

# 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

Objective	Status
construct the future governance of TCS GNSS Data & Products in EPOS;	Agreement of Governance Structure
interact with the geodetic community in Europe, at national and Pan-European (EUREF) levels;	Communication channels with Geodetic Community established.
ensure interoperability between EPOS GNSS services (data and products) and EPOS ICS;	Detailed DDSS to be implemented during the EPOS-IP phase defined.
promote multidisciplinary interoperability with other disciplines within EPOS;	Contacts with WP09 (Near-Fault) and WP11 (Volcanos) about GNSS data management
<b>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.</b>	<b>GLASS software (including Data &amp; Products Portal) being developed. Prototype Products tested.</b>

# 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

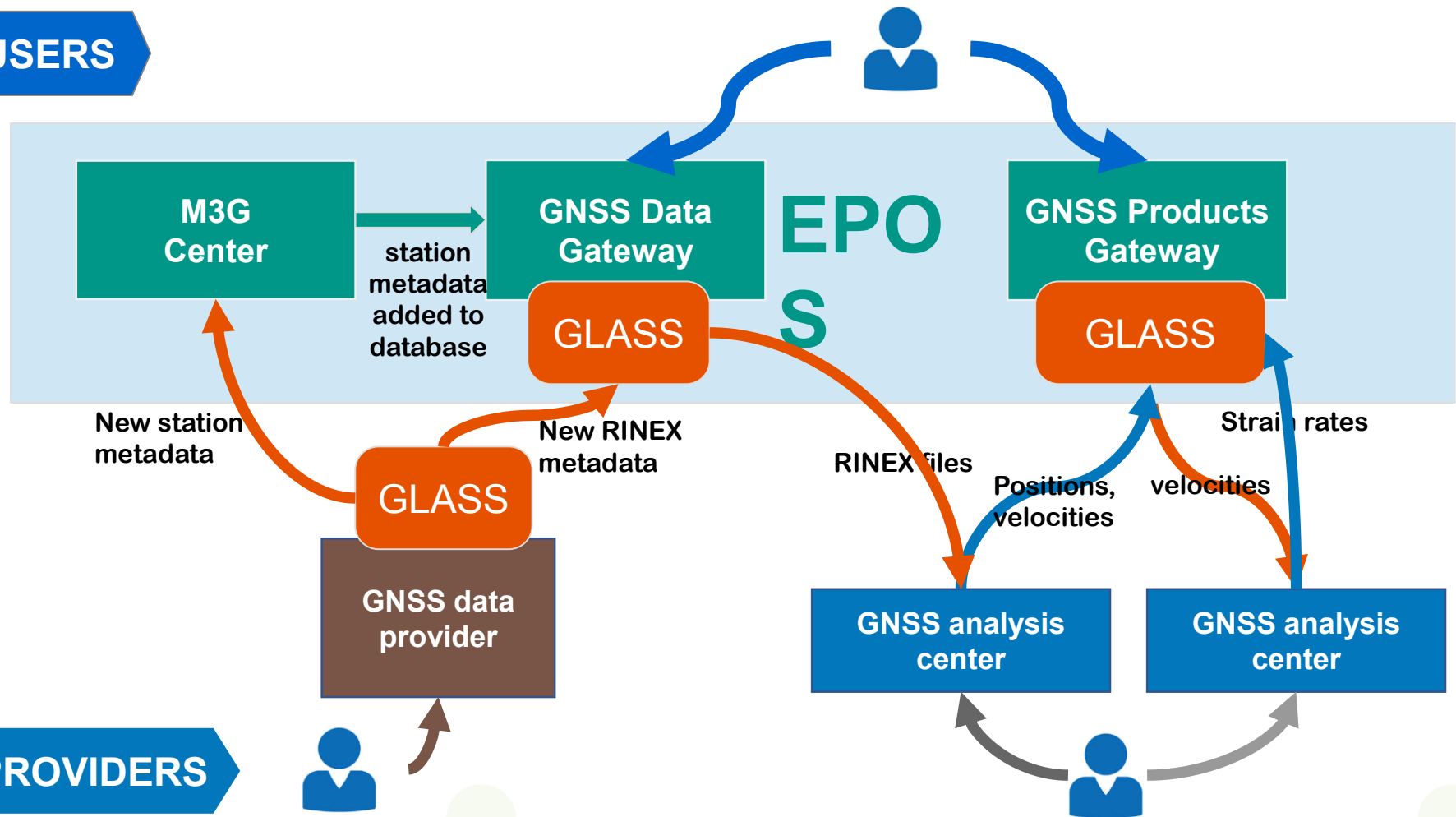
GLASS encompass the following key elements:



