PROCEDURE FOR INCLUDING GNSS STATIONS IN EPOS

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Available from the M³G-Bureau at https://gnss-metadata.eu/site/guidelines/
Questions and comments are welcome at C.Bruyninx@oma.be.

Updates:

September 26, 2023: Added reference to EPOS data policy
March 7, 2023:
− Harmonization with terminology used in new M³G release
− Introduction of "Station Metadata Maintainer (MM)"
− Removal of "Operational Centre (OC)"
− Update of URLs
May 6, 2021: Align with revisited handling of EPOS metadata in M³G
March 23, 2021: Correction of obsolete external links
January 6, 2021: Restructuring of procedure to better reflect practice
August 5, 2020: Corrected links and added clarifications based on user feedback
January 15, 2020: Process of selecting a data node clarified
March 27, 2019: Refinement
Feb. 19, 2019: Revision of "Data Supplier/OC" terminology
Feb. 2, 2018: Revision of "Data Centre/Node" and "Agency" terminology
Jan. 10, 2018: Revision to reflect higher maturity of M³G system
July 17, 2017:
− Added M³G-bureau information in the Supplier Letter
− Relation Operational Centre – Data Supplier clarified
January 13, 2017: Initial version discussed at TCS-ICS Integration Workshop (02/2017)

Intended for:
This document describes the procedure to be followed by the **Station Owners** wishing to integrate GNSS stations in EPOS**.**

Terminology

Data Supplier or Responsible Agency or Station Owner: The EPOS-GNSS Data Supplier is the agency owning the GNSS station and having the legal rights to distribute the data of the GNSS station. The Data Supplier signs the **EPOS-GNSS Data Supplier Letter**. The Data Supplier is responsible to ensure regular uploading of the RINEX data of its station to EPOS and keeping the station metadata in M³G up to date. It is possible that the Data Supplier delegates the maintenance of the GNSS station metadata to another agency, which is the Station Metadata Maintainer.

Station Metadata Maintainer (MM): The agency that keeps **the GNSS station metadata** (e.g. site log) up to date within M³G. The Data Supplier indicates the name of the agency acting as Metadata Maintainer in Annex B of its EPOS-GNSS Data Supplier Letter. In most cases, the Data Supplier itself acts as Metadata Maintainer. However, it is also possible that the Data Supplier delegates the maintenance of the station metadata to another agency.

M³G-Bureau: Collects the EPOS-GNSS Data Supplier Letters and helps station owners to select the most appropriate EPOS data node. The M³G-Bureau maintains the M³G portal (https://gnss-metadata.eu) where GNSS station metadata must be submitted. It validates these metadata, provides them to the EPOS-GNSS Data Gateway and it also collects information on the agencies involved in operating EPOS-GNSS stations.

For more information, see the EPOS-specific glossary at https://gnss-metadata.eu/site/glossary?page=epos

*Unless otherwise specified, all emails should be sent to m3g@oma.be (M³G: **M**etadata **M**anagement and distribution system for **M**ultiple **G**NSS networks, https://gnss-metadata.eu).*

Before starting the procedure explained below, contact the M³G-Bureau at m3g@oma.be to inform them that your agency would like to include GNSS stations in EPOS. The bureau can then assist you through each step of this procedure.

Procedure

1. **GNSS Station Requirements**

   Make sure the GNSS station complies with the *Requirements for Permanent Stations* in Section 2 of the document "*Guidelines for EPOS-GNSS Stations, Data Suppliers, and Station Metadata Maintainer*", available from https://gnss-metadata.eu/Guidelines/EPOS-GNSS_Guidelines_Station_DataSupplier_Metadata_Maintainer.pdf.

   As a basic principle, EPOS has an **open data policy** (see https://gnss-metadata.eu/Guidelines/EPOS-Data_Policy.pdf). EPOS requires that the daily RINEX data of the station are made freely available and that its site log is kept up to date.

   EPOS is interested to integrate
   - permanently tracking GNSS stations that are presently active

   or
   - permanent GNSS stations that are not tracking at this moment, but for which minimally 3 years of data over the full station history can be made available to EPOS. These stations can already be decommissioned.

   Note that the GNSS equipment (receiver, antenna) must be known to the International GNSS Service (IGS)! If it is not, contact m3g@oma.be.

2. **Responsibilities of the agency proposing to include GNSS stations in EPOS**

   Make sure your agency is the station owner, having the legal rights to distribute the data of the GNSS station, and allowed to sign the **EPOS-GNSS Data Supplier Letter**, available from https://gnss-metadata.eu/Guidelines/EPOS-GNSS_Supplier_Letter.docx.

   The responsibilities of the Data Supplier are outlined in Section 3.1 of the "*Guidelines for EPOS-GNSS Stations, Data Suppliers, and Station Metadata Maintainers*".

   Make sure your agency, or another agency, is capable of fulfilling the responsibilities of the Station Metadata Maintainer as outlined in Section 3.2 "*Guidelines for EPOS-GNSS Stations, Data Suppliers, and Station Metadata Maintainers*".

3. **Station List**

   Prepare the list of the GNSS stations that your agency wishes to include in EPOS. Use the RINEX 3 9-char identification code(s) consisting of a 4-char station ID, followed by "00" and the 3-char ISO country code. The 9-char code will be used for all future reference to your stations (data and documentation) and will uniquely identify each station.

   To prevent duplication, do not use 4-char station IDs already in use at
   - ftp://igs-rf.ign.fr/pub/DOMES/codomes.snx
   - https://gnss-metadata.eu/site/stations

   OPTIONAL, but recommended:
   request a DOMES number for your station marker from the International Earth Rotation and Reference Systems Service (IERS): *https://itrf.ign.fr/en/network/domes/request.*

4. Data Availability and Access Restrictions

Identify if there are any **data access restrictions** and inform the M³G-Bureau about these restrictions.
For example:

- The station data can only be available from a specific EPOS data node, and other data nodes are not permitted to distribute the data. The list of EPOS-GNSS Data Nodes is available from https://gnss-metadata.eu/site/distributor.
- The station data become available after a well-defined embargo period.
- The station data can only be made available under a specific data license.

