



# EUREF – Reference Frame Sub-Commission for Europe of IAG

## Terms of Reference

### 1. Preamble

Recognizing the potential of space-based geodetic techniques, in particular the GNSS, for the establishment and maintenance of global and continental geodetic reference frames, and the need of modern and precise continental reference frames in Europe, the International Association of Geodesy (IAG) constituted the EUREF Sub-Commission at the International Union of Geodesy and Geophysics (IUGG) General Assembly held in Vancouver, 1987, under the umbrella of Commission X – Global and Regional Geodetic Networks of Section 1 – Positioning. EUREF continues the work of the former RETrig<sup>1</sup> and REUN<sup>2</sup> Sub-Commissions created by the IAG in the middle of the 20<sup>th</sup> century, responsible for the maintenance of the European Datum (ED), based on terrestrial techniques, and for the adjustment of the European levelling networks, respectively.

The reference frame established and maintained by EUREF should be the geodetic infrastructure for European needs requiring precise geo-referencing (e.g. three-dimensional and time dependent positioning, geodynamics, precise navigation, geo-information and other geo-sciences). Moreover, EUREF should cooperate closely with EuroGeographics (the merger of the previous CERCO<sup>3</sup> and MEGRIN<sup>4</sup>), the organisation of the European NMCAs<sup>5</sup>, in particular PosKEN<sup>6</sup>, EUPOS<sup>7</sup>, UN-GGIM<sup>8</sup> and UN-GGIM:Europe, EPOS<sup>9</sup> and other relevant bodies.

### 2. Mission

EUREF's primary mission is to establish and maintain the European coordinate reference system and physical height reference system. The adopted systems are ETRS89 (European Terrestrial Reference System) and EVRS (European Vertical Reference System). These systems are the basis for geo-referencing in Europe, and have been endorsed by the European Union INSPIRE<sup>10</sup> directive, Eurocontrol and EuroGeographics.

ETRS89 provides geocentric, three-dimensional positions in a unique homogeneous reference system for the whole Europe, while EVRS does the same for the physical height. ETRS89 is ideally suited, and commonly used, as the backbone for modern mapping and Earth Science applications in Europe.

A key instrument in maintaining ETRS89 is the EUREF Permanent Network (EPN), covering the European continent with numerous well-distributed GNSS sites. The stations that form the EPN track continuously the state-of-the-art satellite navigation and augmentation systems with high accuracy GNSS receivers, operating under well-defined standards and guidelines that guarantee the efficiency of the EPN and the long-term quality of its products.

The EPN constitutes the European contribution to, and densification of, the International GNSS Service (IGS), and contributes also to the realization of the International Terrestrial Reference System (ITRS), to the monitoring of tectonic deformations in Europe, to long-term climate monitoring and to the development of the standards and the operational means to disseminate GNSS data in real-time over the Internet.

As a result of the implementation of the new IAG structure at the IUGG General Assembly held in Sapporo, 2003, EUREF was integrated in the Sub-Commission 1.3, Regional Reference Frames, under Commission 1 – Reference Frames, with the designation “Sub-Commission 1.3a, Reference Frame Sub-Commission for Europe”.

Within the Digital Agenda for Europe, EUREF supports the Open Data Policy and makes the geo-information data related to its mission freely available for use and re-use, via a dedicated portal [www.euref.eu](http://www.euref.eu).

### 3. Goals and Objectives

The long-term objective of EUREF is the definition, realization and maintenance of the European Reference Systems, in close cooperation with the pertinent IAG components (Services, Commissions, and Inter-Commission projects) as well as EuroGeographics. EUREF must provide the best possible unique and homogeneous reference system and respective realization, to be used Europe-wide in all scientific and practical activities related to precise geo-referencing and navigation, Earth Sciences research and multidisciplinary applications. For that, EUREF will make use of the most accurate and reliable terrestrial and space-

<sup>1</sup> Réseau Européen Trigonométrique

<sup>2</sup> Réseau Européen Unifié de Nivellement

<sup>3</sup> Comité Européen des Responsables de la Cartographie Officielle

<sup>4</sup> Multipurpose European Ground Related Information Network

<sup>5</sup> National Mapping and Cadastre Agencies

<sup>6</sup> Positioning Knowledge Exchange Network

<sup>7</sup> European Positioning Service

<sup>8</sup> United Nations Initiative on Global Geospatial Information Management

<sup>9</sup> European Plate Observing System

<sup>10</sup> Infrastructure for Spatial Information in the European Community

borne techniques available, and develop the necessary scientific background and methodology for the combination of heterogeneous measurements.