- **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

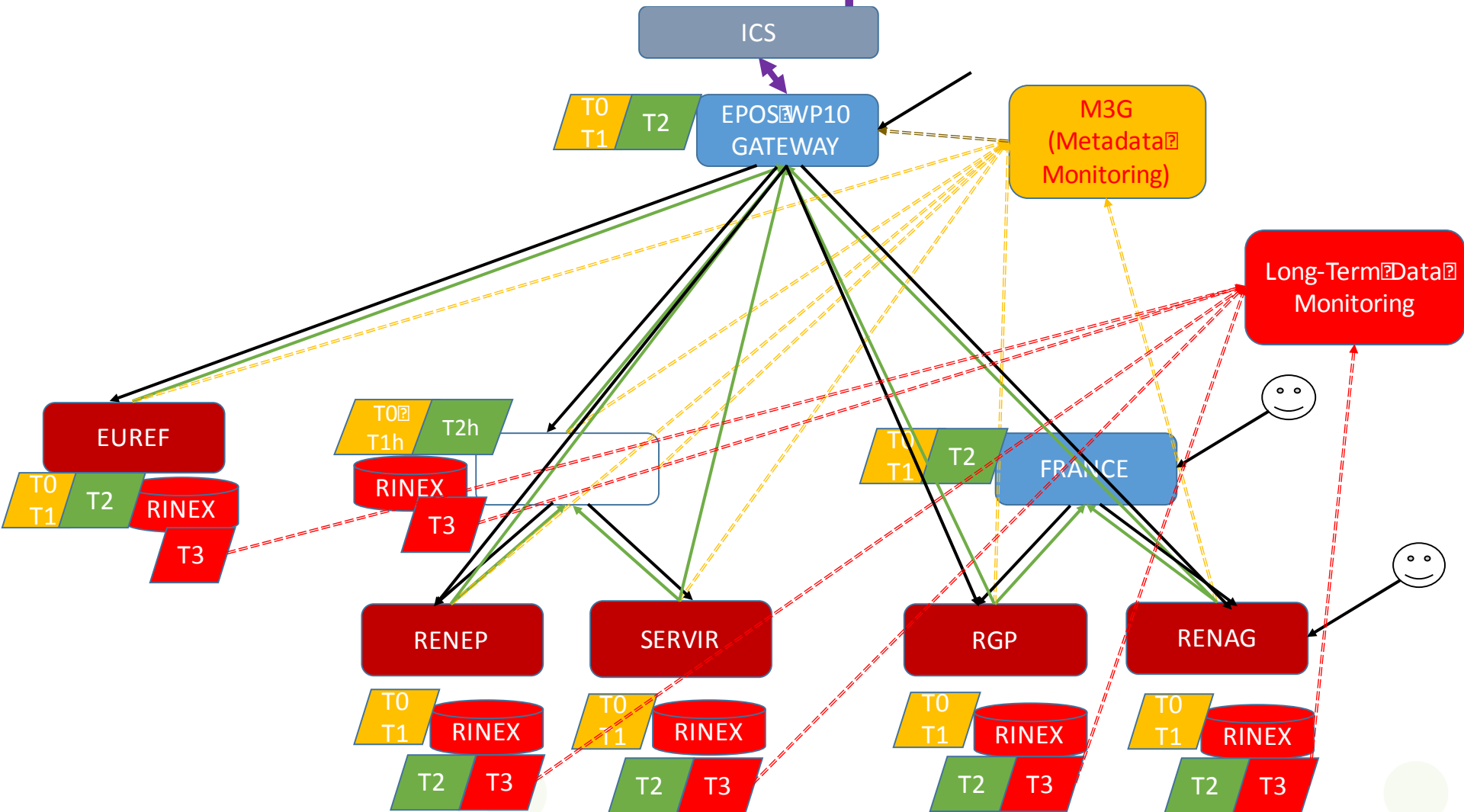
# GLASS work flow

USERS



# GLASS framework

## EPOS example





# RINEX Repositories / Data Centers

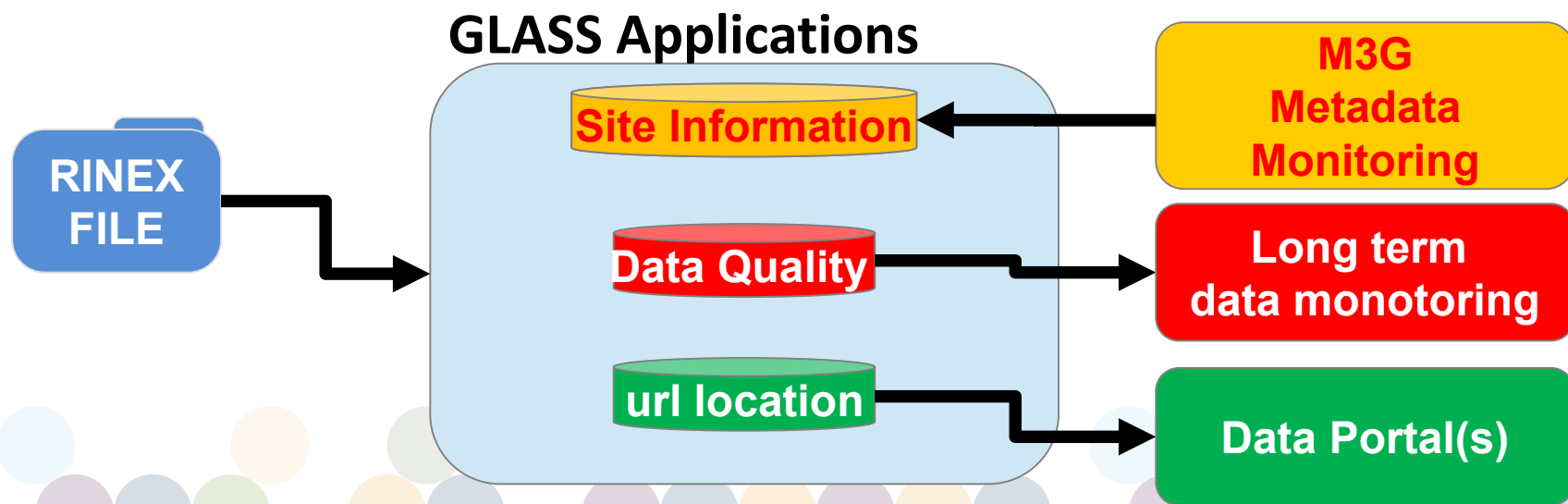
**FILES**

**RINEX Repository  
(Data Center)**

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).

- GLASS software will act when a new file become available by:

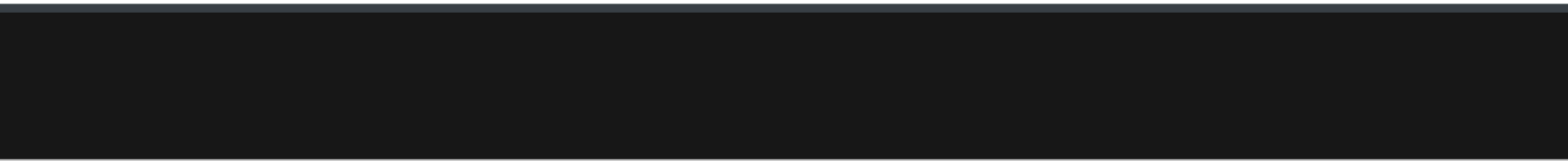
- Checking the file metadata (Header) against the the Site metadata (Anubis)
- Run additional checks on file contents (Anubis)
- Provides the url location to the data portal (local and externals)



# M3G – Metadata Management system for Multiple GNSS Networks

to be maintained by ROB - Belgium

## SITE LOG SUBMISSION DEMO



Agency Name

ROB

Password

••••••••

☒ Remember Me

Reset Password

Login

Reset



# M3G – Metadata Management system for Multiple GNSS Networks

## SITE LOG SUBMISSION DEMO



View current log

Update site log

Export site log

### Sitelog BRUX

NETWORKS & STATIONS

- Stations 5
- BRUX00BEL
- » Site log
- DENT00BEL
- DOUR00BEL
- WARE00BEL
- TEST00BEL
- Profile
- Logout

BRUX Site Information Form (site log)

International GNSS Service

See Instructions at:  
<ftp://igsb.jpl.nasa.gov/pub/station/general/sitelog>

Import site log from local disk

0. Form

Prepared by (full name) : Bruyninx Carine  
Date Prepared : 2017-04-07  
Report Type : UPDATE  
If Update:  
Previous Site Log : BRUX\_20170103.log  
Modified/Added Sections : 0,3.12

