

Management and dissemination of GNSS site log metadata using the new GeodesyML standard

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EPN GNSS metadata management

Maintenance of Metadata

- Preserve data quality
- Correct analysis and interpretation of the GNSS data

In the EPN the metadata management is getting more complex:

- EPN network has grown considerably in number of stations (More than 300 stations)
- New Independent networks (EPN, EPN densification, or EPOS) with common stations and with different Network requirements
- Increased the necessity for interoperability with other network (like IGS)

Proposed Solution

- The geodetic community requires a standard which makes data and metadata:
 - discoverable and interoperable,
 - easily transferable via web services, and
 - based on internationally recognised data exchange methods.
- Australia and New Zealand created the Geodesy Markup Language (GeodesyML)
- GeodesyML describes how geodetic data and metadata can be defined and transferred in XML format
- *GeodesyML is an example of a GML Application schema that extends GML to meet the needs of a specific community of interest (e.g. Geodesy)*

Introduction:



Metadata Management and distribution system for
Multiple GNSS Networks

New requirements for the system

Should be able to:

- Handle the site log submission of a station to multiple networks in one place
- Handle the independent network requirements and validation process

- Handle Online Operational Center (OC) Form
- Handle the information common to several site logs once (Responsible agency)

- Handle Multiple site log updates within one day
- Separate the historical and current information during the update
 - Avoid changing historical information by accident
- Handle the individual exception rules for stations.

- Handle the new interoperability export/import format GeodesyML

GeodesyML – Pro/Cons

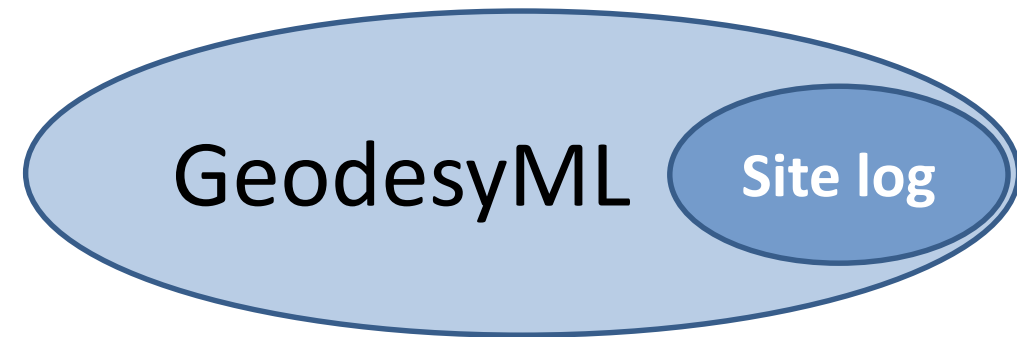
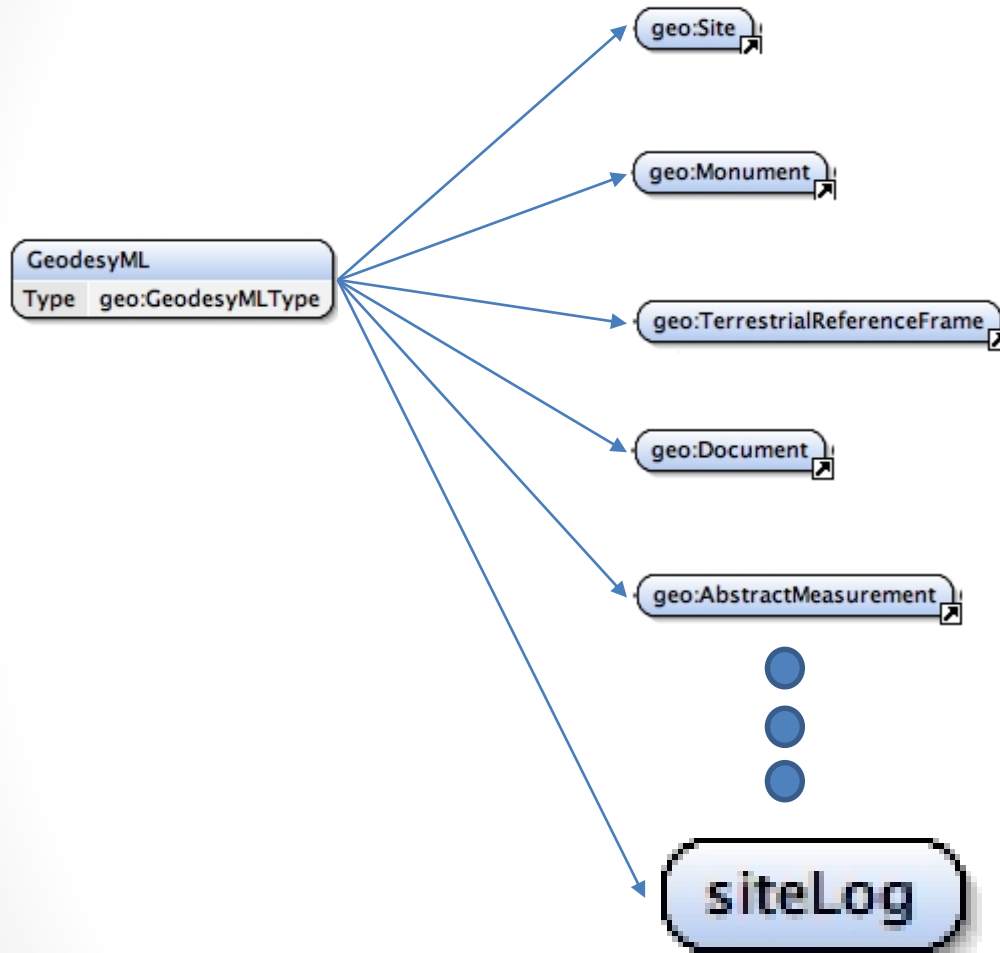
Pro of the GeodesyML:

