

Introduction

V1.1

V2.0

Operation

New Functionalities in M³G

(Metadata management and distribution system for Multiple GNSS Networks)

Stations

Showing 1-10 of 2,369 items.

| # | 9-char ID | Network (I)=included (P)=proposed | Status | Metadata | Country | Responsible for metadata | DOMES number | Last update | GNSS receiver | GNSS antenna |
|----|-----------|-----------------------------------|--------|-----------|----------------|--------------------------|--------------|-------------|--------------------|--------------|
| 1 | ABAN00ESP | EPOS(P), EPN densification(I) | active | valid | Spain | REGAM | 19430M001 | 2018-12-27 | LEICA GRX1200+GNSS | LEIAR25 |
| 2 | ABAS00ITA | EPN densification(I) | active | valid | Italy | CISAS | 19581M001 | 2016-09-15 | TPS NETG3 | TP5G3_A1 |
| 3 | ABBS00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 4 | ABEA00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 5 | ABED00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 6 | ABEE00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 7 | ABEP00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 8 | ABER00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 9 | ABYW00GBR | EPN densification(I) | active | not valid | United Kingdom | BIGF | - | - | - | - |
| 10 | ACAL00ESP | EPOS(P), EPN densification(I) | active | valid | Spain | REGAM | 19431M001 | 2018-12-27 | LEICA GRX1200GPPRO | LEIAT504GG |

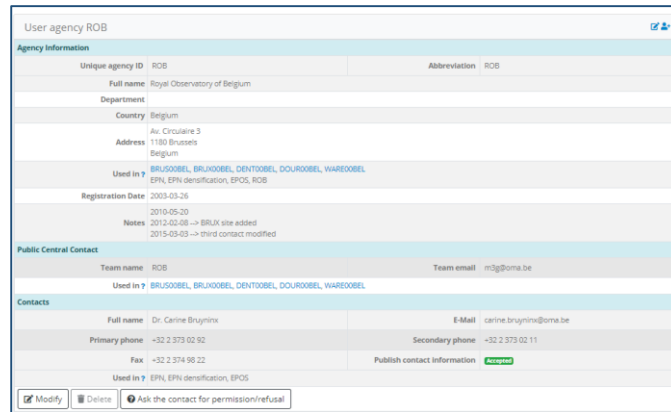
Networks

Showing 1-8 of 8 items.

| # | Abbreviation | Network name | Network type | Country | Network manager | DOI | Additional information | Station(s) |
|---|--------------|--|--------------|----------------------|-----------------|---|---|------------|
| 1 | BFA | | Local | | ARA | | GNSS Network of Bizkaia | |
| 2 | CZEPOS | Network of GNSS Permanent Stations of the Czech Republic | Local | CZE (Czech Republic) | ZU | | | |
| 3 | GEONAS | GEOdynamic Network of the Academy of Sciences | Local | CZE (Czech Republic) | IRSM | | | |
| 4 | GFA | | Local | | ARA | | GNSS Network of Gipuzkoa | |
| 5 | PPGNET | Pecny-Patras-Praha GNSS Network | Local | GRC (Greece) | RIGTC GOP | | | |
| 6 | RENAG | Réseau National GNSS | Local | FRA (France) | OREME | | | |
| 7 | ROB_GNSS | ROB GNSS Network | Local | BEL (Belgium) | ROB | https://doi.org/10.24414/FFSTB-P256 | Observations and metadata from continuously observing GNSS tracking stations operated by the Royal Observatory of Belgium (ROB) | |
| 8 | VESOG | Research and Experimental Network for GNSS Observations | Local | CZE (Czech Republic) | GOP | | | |

Acknowledgements:

The GNSS@ROB activities are supported by Belgian Science Policy (BELSPO) through its Solar Terrestrial Center of Excellence and receive funding from BELSPO under grant agreement FSIRI/33/EP1 and the European Union's Horizon 2020 research and innovation programme under grant agreement No 676564.



User agency ROB

Agency Information

Unique agency ID: ROB Abbreviation: ROB

Full name: Royal Observatory of Belgium

Department: Belgium

Country: Belgium

Address: Av. Croixneuf 3
1180 Brussels
Belgium

Used in: BRUX00BEL, BRUX00BEL, DENT00BEL, DOUR00BEL, WARE00BEL
EPN, EPN identification, EPOS, ROB

Registration Date: 2003-03-26

Notes: 2013-03-20
2012-02-08 -> BRUX site added
2015-03-03 -> third contact modified

Public Central Contact

Team name: ROB Team email: m3g@oma.be

Used in: BRUX00BEL, BRUX00BEL, DENT00BEL, DOUR00BEL, WARE00BEL

Contacts

Full name: Dr. Carine Bruyninx E-Mail: carine.bruyninx@oma.be

Primary phone: +32 2 373 02 92 Secondary phone: +32 2 373 02 11

Fax: +32 2 374 90 22 Publish contact information: ☒

Used in: EPN, EPN identification, EPOS

☒ Modify ☐ Delete

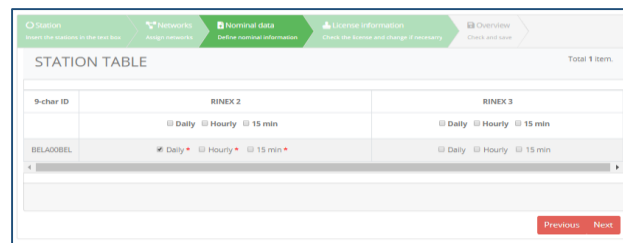
- **Improved handling of the contact information:** To ensure consistency between the contact information defined in the station metadata (e.g. site logs) and the contact information inserted in the agency part of the M³G, we developed two new user interfaces: one is centralizing all the information relative to the agencies, while the other allows the user to change contact information for multiple stations in one place.
- **Compliance with the EU General Data Protection Regulation (GDPR):** Each person whose personal data is stored in M³G is requested by email if his/her data can be made available publicly or not.

