

**National report on the geodetic activities in the Grand-Duchy of Luxembourg for the period 1995 to 1998 to the General Assembly of the International Association of Geodesy**

*\* Geodetic Network, GPS-Positioning:*

*In accordance with the adopted concept for a complete renewal of our national geodetic network - going back on a fundamental analysis realised in cooperation with the Institute for Astronomical and Physical Geodesy of the Technical University of Munich in 1989 – the new first order network with 48 main stations has been constantly densified by the national surveying agency during the years 1995 to 1998, thus creating by means of GPS-measurements in static mode a new second order with site distances of about 4 kilometers.*

*This homogeneous basis is actually of great advantage for several applications on a national level like the recent numeric photogrammetric restitution for a detailed topographical database covering the whole territory and the running project for numerisation of the cadastral map documentation.*

*In the same context, the official presentation of the final results for the EUREF-LUXBD 94 GPS campaign at the EUREF-Symposium in Kirkkonummi, Finland in May 1995 has to be mentioned. The main goal of this campaign was to connect the area of Luxembourg to EUREF with 4 new stations and to improve simultaneously the EUREF connection for Belgium. The computations, realised at the IfAG – "Institut für Angewandte Geodäsie" in Leipzig, Germany in the ITRF92 (IERS Terrestrial Reference Frame 1992) using high accuracy GPS satellite ephemerides distributed by the International GPS Service for Geodynamics (IGS) confirmed the expected accuracy on the 1 centimeter level, compared with the reference coordinates.*

*\* Determination of the Gravity Field:*

*A levelling campaign, realised in cooperation with the "Institut Géographique National" of Belgium in order to improve and densify homogeneously the altimetric network over the whole territory of Luxembourg, has been completed in 1995 and the final results and characteristics were published as "réseau de nivellement NG95".*

*The complete network with a total of about 108000 stations, attached to the "zéro normal" with reference to the german network, was compensated in one block for the first order and one unique block for the second and the third orders and has now a density of 1,5 reference points per square kilometer.*

*On this basis the first national gravimetric network, created in 1948 with 96 stations was improved by replacing the original inaccurate barometric levelling with the new possibility of a precise determination referenced to NG 95.*

*Nevertheless, the aim of a precise three-dimensional positioning by GPS with the transformation to our national GAUSS-KRÜGER projection and the orthometric height system required a more accurate Geoid-model.*

*In fact, a new gravimetric network with 509 stations could be realised between 1996 and 1997 in cooperation with the ORB – "Observatoire Royal de Belgique" and the IGN – "Institut Géographique National" so that we now dispose of a modern national Geoid-model LG97 as a local grid with steps of 3 kilometers and an absolute accuracy of about 3 to 4 centimeters.*

*The reference of this network is the absolute station located at the "Centre Universitaire de Luxembourg".*

*\* Geodynamics:*

*For the concerned period of the last four years, the international known "Journées Luxembourgeoises de Géodynamique" periodically invited scientists researching in the fields of Geodynamics to nine meetings locally organized by the European Center for Geodynamics and Seismology (ECGS) at Walferdange under the European Network on Geodynamics of the Council of Europe.*

*The main objectives of these workshops are to promote the study of scientific problems in the mentioned fields and to exchange the results of these studies.*

*Luxembourg, 24<sup>th</sup> march 1999*

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