- Lot of third party tools (xmlint, W3C online validator) to validate it
- Using the GeodesyML standard, the metadata will be interoperable and reliable
- More useable for a machine-to-machine update
 - interoperable with IGS

Cons of the GeodesyML:

- Hard to read for Human and for manual editing
- For the implementation, it requires more background information about the formal specifications and the other standards (GML)
- Still under development
- No one-to-one relation between site log and GeodesyML

GeodesyML – Site log relation



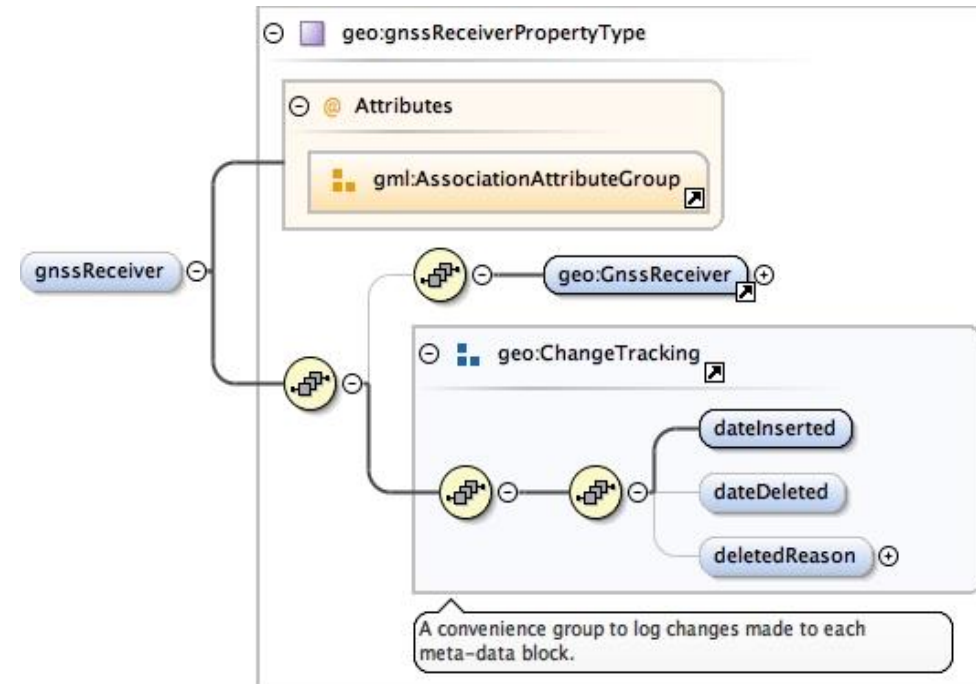
GeodesyML – Site log: Section Handling

IGS Site log

3.1 Receiver Type	: SEPT POLARX2
Satellite System	: GPS
Serial Number	: 1436
Firmware Version	: 2.6.2
Elevation Cutoff Setting	: 0 deg
Date Installed	: 2006-07-07
Date Removed	: 2008-02-14T09:00Z
Temperature Stabiliz.	: +/-0.1
Additional Information	: hardware replacement of receiver



GeodesyML



GeodesyML

- Contains id information for each sub-section
- Contains extra change tracking information:
 - Extra time stamps for the records (For example: database insert/delete time for the receivers)
 - To keep the sections trackable
 - No physical delete (Just inactivate)
 - No direct modification (Instead inactivate the section and copy the content to a new subsection)

GeodesyML – Site log: Agency Information

- Agency information handling (Site Owner, Site Contact, Site Metadata Custodian)
 - Site Owner: (Mandatory) Responsible agency for the site (Section 12. in the IGS site log)
 - Site contact: (Optional) Point of contact for the site. (Section 11. in the IGS site log)
 - Site metadata custodian: (Mandatory) The agency/person responsible for maintaining the site metadata (Not in the IGS Site log). In M3G It is coming from the Operational Center Form
- Plus additional Information in the GeodesyML Site log
 - site Datastreams
 - site DataSource
 - site DataCenter (Who can provide the site log on behalf of the Site Owner)

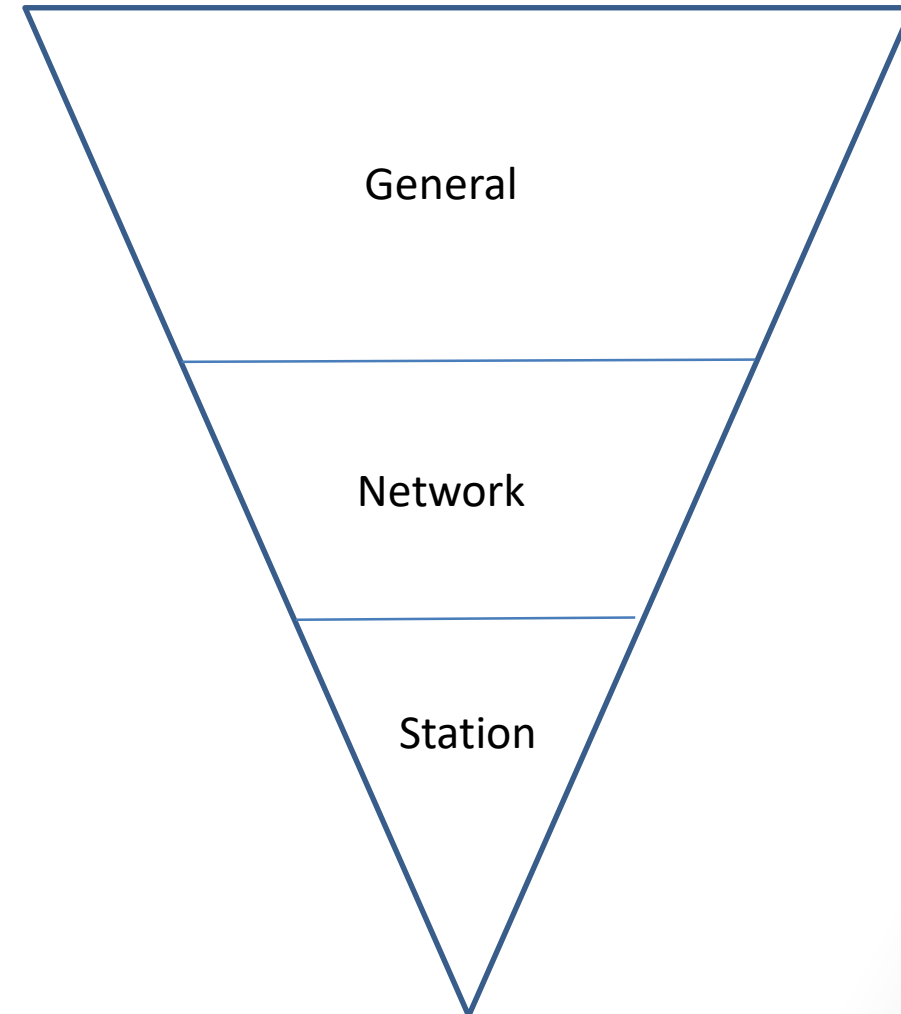
Relation between GeodesyML and the IGS Site log