Decide, **in consultation with the M³G-Bureau**, the most appropriate way of making your station data available to EPOS.
This can be done through one of the following options:

a) Keep your GNSS observation files in your local repository and operate your own EPOS Data Node. Consult the document "Guidelines for Setting Up and Operating an EPOS-GNSS Data Node", available from https://gnss-metadata.eu/Guidelines/EPOS-GNSS_GLASS_Node_Guidelines.pdf for more details.
b) Keep your GNSS observation files in your local repository and agree with another agency operating an EPOS Data Node to make your observation files discoverable to EPOS.
c) Send your GNSS observation files to a European community data repository associated with an EPOS Data Node, see https://gnss-metadata.eu/site/distributor.

5. EPOS-GNSS Data Supplier Letter

If your agency has not yet provided an *EPOS-GNSS Data Supplier Letter*, see 5.1.
If your agency has already provided an EPOS-GNSS Data Supplier Letter, see 5.2.

5.1 Download the EPOS-GNSS Data Supplier Letter (from https://gnss-metadata.eu/Guidelines/EPOS-GNSS_Supplier_Letter.docx) and complete it, including Annex A, B, and C.
Include

a) in the first page: a list of the co-owned stations,
b) in Annex A: a list of all the stations,
c) in Annex B: for each station, the agency that will maintain the station metadata in M³G
d) (Station Metadata Maintainer column),
e) in Annex C: the EPOS Data Nodes that are allowed to redistribute your data.
  i. If the distribution of the station data is not restricted to one (or more) specific EPOS data nodes, then leave this table empty.
  ii. If the node restriction depends on the station (e.g. EPN or non-EPN stations), then use multiple lines and explain the restrictions for the different sets of stations.

Do not forget to fill in the date on all Annexes!

Before signing the Data Supplier Letter, send it to m3g@oma.be and wait for feedback.
Once the letter is approved by the M³G-Bureau, sign it.
Email the signed document to the M³G-Bureau (m3g@oma.be) and, if the signature is not digital, also send the original to:

Carine Bruyninx
Royal Observatory of Belgium
Av. Circulaire 3
1180 Brussels
BELGIUM

5.2 If your agency is already an EPOS-GNSS data supplier and has provided an EPOS-GNSS Data Supplier Letter, then it is not necessary to send an updated EPOS-GNSS Data Supplier Letter. It is sufficient that you send an email to m3g@oma.be indicating:
  a) the list of GNSS stations to be proposed to EPOS,
  b) the agency acting as Station Metadata Maintainer,
  c) the EPOS node through which the station data can be distributed.

6. **Insertion of GNSS station metadata in M³G**

Upon reception of the EPOS-GNSS Data Supplier Letter (or the email mentioned in 5.2 in the case of additional stations), the M³G-Bureau will
  – create (if not already existing) an account on M³G for the Station Metadata Maintainer(s) indicated in Annex B of the EPOS-GNSS Data Supplier Letter.
  – set up the Data Owner as EPOS-GNSS data provider in M³G.
  – assign in M³G to each station at least one EPOS-GNSS data node (using input from section 4.)
  – inform the contact person of the Station Metadata Maintainer(s) indicated in the EPOS-GNSS Data Supplier Letter that he/she can start inserting metadata in M³G.

After this, the Station Metadata Maintainer must login into M³G http://gnss-metadata.eu/site/login and, in the user dropdown menu under AGENCIES METADATA, click on the following items:
  a) "Edit My Agency Information": verify/update its **Agency Information**
  b) "Edit Third-Party Agencies Information": verify and add **Third-party Agencies** (if any).
  c) "Edit all Metadata":
     – upload, validate and submit the **station site log**. Make sure that the Data Supplier is correctly indicated in *Section 12 Responsible Agency* of the site log and that it is exactly the same agency as the agency that has signed the EPOS Data Supplier Letter.
     – Indicate the Creative Commons license to be used to distribute the data of each station and make sure it is in-line with the EPOS data policy (https://gnss-metadata.eu/Guidelines/EPOS-Data_Policy.pdf). If no data license is not provided, M³G will use CC-BY 4.0 by default, as indicated in the template of the EPOS-GNSS Data Supplier Letter.
     – Indicate the embargo period on the data.

Contact m3g@oma.be in case of questions.

*Once the information above has been correctly entered in M³G, **M³G will automatically propose the station(s) to EPOS** and send the station metadata to the EPOS-GNSS Data Gateway (http://gnssdata-epos.oca.eu).*

7. **Data Provision**

You can now start providing daily RINEX 2 or RINEX 3 (preferred) data to the selected EPOS data node(s) and monitor the data discoverability from the EPOS nodes and EPOS-GNSS Data Gateway through https://gnssquality-epos.oma.be/.

The M³G-Bureau will switch the status of the station from "Proposed to EPOS" to "Included in EPOS" as soon as a relevant number of RINEX data becomes discoverable at the EPOS-GNSS Data Gateway:

  – *For active stations (which have a receiver and antenna installed): minimally 4 weeks of recent RINEX data must be discoverable, taking into account embargo times indicated in M³G. Exceptions are allowed for stations at remote locations unable to submit regular data.*

- *For inactive stations (which have temporarily no receiver or antenna installed), decommissioned stations (which will never track again), or stations temporarily unable to submit data: Minimally 3 years of RINEX data over the full station history must be discoverable.*