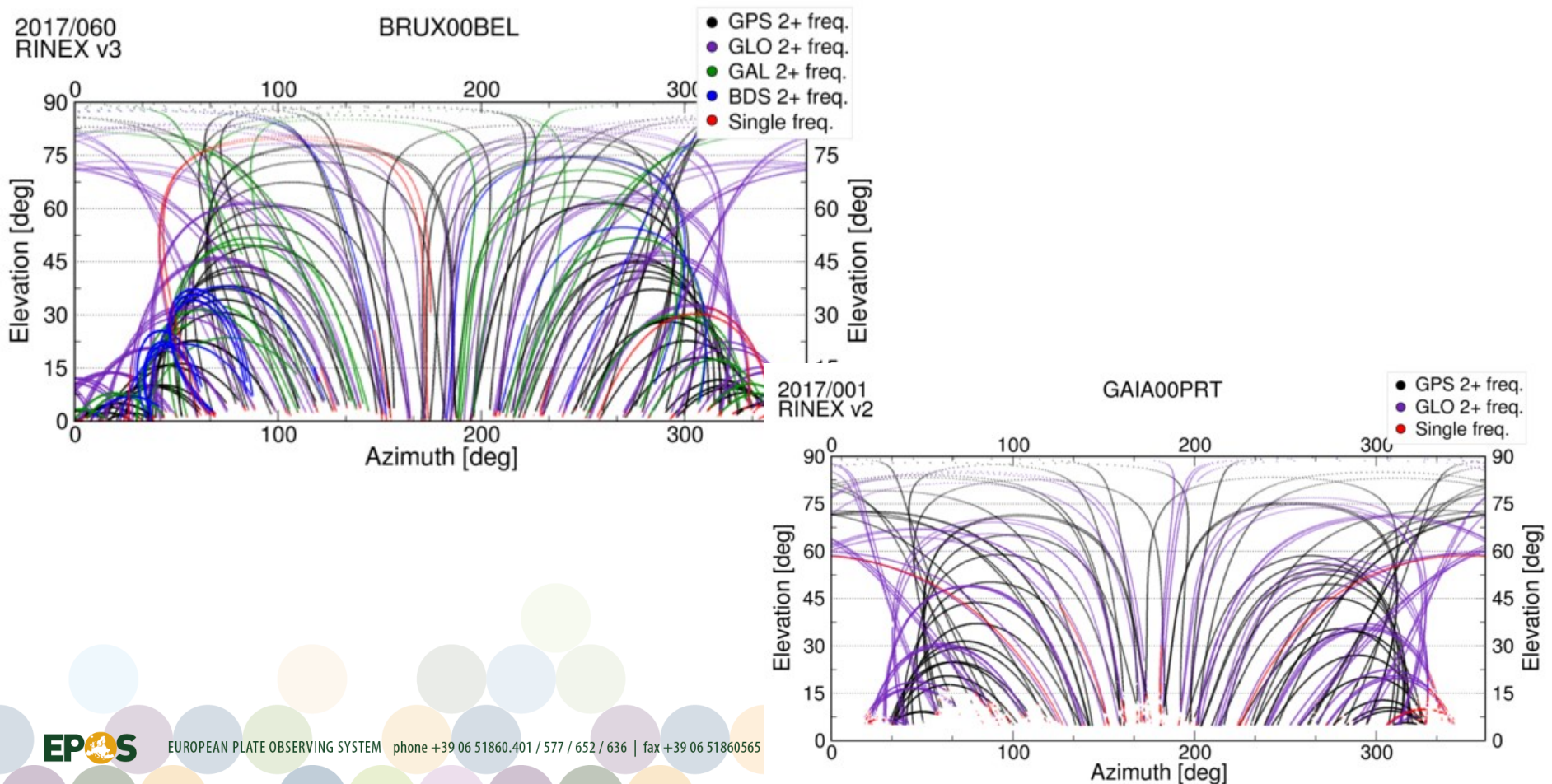
1. Site Identification of the GNSS Monument

Site Name : Brussels  
Four Character ID : BRUX  
Monument Inscription :  
IERS DOMES Number : 13101M010  
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.





