (Volcanos) about GNSS data management</td>
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<tr>
<td>implement distributed dissemination of file-based GNSS data for about 2000 stations (and and derived Products: CRD, VEL, STR) in the first 2 years with the goal of reaching 3000 by the end of the EPOS-IP.</td>
<td>GLASS software (including Data &amp; Products Portal) being developed. Prototype Products tested.</td>
</tr>
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</table>
GLASS – What and Why?
GLASS – What and Why?

GNSS Linkage Advanced Software System

GLASS intends to be an integrated software package to be deployed in a GNSS infrastructure to:

• Manage GNSS data (RINEX & metadata) from distributed repositories/data centers:
  - Collect data
  - Validate data
  - Disseminate data

• Provide GNSS products:
  - Coordinate Daily and Time Series
  - Velocity Fields
  - Strain Rate Fields
GLASS – What and Why?

GSAC* issues identified → GLASS system defined instead applying the following constraints and requirements:

- **Data redundancy**
  - integration of existing physical repositories, robustness

- **Data monitoring**
  - data quality control

- **Independency**
  - GLASS node can be fully separated from existing GNSS repository(ies)

*GSAC – Geodetic Seamless Archive Center – software developed by UNAVCO to integrate GNSS repositories*
GLASS – components

GLASS encompass the following key elements:

• **Physical components** – repositories/data centers
  - *Primary* - default repository, decided by the data provider
  - *Secondary* - alternative repository
  - *Mirror* - a repository that act as a mirror of another

• **Web services** – portals, monitoring tools, data and products mining solutions

• **Software applications** – managing interactions between repositories and services
RINEX Repositories / Data Centers

- GLASS software will act when a new file become available by:
  - Checking the file metadata (Header) against the the Site metadata (Anubis)
  - Run additional checks on file contents (Anubis)
  - Provides the url location to the data portal (local and externals)

RINEX Data: need to be available (local or external – url link) and GLASS will run on top of it (no need to adapt directory structure).
M3G – Metadata Management system for Multiple GNSS Networks

SITE LOG SUBMISSION DEMO

View current log
Update site log
Export site log
Import site log from local disk

BRUX Site Information Form (site log)

Form
Prepared by (full name) : Bruyninx Carine
Date Prepared : 2017-04-07
Report Type : UPDATE
If Update:
Previous Site Log : BRUX_201704073.log
Modified/Added Sections : 0,3,12

Site Identification of the GNSS Monument

Site Name : Brussels
Pour Character ID : BRUX
Monument Inscription : 
IERS Domes Number : 133010010
CDP Number : (A4)
Monument Description : STEEL MAST
Height of the Monument : 8 m
Monument Foundation : CONCRETE BLOCK
Foundation Depth : 3 m
Marker Description : CENTER OF HOLE IN STEEL PLATE
Date Installed : 2006-07-07
Geologic Characteristic : SAND
Bedrock Type : SEDIMENTARY
Bedrock Condition : FRESH
Fracture Spacing : 0 cm
T3 Monitoring Center

to be maintained by ROB - Belgium

Observed phase data for all constellations. Input are the station daily RINEX 2/3 observation files. The graphs give a snapshot of the station tracking for a specific date.
Data Portal

to be maintained by CNRS - France
# Data Portal

The Data Portal provides access to various data sets and visualization tools for users interested in Earth sciences. This page includes a map feature with data points and a table for specific data selection.

### Map Features
- **Spatial Selection**:
  - **Rectangle**
  - **Circle**
  - Latitude and Longitude inputs
- **Monumentation / Equipment**
  - Receiver Type
  - Antenna Type
  - Satellite System

### Table Features
- **4 Char ID**
- **Site Name**
- **Lat**
- **Lon**
- **All**
- **Install Date**
- **End Date**
- **Country**
- **State**
- **Agency**
- **Network**

### Example Table Data
- **AGDE**: Cap d’Agde purification plant, 43.2997, 3.4664, 67
- **AIGL**: Mont Aiguizal, 44.1271, 3.5813, 1618.8
- **ALPE**: Alpe d’Huez, 45.0866, 6.0835, 1892.2
- **BANN**: Fort de Banne, 44.3692, 4.1503, 2597.1
- **GINA**: Cadeach - Gnass... 43.6755, 3.7871, 322.8
- **JANU**: Fort du Janus, 44.9104, 3.7871, 2597.1
- **LAJA**: La Jasse - L’Hôpita... 43.9697, 4.7618, 761.8
- **MARS**: Marseille, 43.2788, 5.9673, 61.8
- **MICH**: Saint Michel l’Ober... 43.9241, 5.7176, 652.9
- **MTP2**: Montpellier 2nd site... 43.6388, 3.8641, 130
- **MTPL**: Montpellier (CNRS... 43.6374, 3.8648, 120
- **PALI**: Domaine de la paliss... 43.3757, 4.8105, 107.7

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[Image of the Data Portal interface with map and table data]
EPOS-GNSS Products

Current status: Prototype Products already generated

Daily solutions + metadata
- run by 2 Pan-European processing centers (INGV, UGA-CNRS)
- densified solution EUREF (BFKH)

Daily time-series & velocity fields + metadata
- Individual Solutions (INGV, UGA-CNRS)
- Combined Solution (BFKH)

Strain Rate maps + metadata
- Global + Regionals (LM)
Products Portal
to be maintained by UBI/C4G – Portugal
Summary

• GLASS is a software package to manage, validate, and distribute GNSS data & metadata and associated products.

• GLASS is being developed in the framework of EPOS-IP (Implementation Phase, until 2019).

• GLASS will be used in the GNSS component of EPOS-OP (Operational Phase, after 2019).

• We have shown the major components:
  • Repository Software
  • M3G software
  • Data & Products Portals

• All these components work together in a complete package (can be installed in a stand-alone server but the goal is to facilitate the integration of individual repositories/data centers.
  • First version available for testing in late Summer – interested people can contact us:

  \[ \text{wp10@epos-ip.eu} \]
Thank you for your attention

Questions?