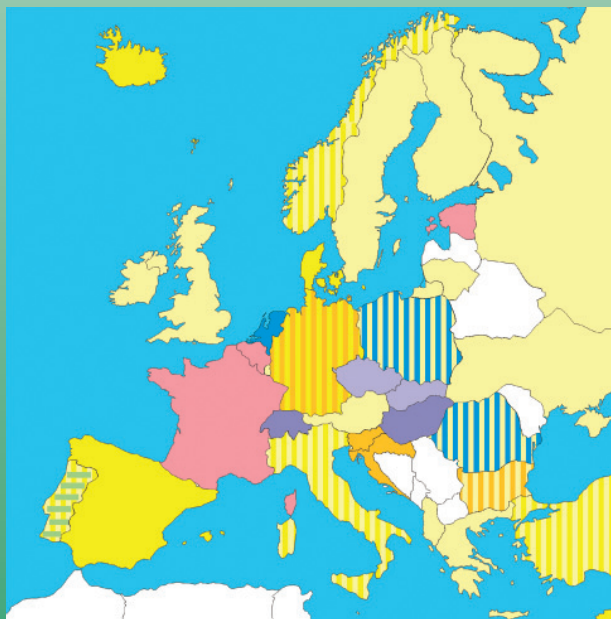




Bundesamt für
Kartographie und Geodäsie

CRS_{EU}

Information system
for European
Coordinate Reference Systems



Introduction

Geodetic reference systems ensure the spatial reference for topographic maps and digital geodata, whereby a difference is made between the definition and the realisation of reference systems.

The definition of the geodetic reference systems includes the concept, the observation strategies, the standards for data reduction and the necessary parameters. The concept of the geodetic reference system defines the type of coordinate system, its position in the terrestrial body and, where required, additional parameters, as e.g. the dimensions of a reference ellipsoid. The alignment of the coordinate system in relation to the terrestrial body is also designated as geodetic datum. The datum determination includes the position of the origin of the coordinate system, the orientation of the coordinate axes and the scale.

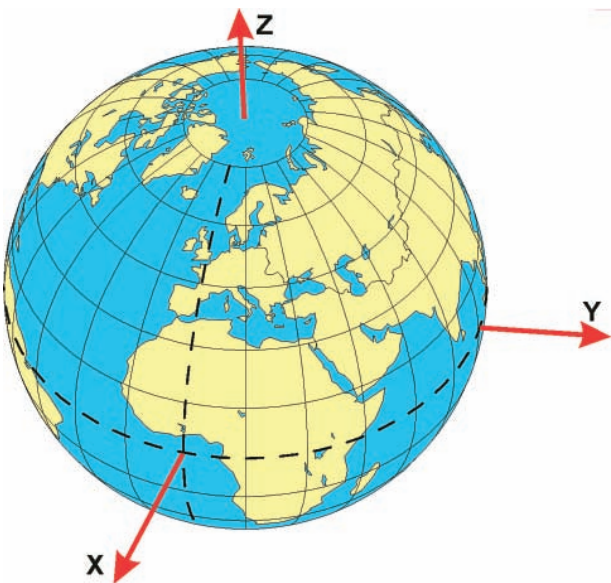
In international language use the realisation of geodetic reference systems is also designated as Coordinate Reference System (CRS). Geodetic reference systems are realised by means of physical points on the earth's surface. Coordinates are assigned to the points. The coordinates are determined by a combination of different geodetic measurement procedures. This way, these measurements achieve in parallel with the coordinates an ever-increasing accuracy thanks to new measurement methods, techniques and instruments, although they can never be free from errors. Nowadays satellite-geodetic methods (GPS) have found the widest application.

National and European Coordinate reference systems

As a result of territorially limited activities, local particularities and applications a multitude of geodetic reference systems have been realised over the last 150 years.

Basically, these systems are respectively restricted to the territory of one country. It was not till the introduction of the satellite-geodetic observations that it became possible to establish, during the 60s and 70s, uniform reference systems with an increasingly achievable higher accuracy both on the continental and global levels. For planimetry, the ETRS89 coordinate reference system has established itself as the pan-European system. For the performance of pan-European tasks this system has been stipulated and defined as binding by the European Commission.

Besides the ETRS89 there still exist a great many of national coordinate reference systems, for which reason it is necessary to be able to maintain and represent maps and georeferenced data both in national and European coordinate reference systems. These different coordinate reference systems must be described uniformly and the relations between them defined. This applies not only to planimetry, but also to the height component.



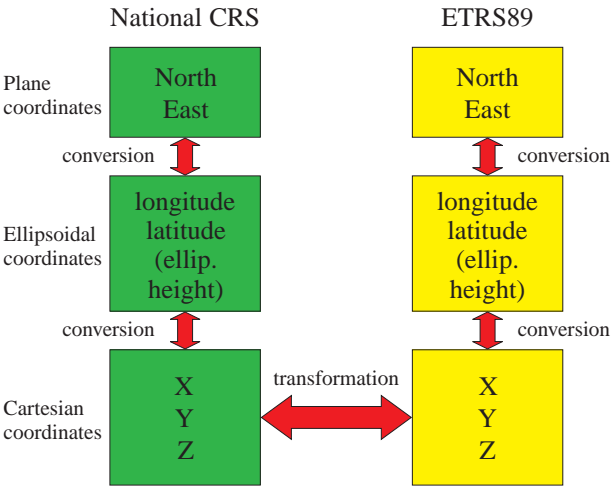
Relations between the coordinate reference systems

The relations between the coordinate reference systems as a combination of a geodetic datum, on the one hand, with a coordinate system on the other hand are established through transformations and conversions.

A transformation means a modification of the geodetic datum, for which purpose a set of transformation parameters is derived from coordinates of identical points respectively in both systems. By means of these parameters georeferenced data can be transferred into another geodetic datum. The transformation parameters, and thus the accuracy of the transformed coordinates, are decisively influenced by the size of the transformation area, the selection of the identical points and the accuracy of the two reference systems. Therefore, there exists no all-purpose set of transformation parameters for the transition from a geodetic datum to another one, but in each case several possible sets of parameters.

Besides the transformation, there are transfers of coordinate systems within the same geodetic datum, which is designated as conversion of the coordinate systems. Such a conversion can be performed always in a precise manner by the use of appropriate mathematical formulae (e.g. projection equations).

Planimetry



Altimetry



Information system

In cooperation with the European Organisations EUREF and EuroGeographics a web-based information system designated as CRS-EU (Coordinate Reference Systems for Europe) has been created by the Bundesamt für Kartographie und Geodäsie (BKG) (Federal Agency for Cartography and Geodesy). This information system for national and pan-European coordinate reference systems contains the characteristic parameters for the description of the reference systems as well as of the transformation parameters for transferring the coordinates of the national into the pan-European reference systems.

The parameters for the transformation of national into pan-European reference systems (ETRS89 for planimetry and EVRF2007 for altimetry) are available in each case for the whole area or for partial areas of the respective country, which means with an accuracy of 1...3 m for planimetry and 1...5 cm for altimetry.

CRS_{EU}

Information and Service System
for European
Coordinate Reference Systems - CRS
Bundesamt für Kartographie und Geodäsie in cooperation with EuroGeographics and EUREF



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- Russia
- Slovak Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- Ukraine

Data collected by national survey administrations of the European states formed the basis of this information system. These data have been edited and compiled after an international standard – ISO 19111 Spatial Referencing by coordinates.

The information system is written in English in order to allow its usage by all European countries. It can be reached under the internet address



For further information please contact:

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