- Consequently GeodesyML site log can contain more information than the IGS Site log
 - risk to lose station metadata during the GeodesyML to IGS Site log conversion

Hierarchical Rules for validating the site logs:

- General rules: same for all networks
 - e.g. antenna type known by IGS
- Network Rules: depend on the network
 - e. g. elevation cut-off required for EPN but not for EPOS
- Station-dependent rules: to handle exceptions
 - e.g. historical antenna which do not fulfill present requirements



Showing 1-9 of 9 items.

Full name	Abbreviation	Country	Network(s)	Stations
Direcao-Geral do	DGT	Portugal	EPOS	CASC00PRT, GAIA00PRT, LAGO00PRT

EPOS Guidelines (DRAFT)

Procedure for Including GNSS Stations in EPOS

Last Update: July 17, 2017

LOGIN PAGE

Login ID

Password

Remember Me

Reset Password

Login

Reset

Additional Information

Agency information in M3G

Last Update: Oct. 19, 2017

Home

OC overview

Guidelines

Application version

Login

 Home Stations overview Stations 1  Profile OC overview Guidelines Application version Logout

Operational Center Form

Identify:

- stations that fall under OC responsibility
- which OC has committed to maintain metadata

OC FORM : ROYAL OBSERVATORY OF BELGIUM(ROB)


Agency Information

Full name	Royal Observatory of Belgium
Abbreviation	ROB
Country	Belgium
Address	Avenue Circulaire 3 1180 Brussel
Registration	2017-10-20
Report note	

Stations

Operated Stations	Showing 1-1 of 1 item.		
	Station Name	EPOS	EPN
	BRUX00BEL	Proposed	Proposed

Third Party Stations	Station Name	EPOS	EPN
	No results found.		

 Modify

Contacts

Full name of the contact	Mr. Andras Fabian
E-Mail address	andras.fabian@oma.be
Primary Telephone number	
Secondary Telephone number	

Operational Center Form

Online Form

- Maintained by the site log manager
- No manual check by the EPN administrator
- Modify the responsible agency Information
- Modify the station list
- Propose stations to networks
- Extend the contact information



ROYAL
OBSERVATORY
OF BELGIUM

EUREF AC Workshop Brussels, Oct. 25-26, 2017



gnss-metadata.eu

Operational Center Form

Online Form

- Maintained by the site log manager
- No manual check by the EPN administrator
- **Modify the responsible agency Information**
- **Modify the station list**
- **Propose stations to networks**
- **Extend the contact information**

Full name *	?	Royal Observatory of Belgium
Department	?	
Abbreviation *	?	ROB
Country *	?	Belgium
Address *	?	3 Avenue Circulaire
		POB
		1180
		Brussel
Report note	?	

OWN STATIONS

BRUX00BEL



Proposed to EPOS

Proposed to EPN

Maintenance Metadata

Home

Stations overview

 Stations 1

Profile

OC overview

Guidelines

Application version

Logout

MY STATIONS Showing 1-1 of 1 item.