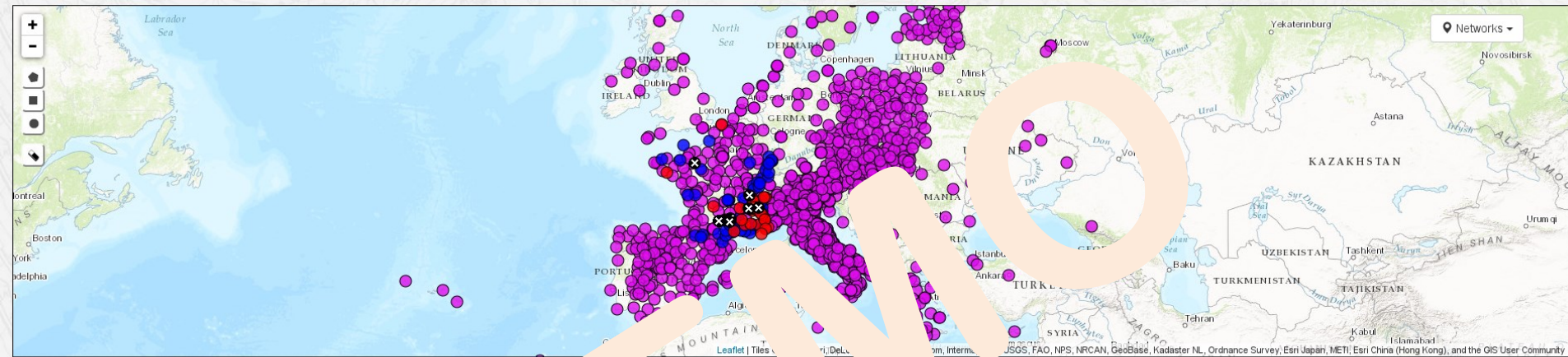
# Data Portal

to be maintained by CNRS - France



Download Show spatial selection Show advanced search

Files Search Clear Run Search



4 Char I D	Site Name	Lat	Lon	Latitude	Longitude	Date	Country	State	City	Agency	Network
AGDE	Cap d'Agde purificat...	43.2964	3.0813	43.2964	3.0813	2006-09-04 12:00:00	FRANCE	Herault	CAP D'AGDE - AGDE	GM	RENAG RGP
AIGL	Mont Aigoual	44.1214	3.0813	44.1214	3.0813	2001-05-01 00:00:00	FRANCE	Gard	VALLERAUGUE	GM	RENAG RGP
ALPE	Alpe d'Huez	45.0866	6.0835	45.0866	6.0835	2000-01-01 00:00:00	FRANCE	Isere	ALPE D'HUEZ	ISTerre	RENAG RGP
ARUF	ARUDY	43.0996	1.311	43.0996	1.311	2004-03-13 00:00:00	FRANCE	Pyrenees-Atlantiques	ARUDY	OMP-GET-CNES	RENAG RGP
AUBU	Aubure	48.2168	6.0835	48.2168	6.0835	2008-07-05 00:00:00	FRANCE	Haut-Rhin	AUBURE	EOST	RENAG RGP
BANN	Fort de Banne	44.3692	6.0835	44.3692	6.0835	2003-07-03 00:00:00	FRANCE	Ardeche	BANNE	ISTerre	RENAG RGP
BLVR	Belvoir	47.3235	6.0835	47.3235	6.0835	2013-07-03 00:00:00	FRANCE	Doubs	BELVOIR / LES CH...	OSUTHETA	RENAG RGP
BUAN	Bure-Andra	48.4862	5.353	48.4862	5.353	2007-11-13 00:00:00	FRANCE	Meuse	BURE	EOST	RENAG RGP
CHIZ	CHIZE	46.1335	-0.4077	46.1335	-0.4077	2000-10-19 00:00:00	FRANCE	Deux-Sevres	CHIZE	LIENSs	RENAG RGP
CHTG	Cherbourg	49.6512	-1.6355	49.6512	-1.6355	2015-02-20 00:00:00	FRANCE	Manche	CHERBOURG	LIENSs	RENAG RGP
CHTL	Le Chatel	45.3042	6.3588	45.3042	6.3588	1997-10-14 00:00:00	FRANCE	Savoie	LE CHATEL	ISTerre	RENAG RGP
CLFD	Clermont-Ferrand	45.761	3.1111	45.761	3.1111	2006-10-17 00:00:00	FRANCE	Puv-de-Dome	CLERMONT-FERR...	OPGC	RENAG RGP

# Data Portal

**EPoS** EUROPEAN PLATE OBSERVING SYSTEM

Download Show spatial selection Hide advanced search

Files Search Clear Run Search

**Spatial selection**

**Rectangle**

Lat-Lon Bounding Box

45.089036  
3.010254 7.734375  
42.827639

**Circle**

Latitude Longitude  
Radius (Km)

**Monumentation / Equipment**

Receiver Type

TRIMBLE NETR5  
TRIMBLE NETR8  
**TRIMBLE NETR9**  
TRIMBLE NETRS  
TRIMBLE R10

Antenna Type

3S-02-1AERO+CR  
3S-02-1AERO+CR  
3S-02-2AERO+CR  
3S-02-2AERO+GP

Radome Type

AUST  
BEVA  
CAFG  
CONE

Satellite System

GPS  
GLONASS  
GALILEO  
BEIDOU

File Info

T3 Info

4 Char ID	Site Name	Lat	Lon	Alt	Install Date	End Date	Country	State	Agency	Network
		greater than less than	greater than less than	greater than less than	greater than less than	greater than less than				
AGDE	Cap d'Agde purificat...	43.296	3.4664	67	2007-04-21 12:00:00	2017-04-21 16:16:08	FRANCE	Herauld	GM	RENAG RGP
AIGL	Mont Aigoual	44.12	3.5813	1618.8	2007-04-21 00:00:00	2017-04-21 16:16:08	FRANCE	Gard	GM	RENAG RGP
ALPE	Alpe d'Huez	45.0866	6.0835	1892.2	2006-10-30 00:00:00	2017-04-21 16:16:08	FRANCE	Isere	ISTerre	RENAG RGP
BANN	Fort de Banne	44.3692	4.1563	16	2003-07-03 00:00:00	2017-04-21 16:16:08	FRANCE	Ardeche	ISTerre	RENAG RGP
GINA	Cadarache - Ginass...	43.6755	5.7871	322.8	1998-02-25 18:00:00	2017-04-21 16:16:08	FRANCE	Bouches-du-Rhone	Ginasservis	IRSN
JANU	Fort du Janus	44.9104		2597.1	2005-10-14 00:00:00	2017-04-21 16:16:08	FRANCE	Hautes-Alpes	MONTGENEVRE	ISTerre
LAJA	La Jasse - L'Hospit...	43.9697		761.8	2014-03-07 00:00:00	2017-04-21 16:16:08	FRANCE	Aveyron	Hospitalet du Larzac	GM
MARS	Marseille	43.2788		61.8	1998-07-16 15:00:00	2017-04-21 16:16:08	FRANCE	Bouches-du-Rhone	MARSEILLE	IGN
MICH	Saint Michel l'Obser...	43.9241	5.7176	652.9	1998-07-15 14:00:00	2017-04-21 16:16:08	FRANCE	Alpes-de-Haute-Pro...	Saint Michel l'Obser...	IRSN
MTP2	Montpellier 2nd site ...	43.6388	3.8641	130	2013-08-12 12:00:00	2017-04-21 16:16:08	FRANCE	Herauld	MONTPELLIER	GM
MTPL	Montpellier (CNRS ...	43.6374	3.8648	120	1999-04-01 12:00:00	2013-11-26 00:00:00	FRANCE	Herauld	MONTPELLIER	GM
PALI	Domaine de la palis...	43.3757	4.8105	107.7	2007-12-08 00:00:00	2017-04-21 16:16:08	FRANCE	Bouches-du-Rhone	SALINS DE GIRAUD	GM