Managed networks

Showing 1-4 of 4 items.

| # | Abbreviation? | Network name | Network manager? | Primary contact | Secondary contact | DOI | Additional information | Actions |
|---|--------------------|-------------------------|------------------|---------------------|------------------------|-----------|------------------------|-------------------------------------|
| | (all abbreviation) | (all name) | (all agency) | (all contact) | (all contact) | (all doi) | (all additional info) | |
| 1 | EPN | EUREF PERMANENT NETWORK | ROB | Dr. Carine Bruyninx | - | - | - | <input checked="" type="checkbox"/> |
| 2 | EPN identification | - | ROB | Dr. Carine Bruyninx | - | - | - | <input checked="" type="checkbox"/> |
| 3 | EPOS | - | ROB | Dr. Carine Bruyninx | - | - | - | <input checked="" type="checkbox"/> |
| 4 | ROB | ROB GNSS network | ROB | Dr. Carine Bruyninx | Mr. Dominique Mesmaker | - | - | <input checked="" type="checkbox"/> |

➤ **Extended network management:** National and virtual networks (e.g. EPOS volcanology or near-fault observatories) have been introduced together with the collection of additional metadata such as Digital Object Identifiers (DOIs).



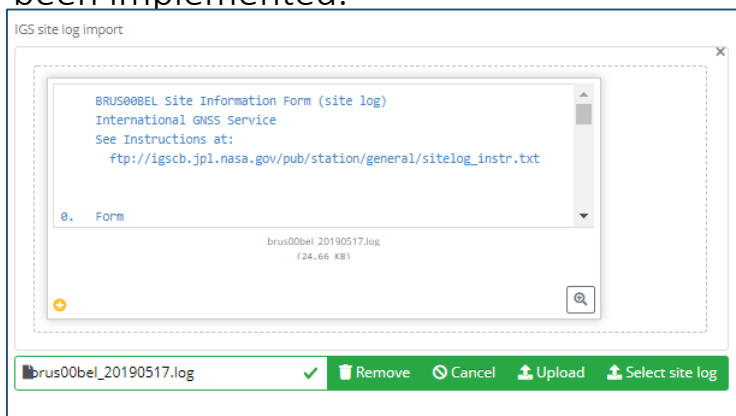
STATION TABLE

Total 1 item

| 9-char ID | RINEX 2 | RINEX 3 |
|-----------|---|---|
| BELAOBEL | <input checked="" type="checkbox"/> Daily <input checked="" type="checkbox"/> Hourly <input checked="" type="checkbox"/> 15 min | <input checked="" type="checkbox"/> Daily <input checked="" type="checkbox"/> Hourly <input checked="" type="checkbox"/> 15 min |

- **Collection of additional metadata:** One of the EPOS requirements was to collect additional metadata such as data license, embargo time, and nominal data submission. Each additional item was added in a separate user layout and can be assigned to several stations at one place.

- **DOMES number check:** Using a DOMES number is highly recommended in EPOS and it is required in for the EPN. To improve reliability, a new crosscheck of the inserted DOMES number with the IERS has been implemented.



| | | | | | | | | | | | | |
|---|-----------|-------------------------------|--------|-------|-------|------|---------------------|------------|------------------|------------|-----------|--|
| 6 | CAR100ITA | EPOS(P), EPN densification(I) | active | valid | Italy | INGV | (Not imported) INGV | 2018-02-15 | LEICA GRX1200PRO | LEIAT504GG | not valid | Error: Incorrect (or missing) DOMES number. According to the IERS, this station should have DOMES number 18752M001 |
|---|-----------|-------------------------------|--------|-------|-------|------|---------------------|------------|------------------|------------|-----------|--|

- **Site log upload:** In the previous version of M³G, a user could only import the site log for stations without a previous site log in M³G in order to avoid overwriting and losing valuable information. With this version, a new site log import tool becomes available. It checks the site log and replaces only that part of the database, which was changed.

| Public Central Contact | |
|------------------------|---|
| Team name | ROB |
| Team email | m3g@oma.be |
| Used in? | BRUS00BEL, BRUX00BEL, DENT00BEL, DOUR00BEL, WARE00BEL |

- **Central contact information:** The central contact can now be used as a primary/secondary contact for the station/network.

To support and maintain the operational version of the M³G, we developed a set of background processes to synchronise the system from/to other external data sources and improve the M³G reliability and usability.

- **Site log migration from EPN CB:** We migrated 99 EPN and EPN densification Operational Centers to M³G in the past year. The migration was a supervised semi-automatic process and now M³G is the official site log submission tool for EPN.
- **Exchange of metadata with other international GNSS networks:** To exchange the metadata with different international networks (e.g. EPOS, EPN), we developed a trigger-based method to ensure that every information update in M³G automatically flows to the different international networks. We also established a web-service to improve the system interoperability and functionality.
- **Maintenance tools for administrator:** In order to support and help the users, we developed collections of import/export/maintenance tools for the administrator.
- **Maintenance of the network-dependent rules:** A set of daily scheduled scripts ensure that the validation rules remain reliable and the databases up to date. M³G imports the list of IGS type mean calibrations, the list of available IGS antenna/receiver types and the list of valid DOMES number every day.
- **Documentation and guidelines:** We continue to extend the M³G documentation, guidelines and local help to improve the system usability for the user.