9 char ID	Metadata	Network	Update	Actions	Import	Export
BRUX						
BRUX00BEL	✘	EPN ,EPOS				

Maintenance Metadata

The screenshot shows a web application interface for maintaining metadata. At the top, there are four icons: an eye, a pencil, a document, and a printer. Below these is a form with a label "Prepared by (full name) *" and a dropdown menu containing the name "Bruyninx Carine". The main part of the interface is a list of 13 numbered items, each with a document icon on the left and a right-pointing arrow on the right. The items are: 1. UPDATE Site Identification of the GNSS Monument, 2. UPDATE Site Location Information, 3. UPDATE GNSS Receiver Information, 4. UPDATE GNSS Antenna Information, 5. UPDATE Surveyed Local Ties, 6. UPDATE Frequency Standard, 7. UPDATE Collocation Information, 8. UPDATE Meteorological Instrumentation, 9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position, 10. UPDATE Local Episodic Effects Possibly Affecting Data Quality, 11. UPDATE On-Site, Point of Contact Agency Information, 12. UPDATE Responsible Agency (if different from 11.), and 13. UPDATE More Information. At the bottom of the form, there are three buttons: "Reset" (with a circular arrow icon), "Save as draft" (with a download icon), and "Validate" (with a checkmark icon).

Prepared by (full name) *

- 1. UPDATE Site Identification of the GNSS Monument
- 2. UPDATE Site Location Information
- 3. UPDATE GNSS Receiver Information
- 4. UPDATE GNSS Antenna Information
- 5. UPDATE Surveyed Local Ties
- 6. UPDATE Frequency Standard
- 7. UPDATE Collocation Information
- 8. UPDATE Meteorological Instrumentation
- 9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position
- 10. UPDATE Local Episodic Effects Possibly Affecting Data Quality
- 11. UPDATE On-Site, Point of Contact Agency Information
- 12. UPDATE Responsible Agency (if different from 11.)
- 13. UPDATE More Information

* Required field.

Maintenance Metadata

👁️ ✎ 📄 🖨️

Prepared by (full name)* Bruyninx Carine

- 1. UPDATE Site Identification of the GNSS Monument
▶
- 2. UPDATE Site Location Information
▶
- 3. UPDATE GNSS Receiver Information
▼

🔍 Expand

3.11 Receiver Type : SEPT POLARX4TR
 Satellite System : GPS+GLO+GAL+BDS
 Serial Number : 3001376
 Firmware Version : 2.9.6
 Elevation Cutoff Setting : 0 deg
 Date Installed : 2017-01-03T12:15Z
 Date Removed : (CCYY-MM-DDThh:mmZ)
 Temperature Stabiliz. : 18.0 +/- 0.2
 Additional Information : (multiple lines)

+ Add

- 4. UPDATE GNSS Antenna Information
▶
- 5. UPDATE Surveyed Local Ties
▶
- 6. UPDATE Frequency Standard
▶
- 7. UPDATE Collocation Information
▶
- 8. UPDATE Meteorological Instrumentation
▶
- 9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position
▶
- 10. UPDATE Local Episodic Effects Possibly Affecting Data Quality
▶
- 11. UPDATE On-Site, Point of Contact Agency Information
▶