# EPOS-GNSS Products

**Current status:** Prototype Products already generated

## Daily solutions + metadata

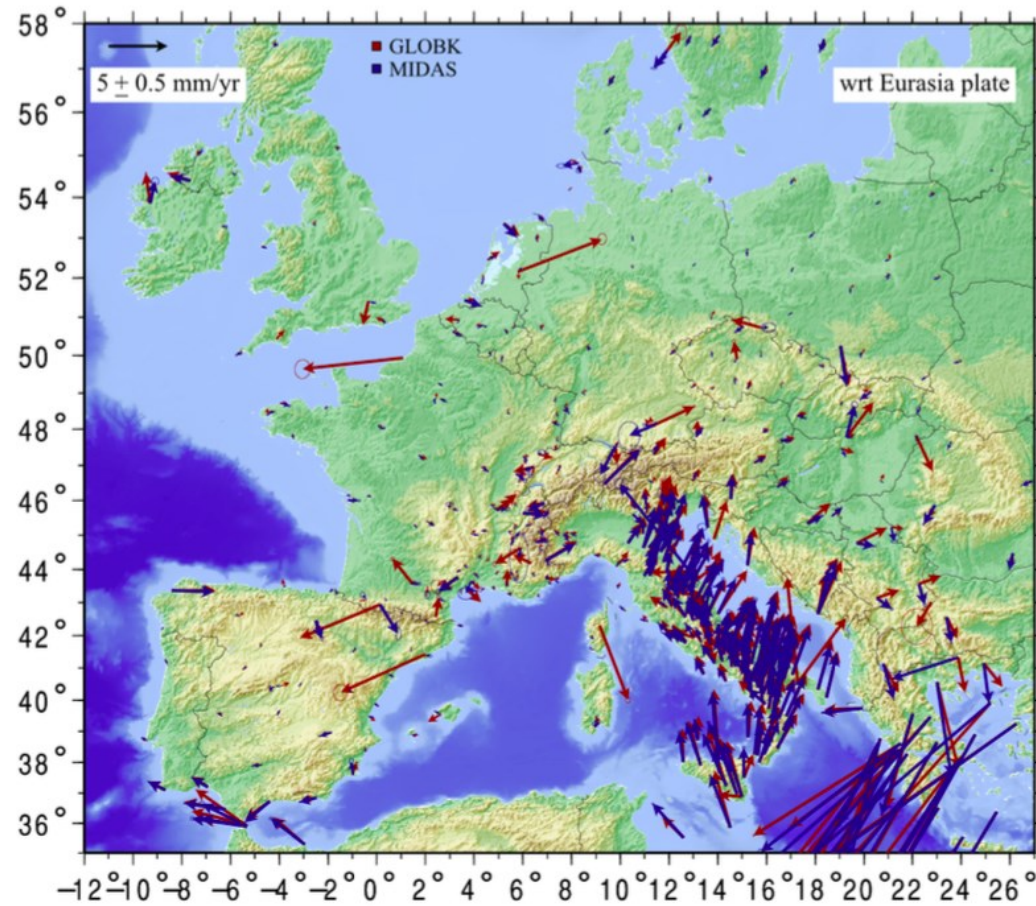
- run by 2 Pan-European processing centers (INGV, UGA-CNRS)
- densified solution EUREF (BFKH)

## Daily time-series & velocity fields + metadata

- Individual Solutions (INGV, UGA-CNRS)
- Combined Solution (BFKH)

