

February 19, 2009

Draft - Charter for the

EUREF Working Group on

Future Development of ETRS89

INTRODUCTION

The ETRS89 has been introduced in 1989 with the goal to provide Europe with a unified terrestrial reference system and consequent frames suitable for all kind of national and pan-European geodetic activities. The main target, design and purpose of the ETRS89 were motivated by the need of harmonization of geo-referencing (through its adoption by the NMAs) applications throughout Europe.

Successive realisations of the ETRS89 were derived from the ITRS, yielding frame shifts (origin, scale and orientation) as well as consequent station coordinate changes between these different realisations, inherited from the ITRS realisations themselves.

Because these changes are undesired for geo-referencing applications, the TWG has decided to adopt the ETRF2000 frame as the basis of the ETRS89 realisation, with the intent to minimize the coordinate shifts at epochs posterior to 1989.0 (embedded in the ETRS89 definition) between different implementations of the ETRS89 in different European countries.

The EUREF Technical Working Group has therefore decided to create a Working Group (WG) dedicated to the ETRS89 future development, realisation and its target users. Another important aspect that this WG should deal with is to clarify its adequateness with its parent system, the (ITRS) for all geoscience's applications, satellite navigation systems and geo-information communities. In effect the IAG is initiating a process for a formal international recognition of the ITRS and EUREF is promoting the adoption of the ETRS89 within INSPIRE directive. Therefore a clear understanding and clarification is needed, emphasizing that the ETRS89 is linked to the ITRS by a pure mathematical formula..

Martin Lidberg

Lantmäteriet, The Swedish Mapping, Cadastral and Land Registration Authority

Phone: +46 (0) 26 633842 Fax: +46 (0) 26 610676

E-mail: martin.lidberg@lm.se Internet: www.lantmateriet.se

OBJECTIVES

The ETRS89 Working Group (WG) has two main objectives:

1. Clarify the definition of ETRS89 and its target groups

The WG aims at providing a bridge between the users of the ETRS89 and the EUREF TWG. There is a clear need for documentation on the ETRS89, including information on terminology and usage of the successive realisations and their updates.

For that purpose, the WG will compile information on the usage of the ETRS89 up to now, and how it has been understood (or possibly miss-understood?) by the user community.

The WG will discuss what ETRS89 should be, and how it should be used in the future.

During this effort, reference documents on the ETRS89 for the user community will be compiled.

In particular two main questions should be addressed by the WG, namely:

- a) Given the fact that, up to now, all national systems (aligned to and compatible with the ETRS89 at the few cm level) are materialised by static coordinates (i.e. no velocities), should the usage of ETRS89 with changing coordinates, due to, e.g. intraplate deformation be promoted? If yes this will be a real challenge of education and will take years to implement, noting that national systems are adopted by the countries, sometimes with legal decrees, and specified by a set of "FIXED COORDINATES" that they don't want to see changing with time.
- b) Should the TWG promote the ETRS89 adoption and usage for scientific applications, while noting the use of the global system (ITRS) by the scientific community? If yes, then we have to provide convincing arguments of the benefit of doing so and probably some minimum guidelines. Of course the ETRS89 (via its realizations - frames) could certainly be used in scientific applications, provided that analysis is appropriately conducted with care. But do we want to go in that direction?

2. Propose to the TWG approaches for the long-term maintenance of the ETRS89

The WG will look for a modernized future maintenance of ETRS89, providing continuity in the coordinates between realizations, i.e. jumps in the coordinate time series caused by an update of the coordinates should be on the average zero. The ETRS89 realizations have, and should continue to have, a firm link with the ITRS. However, the potential benefit from the EPN for future realisations at the coordinate level should be investigated and utilized.

WORKING PLAN

In order to achieve these objectives, the work will be divided into the following sub-tasks:

1. ETRS89 up to now

Document about the history of ETRS89

The WG will prepare a document (about 10 pages, for internal use) describing the history of ETRS89. Such a document will be fruitful, especially for those who did not participate to EUREF from the very beginning. Most reference information is available, but rather dispersed. A starting point for this work will be the EUREF paper from the IAG meeting in Birmingham 1999 ("The European Reference System Coming of Age").

Inventory on the use of ETRS89

The history document will be complemented with an inventory about where ETRS89 has been implemented. The purpose is to have a good understanding of the use of ETRS89 within the surveying and spatial data community as well as the scientific community. Much is available, e.g. EPN and the adopted campaigns. The document will also include information on which countries are now using a realization of ETRS89 as national geodetic reference frame for surveying, cadastre, and mapping purposes.

2. What is ETRS89 supposed to be and how should it be used?

EUREF has promoted since a long time the use of ETRS89 as a national reference system (e.g. Resolution 2 of the EUREF Symposium in Toledo), and ETRS89 is proposed to be mandated within INSPIRE. The use of ETRS89 within the surveying and georeferencing community is thus well established. The use of ETRS89 in scientific applications, as well as requirements from the scientific

community on ETRS89 are however not clear and will be investigated.

Of special importance is to make clear to what extent intraplate deformations should be considered in ETRS89.

3. Future maintenance of ETRS89

Based on a common view on what is mentioned above, today's way to realize the ETRS89 will be evaluated and, if necessary, a modern/modernized way to realize ETRS89 will be investigated, developed and tested. The deliverables include the conceptual model for the realisation, as well as formulas and numerical values for transformation parameters. As given in the objectives, the EPN will and should play an important role in this realization.

Two slightly different paths allow for the realization of this goal:

- a) A proposed best way to realize the ETRS89 based on currently available products, infrastructure, and knowledge etc
- b) The identification of an optimal, improved realization of the ETRS89, including an investigation of the presently missing components and a plan for their implementation.

The WG will consider the dynamics of the crust, e.g. intraplate deformations and plate tectonics within the area of interest, and how this may influence proper maintenance of ETRS89.

The WG will also consider the "geographical scope" of ETRS89. The wordings "extended to the east up to Ural" have been used to indicate the ETRS89 area. But even if there is a good coverage with EPN-sites in Central and Western Europe, the amount of permanent GNSS sites is more limited towards the east. Proposals should therefore be appropriate also for areas where dense coverage of reliable EPN sites are not yet available.

MEMBERSHIP

Martin Lidberg (chair)

Carine Bruyninx (chair TWG, member ex officio)

(further names have been considered, but is not given here for the moment)