Maintenance Metadata

Prepared by (full name)* Bruyninx Carine

1. UPDATE Site Identification of the GNSS Monument
2. UPDATE Site Location Information
3. UPDATE GNSS Receiver Information
 - 3.1 Receiver Type : SEPT POLARX2
Satellite System : GPS
Serial Number : 1436
Firmware Version : 2.6.2
Elevation Cutoff Setting : 0 deg
Date Installed : 2006-07-07
Date Removed : 2008-02-14T09:00Z
Temperature Stabiliz. : (deg C) +/- 0.1
Additional Information : hardware replacement of receiver
: with SN 1128, same receiver, but
: different serial number (now 1436)
 - 3.2 Receiver Type : ASHTECH Z-XI13T
Satellite System : GPS
Serial Number : RT820015201
Firmware Version : 1.01-1D04
Elevation Cutoff Setting : 0 deg
Date Installed : 2008-02-15T08:00Z
Date Removed : 2010-06-28T13:55Z
Temperature Stabiliz. : (deg C) +/- 0.1
Additional Information : (multiple lines)
 - 3.3 Receiver Type : SEPT POLARX3ETR
Satellite System : GPS+GLO
Serial Number : 2001060
Firmware Version : 1.4.0
Elevation Cutoff Setting : 0 deg
Date Installed : 2010-06-28T13:55Z
Date Removed : 2012-01-31T13:00Z
- 3.11 Receiver Type : SEPT POLARX4TR
Satellite System : GPS+GLO+GAL+BDS
Serial Number : 3001376
Firmware Version : 2.9.6
Elevation Cutoff Setting : 0 deg
Date Installed : 2017-01-03T12:15Z
Date Removed : (CCYY-MM-DDThh:mmZ)
Temperature Stabiliz. : 18.0 +/- 0.2
Additional Information : (multiple lines)
4. UPDATE GNSS Antenna Information
5. UPDATE Surveyed Local Ties
6. UPDATE Frequency Standard
7. UPDATE Collocation Information
8. UPDATE Meteorological Instrumentation
9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position
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11. UPDATE On-Site, Point of Contact Agency Information

Maintenance Metadata

Prepared by (full name)* Bruyninx Carine

1. UPDATE Site Identification
2. UPDATE Site Location
3. UPDATE GNSS Receiver Information
 - 3.11 Receiver Type : SEPT POLAR
 - Satellite System : GPS+GLO+GAL
 - Serial Number : 3001376
 - Firmware Version : 2.9.6
 - Elevation Cutoff Setting : 0 deg
 - Date Installed : 2017-01-03
 - Date Removed : (CCYY-MM-DD)
 - Temperature Stabiliz. : 18.0 +/- 0
 - Additional Information : (multiple lines)
4. UPDATE GNSS Receiver Settings
5. UPDATE Site Coordinates
6. UPDATE Frequency
7. UPDATE Collocation Information
8. UPDATE Meteorological Instrumentation
9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position
10. UPDATE Local Episodic Effects Possibly Affecting Data Quality
11. UPDATE On-Site, Point of Contact Agency Information

+ Add

Copy

3.11 Remove Date T

3.12 Receiver Type

Satellite Systems GPS GLO GAL BDS QZSS SBAS

Serial Number*

Firmware Version*

Cutoff Settings* deg

Installation Date* T

Temperature Stabiliz. °C

Additional Information

Maintenance Metadata

Prepared by (full name)* Bruyninx Carine

1. UPDATE Site Identification
2. UPDATE Site Location
3. UPDATE GNSS Receiver Information
 - 3.11 Receiver Type : SEPT POLAR
 - Satellite System : GPS+GLO+GAL
 - Serial Number : 3001376
 - Firmware Version : 2.9.6
 - Elevation Cutoff Setting : 0 deg
 - Date Installed : 2017-01-03
 - Date Removed : (CCYY-MM-DD)
 - Temperature Stabiliz. : 18.0 +/- 0
 - Additional Information : (multiple lines)
4. UPDATE GNSS Receiver Settings
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7. UPDATE Collocation Information
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9. UPDATE Local Ongoing Conditions Possibly Affecting Computed Position
10. UPDATE Local Episodic Effects Possibly Affecting Data Quality
11. UPDATE On-Site, Point of Contact Agency Information

+ Add

Copy

3.11 Remove Date T

3.12 Receiver Type

Satellite Systems GPS GLO GAL BDS QZSS SBAS

Serial Number*

Firmware Version*

Cutoff Settings* deg

Installation Date* T

Temperature Stabiliz. °C

Additional Information

Maintenance Metadata

Prepared by (full name) *

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- 13. UPDATE More Information

* Required field.