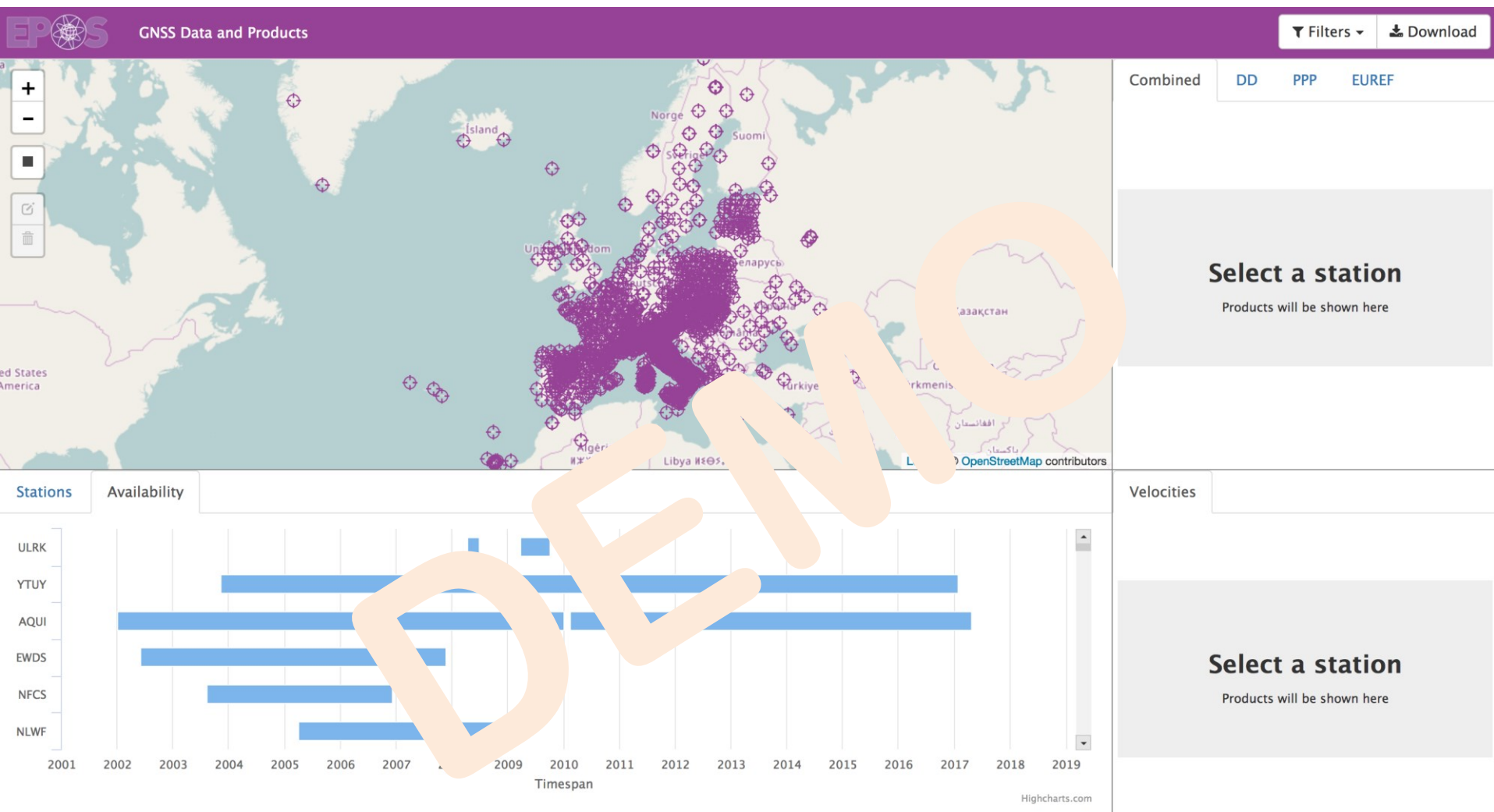
## Strain Rate maps + metadata

- Global + Regionals (LM)




# Products Portal

to be maintained by UBI/C4G – Portugal



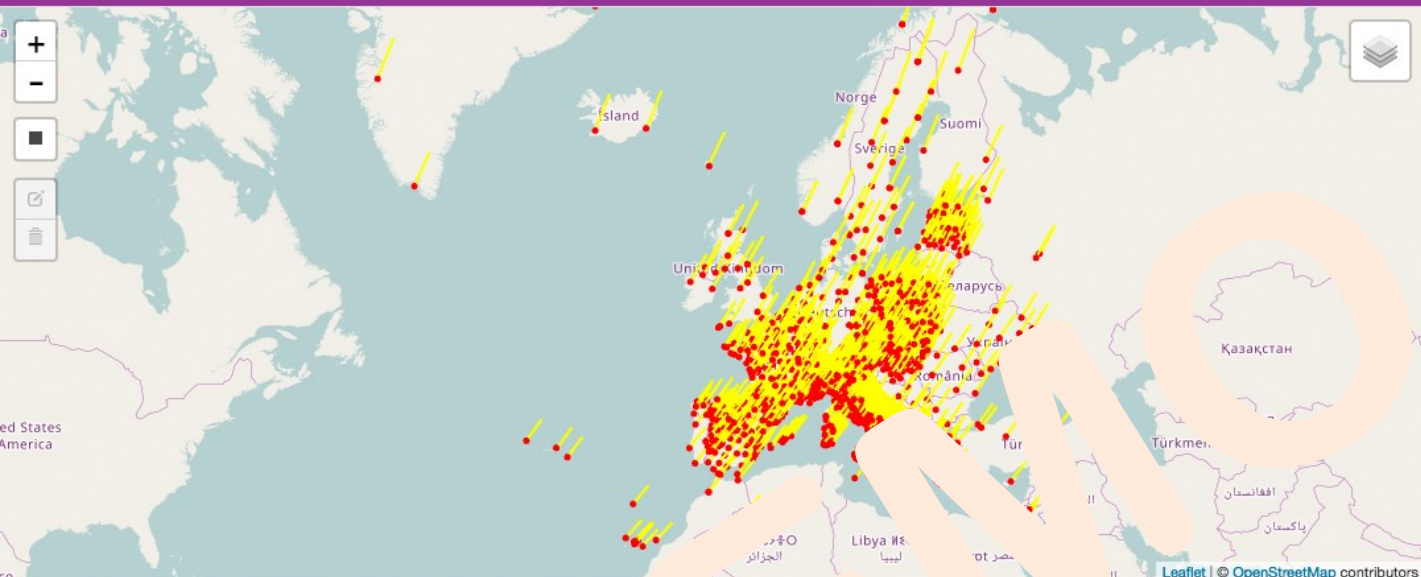


# Products Portal

 GNSS Data and Products

Filters

Download



Combined

DD

PPP

EUREF

## Select a station

Products will be shown here

Download:

PNG

PDF

XML

JSON

CSV

Stations

Availability

Show 10 entries

Search:

4-Char ID	Site Name	Lat	Lon	Altitude	Country	City	Agency	Network
ABAS	ABAS 19581M001	39.7672	17.174	23	Italy	Ales Corso Umberto	GEOTOP S.R.L.	AAAA
ACCA	ACCA 18850M001	41.1586	12.7		Italy	ACCADIA	Innovapuglia s.p.a.	AAAA
ACCE	ACCE 19525M001	44.4762	6.1	1.7	Italy	Acceglio	A.R.P.A. PIEMONTE	AAAA

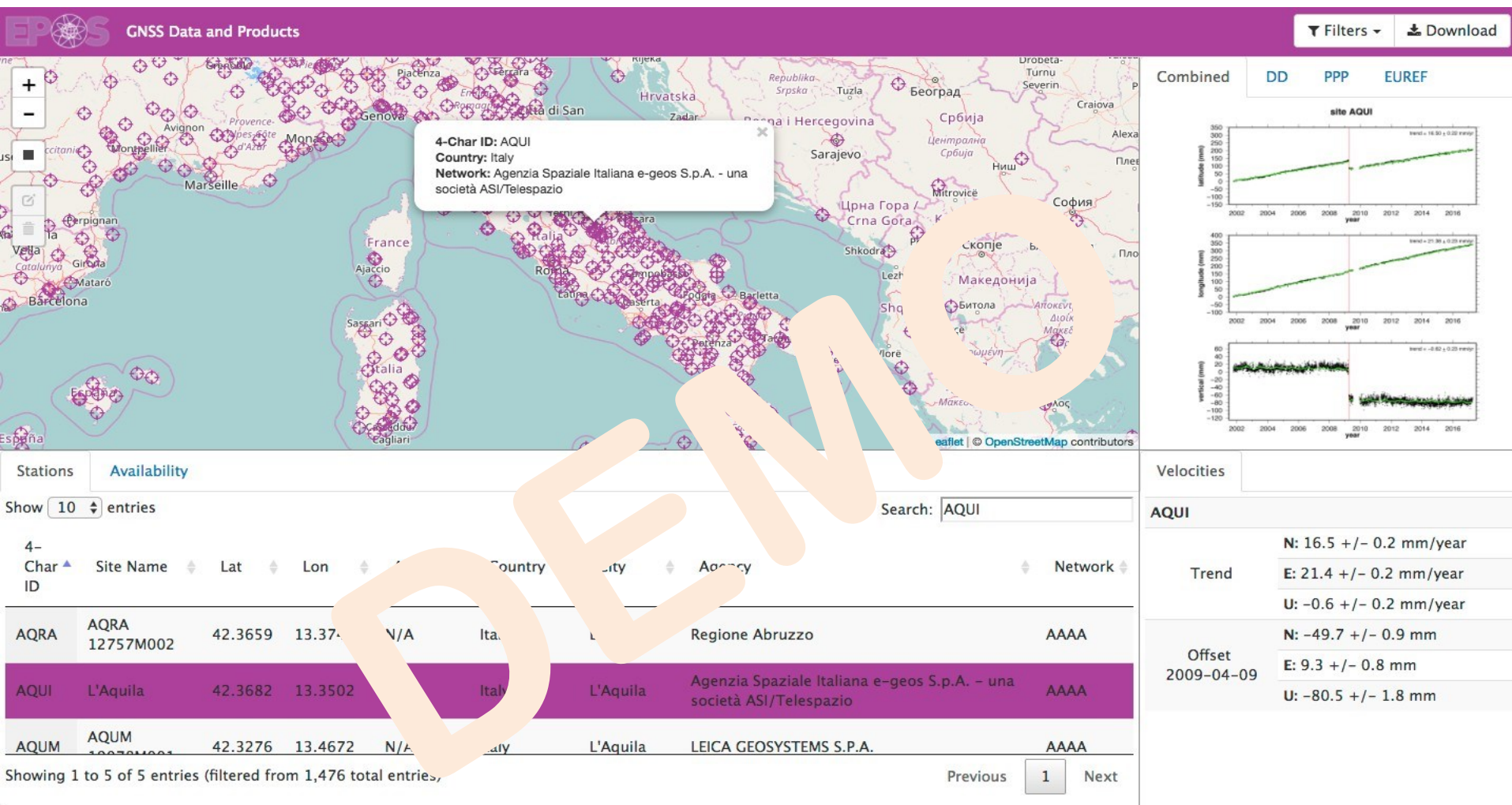
Istituto Nazionale di Geofisica e

Velocities

Select a station

Products will be shown here

# Products Portal



# 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:**

**[wp10@epos-ip.eu](mailto:wp10@epos-ip.eu)**

Thank you for your attention

Questions?

