
EUREF SYMPOSIUM 2015 – PROGRAMME

OPENING SESSION

Session-Chair: Johannes Ihde

The Opening Session comprises opening speeches and welcome addresses by local, regional and international representatives. It is completed by the invited talk given by Carine Bruyninx et al. about the activities of the EUREF Technical Working Group in the last twelve months.

SESSION 1 - SYSTEMS: ETRS89, EVRS

Session-Chairs: Zuheir Altamimi, Markku Poutanen

EUREF designed and established the European Geodetic Reference Systems. The European Terrestrial Reference System 89 (ETRS89) has a continent-wide significance. It is based on the International Terrestrial Reference System (ITRS), but tied to the stable part of Europe, so that the relationship between the two systems is entirely defined by a similarity transformation formula. ETRS89 unifies national reference systems for surveying, mapping, GIS and navigation in Europe. The benefit of ETRS89 is well demonstrated through its acceptance by several communities, e.g. EuroControl and the European Commission. The European Vertical Reference System (EVRS) is a kinematical height reference system. It is the basis for harmonisation of the vertical reference of spatial coordinates. Presentations of the session report on legal acceptance, potential usage in geo-referencing applications and benefit for practice of the outlined geodetic reference systems and their practical realizations.

SESSION 2 - NETWORKS: EPN, UELN, DENSIFICATION

Session-Chairs: Elmar Brockmann, Ambrus Kenyeres

The reference networks through their observations are maintaining but also providing access to the reference system realizations. The EUREF Permanent Network (EPN) and the United European Levelling Network (UELN) are the core infrastructures of EUREF. The EPN is linked to the global network of the International GNSS Service (IGS) and contributes to the definition of the International Terrestrial Reference System (ITRS) realizations, but also serves as reference for the national permanent GNSS networks. This hierarchy ensures the conformity and homogeneity of the geodetic reference system realizations from the global to national level. The operation of a permanent GNSS network requires several well organized components: network coordination, data centres, analysis centres and product gateways. The routine cooperation with the station managers and the user community guarantees the appropriate implementation and usage of GNSS. The objective of the UELN is to establish a unified vertical datum for Europe at the one-decimetre level. Due to the different technology characteristics of GNSS and levelling, UELN is developing on a much longer time scale. However, the GNSS needs for interaction with the height reference systems and networks may leading to changes in the practical implementation. The session presents experiences and improvements of the provision and dissemination of data and results stemming from the geodetic reference networks. Improved analysis strategies and the latest results are expected to be presented.

SESSION 3 - TECHNIQUES: GNSS, LEVELLING, COMBINATION

Session-Chairs: Rolf Dach, Martina Sacher

Geometry and gravity related measurement techniques allow for implementation of a European geodetic reference frame. Nowadays, applications of a Global Navigation Satellite System (GNSS) are the dominant

technique to measure the geometry for continental regions. Direct measurements of the gravity or levelling are techniques related to the gravity field of the earth. All techniques need to take variation of system earth into account, if a longer time period or higher accuracy of site locations is in the focus. Combination of different techniques is not only a validation of one technique against another one, but also opens new applications, e.g. levelling with GPS by using known geoids' information. EUREF supports such practical aspects by the EUVN and EUVN-DA actions. GNSS and levelling measurements refer to discrete points. Developments of remote sensing methods extend the measurement of geodetic reference frame components from points to the surface, e.g. Synthetic Aperture Radar (SAR) measures height changes of the earth's surface. The combination of SAR and GNSS is a challenge for the future. A couple of developments, which include to transport GNSS observations in real-time (data streaming) and even to calculate the receiver position in real-time are almost completed. The provision of geodetic reference frames in real-time has an important impact on current practise. The installation of new satellite navigation systems beside GPS and GLONASS, such as Galileo, BeiDou and QZSS, results in autonomous stand-alone solutions and combined multi-GNSS techniques. More satellites for the multi-GNSS scenario are going for deployment in the near future and investigations to understand improvements for geodetic aspects have already started. This session presents developments, analysis and results of all techniques that are relevant for the establishment of reference frames. Real-time and multi-GNSS developments are of special interest.

SESSION 4 - APPLICATIONS: EARTH SCIENCES, GEO-INFORMATION

Session-Chairs: Alessandro Caporali, Jan Dousa

Geodetic techniques measure the situation on the earth's surface. Modern space techniques extend observations to satellites orbiting the planet earth or even to extraterrestrial targets. Today the position of particular sites on the earth's surface and its variation is known to the sub-millimetre level for the period of decades. These techniques are also sensitive for many occurrences within the system earth, e.g. changes in the atmosphere, movement of tectonic plates and the state of solar radiation. The cross-linking of geodetic findings and knowledge from other geosciences is in the focus of research projects since long time. Geodesy contributes to understand the system earth. This session presents recent research projects of geosciences such as the European Plate Observing System (EPOS) and also updated results of ongoing projects. Real-time analysis of GNSS observations provides geophysical parameters in real-time, e.g. information about the troposphere state. It contributes to online monitoring of the natural environment. Interdisciplinary cooperation for geo-monitoring and visualising in geo-information systems will be addressed here.

SESSION 5 – INITIATIVES FOR PRECISE POSITIONING IN EUROPE

Session-Chairs: Carine Bruyninx, Artur Oruba

Precise Positioning identifies the location in real-time with a remaining uncertainty in the order of some "cm". Resulting application areas differ to those of so-called "navigation tasks", because navigation tasks identify the position in the range of some "m". Precise Positioning obtains significance for many areas of the daily life. Surveying of infrastructure components, such as for road construction or gas supply line maintenance, is noted as an example. Considerable time and cost reduction becomes possible, if Precise Positioning is applied for surveying work, provided the acceptable quality level could be reached. Advantages of Precise Positioning are not bounded by national territory, but are likewise important throughout Europe. This motivates several European organisations to enhance techniques of Precise Positioning. EuroGeographics, EUPOS, the Council of European Geodetic Surveyors (CLGE), and EUREF are given to represent a lot of actors. EuroGeographics established the Positioning Knowledge Exchange Network (PosKEN) to initiate cooperation on GNSS positioning in Europe. A networking platform for experts is going to be provided. This session presents activities of EUPOS and EUREF in the field of positioning. Differences and similarities in the operation of both organisations will be outlined. The cooperation between EUPOS and EUREF will be promoted.

SESSION 6 - NATIONAL REPORTS

Session-Chair: Jan Krynski

Representatives of European countries meet the challenge to report on national activities related to projects of geodetic reference systems. These are GNSS networks, height systems and geodetic methods based on the gravity field of the earth. New projects will be introduced, but also updated results of ongoing projects are of interest. Knowledge about progress in particular European countries provides valuable ideas for future planning in the home country and for a pan-European realisation of geodetic reference systems. The presentations should be rather short, to allow plenty of nations to report.

CLOSING SESSION

Session-Chair: Johannes Ihde

The Closing Session includes the Symposium's resolutions and elections, the Symposium's awards, acknowledgement, and a short presentation of the next Symposium's location.