Maintenance Metadata

Metadata validator message: In order to fix the inconsistencies check the following(s):

- GNSS Antenna Information

Prepared by (full name) *



Mr. Andras Fabian



1. Site Identification of the GNSS Monument



2. Site Location Information



3. GNSS Receiver Information



4. GNSS Antenna Information



5. Surveyed Local Ties



6. Frequency Standard



7. Collocation Information



8. Meteorological Instrumentation



9. Local Ongoing Conditions Possibly Affecting Computed Position



10. Local Episodic Effects Possibly Affecting Data Quality



11-12. Site point of Contact



13. More Information



Reset

Save as draft

Validate

Maintenance Metadata

Metadata validator message: In order to fix the inconsistencies check the following(s):

- GNSS Antenna Information

Prepared by (full name) *

Mr. Andras Fabian

1. Site Identification of the GNSS Monument

2. Site Location Information

3. GNSS Receiver Information

4. GNSS Antenna Information

5. Surveyed Local Ties

6. Frequency Standard

7. Collocation Information

8. Meteorological Instrumentation

9. Local Ongoing Conditions Possibly Affecting Computed Position

10. Local Episodic Effects Possibly Affecting Data Quality

11-12. Site point of Contact

13. More Information

Reset

Save as draft

Validate

4.8

Antenna *

JAVRINGANT_DM

Serial Number *

Serial Number cannot be blank.

Antenna Reference Point *

BPA: bottom of preamplifier

Marker->ARP Up Ecc. (m) *

0.4689

m

Marker->ARP North Ecc(m) *

0.0010

m

Marker->ARP East Ecc(m) *

0.0000

m

Alignment *

0

deg

Antenna Radome Type *

NONE

Radome Serial Number

Filling Radome Serial Number is recommended.

Antenna Cable Type

ANDREW heliax LDF2-50A

Maintenance Metadata

Metadata validator message: In order to fix the inconsistencies check the following(s):

- GNSS Antenna Information

Prepared by (full name) *

Mr. Andras Fabian

1. Site Identification of the GNSS Monument

2. Site Location Information

3. GNSS Receiver Information

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10. Local Episodic Effects Possibly Affecting Data Quality

11-12. Site point of Contact

13. More Information

Reset

Save as draft

Validate

4.8

Antenna *

JAVRINGANT_DM

Serial Number *

Serial Number cannot be blank.

Antenna Reference Point *

BPA: bottom of preamplifier

Marker->ARP Up Ecc. (m) *

0.4689

m

Marker->ARP North Ecc(m) *

0.0010

m

Marker->ARP East Ecc(m) *

0.0000

m

Alignment *

0

deg

Antenna Radome Type *

NONE

Radome Serial Number

Filling Radome Serial Number is recommended.

Antenna Cable Type

ANDREW heliax LDF2-50A



Metadata validator message: Your site log is valid although it hasn't been saved. Check your changes and click on the save at the bottom of the page to accept it.

BRUX Site Information Form (site log)
 International GNSS Service
 See Instructions at:
 ftp://igsb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0. Form

Prepared by (full name) : Mr. Andras Fabian
 Date Prepared : 2017-10-22
 Report Type : NEK
 If Update:
 Previous Site Log : (ssss_ccyyymmdd.log)

•
•
•

Height of the Monument : 8 m
 Antenna Graphics with Dimensions

JAVRINGANT_DM

ARP: Antenna Reference Point
 L1 : L1 Phase Center L2 : L2 Phase Center
 TCR: Top of Chokingering BCR: Bottom of Chokingering
 BPA: Bottom of Preamplifier

All dimensions are in meters.

Reset Edit Save as draft Save

* Required field.

M³G V0.2 is released

- We released the V02 version of the M3G
 - <https://gnss-metadata.eu>
 - It is ready to use for the EPOS users
 - **Demo version for the EUREF user**
- **MAIN FEATURES**
 - In Online OC Form:
 - Maintenance the contact list
 - Propose station to a network
 - Station and OC overview
 - Upload an IGS site log to the database
 - Update the site log direct from/to the database
 - Export the GeodesyML 0.4 export format
 - Export IGS Site log format

M³G
<https://gnss-metadata.eu>

Thank you for your attention

Contact:

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epncb@oma.be

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B-1180 Brussels

BELGIUM

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M³G

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