The activities to be carried out to accomplish these objectives must result in a set of high quality products and services. For this, EUREF must focus on a continuous innovation and on the changing user needs, as well as on the maintenance of an active network of people and organizations, development of knowledge and its dissemination.

Besides IAG components and EuroGeographics, EUREF activities are developed in cooperation with all the individuals and organizations interested in its work, devoted to its objectives, and willing to cooperate on an open, collegial and voluntary basis, based on the ethical principles that rule the international scientific cooperation.

Based on the established long-term objective, the activities and tasks are the following:

- In cooperation with IGS develop the EPN for the maintenance of the European Terrestrial Reference Frame, as a contribution to the International Terrestrial Reference Frame (ITRF) and as infrastructure to support relevant European projects, initiatives and services related to GALILEO or EPOS;
- Elaborate and implement actions and projects for the long-term maintenance and development of the ETRS89 and the EVRS, as well as for the improvement of the coherence between both systems, in close cooperation with other IAG components and partners in Europe;
- Improve the realization and usability of the EVRS by extending and supporting the Unified European Levelling Network (UEN) in all European countries and support usage of gravity based physical heights by promoting precise geoid models and related gravity data dissemination within Europe;
- Contribute to the IAG Global Geodetic Observing System (GGOS) using the installed infrastructures managed by the EUREF members and support UN-GGIM sub-committee on Geodesy and UN GGIM:Europe expert group on Geodetic Reference Frame in implementing the UN General Assembly 2015 resolution on the Global Geodetic Reference Frame for Sustainable Development<sup>11</sup>;
- Promote the adoption of the reference systems defined by EUREF in the European countries and European-wide organizations involved in geo-referencing activities;

- Organize annual symposia addressing activities carried out at national and European-wide level related with the global work and objectives of EUREF;
- Organize a Governing Board (GB, former Technical Working Group – TWG) for preparing and coordinating strategic and conceptual questions as well as technical and scientific activities.

#### **4. Membership**

The members of the EUREF Sub-Commission are all the European countries contributing to its mission and objectives, taking into consideration that a full continental commitment is needed for the establishment and maintenance of the European Reference Systems. As a component of the IAG, EUREF follows also the IAG/IUGG membership rules.

The EUREF member countries have the right to nominate two official representatives in the EUREF Sub-Commission. The nomination is done by the National Committee of the IAG/IUGG member countries, and by the National Mapping Authority of other countries. Countries are urged to keep the balance between the research organizations and the institution responsible for the national geodetic reference frames.

Tasks of the National Representatives are to organize the annual national reports for EUREF, to be the national contact points from EUREF to the nations, and they have the right to vote in such cases – declared by the EUREF Chair – when the voting is restricted to the representatives. EUREF maintains on its web page a list of the National representatives.

The EUREF Chair, Secretary and the members of the GB proceed from a EUREF member country.

#### **5. Plenary**

The EUREF Symposium is an open forum, and may be attended by any person interested in the work of the Sub-Commission. It is the main forum for user interaction and should take place once a year.

All the persons who attend a EUREF Symposium constitute the Plenary.

The Plenary approves the GB proposal for EUREF Chair, elects GB members on the proposals presented by the GB, approves the constitution of Working Groups on the proposals presented by the GB, and decides on the adoption of scientific and technical methodologies and, in general, on the relevant issues for the maintenance and development of EUREF work. These decisions must be always preceded by a consultancy with the GB Chair.

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<sup>11</sup> A/RES/69/266, adopted on 26 February 2015

The decisions of the Plenary are reflected in the resolutions, approved by the simple majority of its attendees.

All the Plenary attendees have the right to approve, elect and vote. Exceptionally, in case that a resolution is considered to affect the IAG statutes and by-laws or in other special cases, the EUREF Chair may decide that the vote be restricted to one vote per country, casted by the official representatives of each country, or, if not present, substitutes nominated by them with a written note to the Chair. This decision must be preceded by a consultancy with the GB Chair.

