



IAG Reference Frame Sub Commission for Europe



## MEMORANDUM OF UNDERSTANDING

between

**A: EUREF, the IAG Reference Frame Sub Commission for Europe**

and

**B: EUPOS, the European Position Determination System**

### 1. Parties

**A: EUREF** ([www.euref.eu](http://www.euref.eu)) is the Reference Frame Sub-commission for Europe of the International Association of Geodesy (IAG), responsible for the definition, realization and maintenance of the European Reference Systems (ETRS89 and EVRS2007), to be used Europe-wide in all scientific and practical activities related to precise geo-referencing and navigation, Earth sciences research and multidisciplinary applications.

**B: EUPOS** ([www.eupos.org](http://www.eupos.org)) is an international organization of European public institutions related to the development and maintenance of real-time GNSS services. The contributing national GNSS networks are providing correction data for real-time positioning and navigation, and observation data for geodetic post-processing, fulfilling all positioning requirements. EUPOS acts to elaborate real-time positioning standards, to homogenize the national positioning services to support seamless cross-border applications. EUPOS also acts for the GNSS service providers in international bodies to represent their needs and proposals.

### 2. Background

EUREF maintains the EUREF Permanent Network (EPN), which is the key infrastructure for the collection, archiving, processing and analysis of GNSS data stemming from a network exceeding 250 stations homogeneously covering the European continent. EPN can be considered as the regional densification of the global IGS (International GNSS Service) network and the ITRS (International Terrestrial Reference System) realizations. The EPN-related services (EPN Data Centers, Central Bureau, Local Analysis Centers, Product Coordinators) and products (troposphere parameters, positions and velocities) are providing the backbone of the European Terrestrial Reference Frame, ETRS89. EUREF has also elaborated standards for the realization and maintenance of regional and national reference networks and their connection to ETRS89. EUREF products and services are widely used as reference by positioning and Earth science communities.

EUREF closely cooperates with universities and National Mapping and Cadastral Agencies (NMCA's). Those support EUREF with voluntary contributions on the best effort basis therefore EUREF provides its services and products for free.

The main field of activity of EUREF/EPN is related to the post-processing GNSS applications, but based on selected EPN sites, where real-time data streams are made available, real-time ETRS89 orbit product and value-added real-time streams are also provided.

The most important task of EUPOS is to support the realization and maintenance of precise national positioning services based on dense national active GNSS networks. EUPOS members had elaborated commonly defined standards, which then offered for implementation in the national positioning services. Those standards are necessary to maintain homogeneous high quality services and seamless cross-border applications. EUPOS promotes those standards to countries, where the establishment of GNSS production networks is planned or it is on the way. Another important task of EUPOS is to represent the members in international bodies and also act for the common interests in international bodies such as RTCM or ICG. The current EUPOS members come mainly from Central and Eastern Europe, but EUPOS has connections to Central Asian countries as well. However EUPOS willing to attract more European members and willing to establish a common discussion forum for all GNSS service providers.

EUREF and EUPOS are two relevant European players in the fields of positioning and georeferencing with activities, infrastructures, services and elaborated standards, which are well complementing each other. EUREF will benefit from the real-time positioning services experience of EUPOS to improve certain EUREF products, and EUPOS will benefit from EUREF experience in definition and implementation of reference frames and scientific results.

Beyond the real-time-related topics an important common activity is the densification of the EPN using the products of the national dense active GNSS networks. The EUPOS Combination Center (ECC) activities, with the support of EUREF are now extended to all Europe and the two organizations have a common contribution to the IAG WG on Unified Dense Velocity Fields.

### 3. Objectives

The main purpose of this Memorandum of Understanding is to initiate and facilitate the formal environment for discussions between EUREF and EUPOS for the benefit of both partners. Both parties, EUREF and EUPOS agree that this general undertaking would be accomplished by:

- clear identification and definition of tasks, fields of common interest, following the descriptions in the section 2. Background,
- mutual information about on-going and planned activities in the respective area of interest of each party,
- design of an interface between the EPN (EUREF Permanent Network) and the positioning services/networks of EUPOS members,
- close cooperation to realize a European Velocity Model for practical and scientific applications,
- working towards common standards and guidelines,
- common operation of a Knowledge Exchange Network in the context of EuroGeographics together preparations for the cooperation with 3rd parties as CLGE

(Council of European Geodetic Surveyors) and EuroGeographics that prove expertise and interest on European level in GNSS positioning,

- cooperation in European and other international activities, such as EPOS, UN-GGIM Europe EUMETNET, as well as elaborating common position and mutual support towards other international bodies, such as ICG or RTCM.

#### 4. Responsibilities

The responsibilities of the parties are as follows:

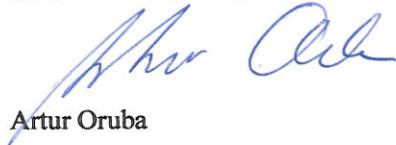
- The cooperation between EUREF and EUPOS will be managed on an operational level, with regular contacts between the representatives of the partners.
- EUREF and EUPOS will invite representatives into their governing bodies (EUREF Technical Working Group and EUPOS International Steering Committee) from the partner organization, who has equal rights as other members.
- EUREF and EUPOS will together inform the partner organization, through their representatives in the governing bodies, about any possibilities of mutual involvement in issues related to the fields of interest of the partner.
- EUREF and EUPOS will together work to establish and operate a EuroGeographics Knowledge Exchange Network focused on GNSS positioning.

#### 5. Amendments

This Memorandum of Understanding may be revised or canceled by initiative of any of the parties by a written agreement.

Date: 3-06-2014

Place: Vilnius



Artur Oruba

Vice-chairman of the  
EUPOS® International Steering Committee

Date: 03/06/2014

Place: Vilnius



Johannes Ihde

Chairman of EUREF