## **6. Chair and Secretary of EUREF**

The Chair represents EUREF officially. The main tasks are the overall coordination and management, the coordination and presidency of the annual Symposia, the creation of the conditions for the achievement of EUREF objectives and other duties defined by the GB.

The Chair of EUREF is appointed by the President of IAG Commission 1, under GB proposal, which must be approved by a Plenary's resolution. The term is 4 years, which can be renewed once.

The Secretary is in charge of the preparation and organization of the Symposia and GB meetings in cooperation with the respective local organizing committees, as well as the publication of the Symposia's contributions and the Minutes of the GB meetings. Other tasks are to disseminate the information, to maintain a list of members and contacts, to provide the relevant information to the web portal and to assist the EUREF chair and the GB chair.

The Secretary of EUREF is appointed by the EUREF Chair. The term is 4 years, and may be renewed.

## **7. Governing Board (GB)**

The GB is responsible for the definition of the standards, methodologies and policy used to maintain the mission, and has the following specific tasks:

- to coordinate and develop the EPN (EUREF Permanent Network);
- to coordinate the actions for the realization of a European Height System and the integration of the geo-spatial and vertical components of the European Reference Frame;
- to identify the relevant actions for the continuation and development of EUREF, with respect to innovation and the changing user needs;
- to evaluate and classify results of GNSS campaigns presented to the GB for acceptance

as EUREF densification or national realization of the ETRS89;

- to set up working groups to run dedicated projects or to work on specific matters;
- to prepare the recommendations for the EUREF plenary.

The GB meets at least twice a year, and preferably 3 times a year. In the case of an urgent need, a video meeting or an e-mail voting can be organized.

The GB is constituted by members elected by the plenary, ex-officio members, members in charge of specific tasks (e.g. Coordinators, Working Group chairs, Head of the EPN Central Bureau (EPN CB)), and honorary members.

Prior to the engagement in the GB, each member has to declare his willingness to contribute and participate to the tasks of the GB at least for his intended term, ideally through a supporting letter of the agency or institution the member belongs to.

The GB Chair, elected among and by its members, coordinates the GB. The term is 4 years, in a maximum of 2 terms.

The number of members elected by the plenary is defined by the GB Chair and must be in agreement with the tasks committed to the GB. The recommended term is 4 years, in a maximum of 2 terms.

The ex-officio members are the EUREF Chair and Secretary.

The Head of the EPN CB oversees the activities of the EPN CB and is in charge of the preparation and organization of the EPN. The term is four years, and may be renewed by the GB.

Former EUREF Chairpersons, Secretaries and GB Chairpersons receive the status of Honorary Members. While participating to the GB meetings, Honorary Members have voting rights. In case former EUREF chairpersons, secretaries of GB chairpersons have been taking over a function which causes another kind of membership in the GB, the status of honorary member remains dormant.

The GB Chair appoints the members in charge of specific tasks (e.g. coordinators, working group chairs), in agreement with the tasks committed to the GB and after consultation in the GB. The recommended term is 4 years and can be renewed. If the term for a member in charge of a specific task is closed, the GB membership is terminated.

The GB Chair may invite guests to attend the meetings, to assist in the discussion of specific subjects or to present relevant items for EUREF. The guests have no voting rights.

A Working Group (WG) is established within the GB and approved in a Plenary's resolution. The GB

Chair proposes the leadership of the WG. The chair of a WG will be a member of the GB. The GB reviews the progress and decides on the continuation of a WG. The GB chair is ex-officio member of a WG.

The GB chair, the members elected by the plenary, the members in charge of specific tasks and the ex-officio members have the right to vote.

Only GB members physically available at the GB meeting have the right to vote. The voting is carried out by simple majority voting. A GB voting is valid if more than half the GB members are present at a meeting.

Upon request, a voting can be carried out as secret ballot.

Upon request, a voting can be extended to not physically available GB members, i.e. via a video connection or phone. In general, voting should be announced one month prior to the meeting to the GB members. In case where an urgent decision is needed between the physical meetings of the GB, an e-mail voting can be arranged. Practical organization of the e-mail voting will be done by the secretary.

In case of a tie, the GB chair has one additional vote.

## **8. Revision**

The Terms of Reference may be reviewed whenever considered necessary, under proposal of the EUREF Chair or the GB. The proposal must be approved by the Plenary.