



L-Awtorita` ta' Malta Dwar l-Ambjent u l-Ippjanar

Malta Environment & Planning Authority

**IAG Reference Frame Sub-Commission for Europe
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**National Report
MALTA**

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National Report of Malta

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Introduction

This report gives a brief account of the activities taking place in the field of geodesy in Malta. The work is carried out by the Mapping Unit which is the National Mapping Agency and which forms part of the Malta Environment and Planning Authority.

Historical Background

Throughout its history, Malta has always relied on foreign countries for mapping and other surveying activities. The reason being its size limitation and also because for over than 2,000 years it has been under continuous rule of one nation or another mainly due to its strategic position in the Mediterranean.

The last maps of the Maltese islands were made by the British in the mid-seventies. In the early eighties the 'Istituto Geografico Militare' of Italy provided local surveyors with valuable know-how in small scale mapping enabling them to start doing this work on their own. Since then, the surveying community in Malta has never looked backwards and has had a number of co-operation agreements with various institutions including one with the 'Institut Géographique National' of France in 1988

and one with the University of East London in 1993. The former was for the provision of equipment and technical assistance for large scale mapping whilst the latter for the establishment of the first GPS network of Malta. In 1996 the EUREF – Malta GPS campaign took place. Six stations were used during this campaign, five of which formed part of the existing GPS network whilst the sixth station was established with a view to setting up a Permanent GPS station.

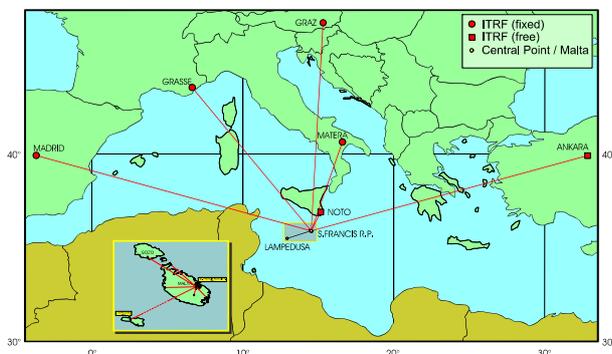


Fig. 1



Fig. 2

Figures 1 and 2 above illustrate the Euref network stations used during the Euref-Malta '96 GPS campaign and the six station fixed in Malta.

Geodetic Network

The present GPS Network of Malta consists of 26 primary points including the Luqa Barracks Station which had been fixed by RACAL Surveys Ltd to the world wide GPS Network CIGNET. The network was observed in 1993 and spans the three main islands (refer to figure 3 below).

Three Leica System 200 receivers were used to observe the 26 points, 17 of which were placed on mother land Malta, 8 on Gozo and 1 on Comino. Processing took place using Leica SKI software. The WGS84 coordinates were transformed to ED50 and ITRF91.

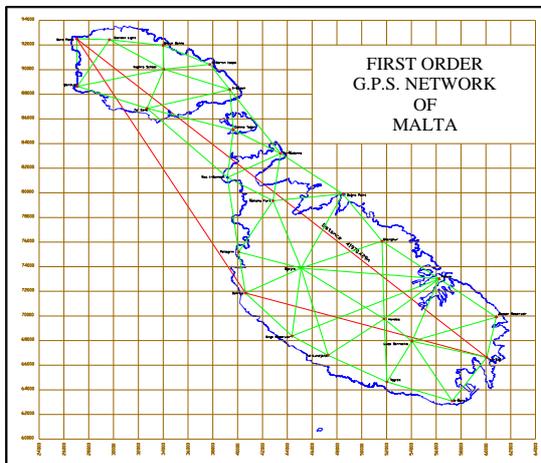


Fig. 3

Horizontally, the semi-major axis for the absolute error ellipses were all less than 1.3cm for the network points at a 68% confidence level. The standard deviation for the heights of the network points were all less than 0.017m. An independent check showed an agreement equal to 0.17m (0.67ppm) in the horizontal components. (Peter Dare. - Project Malta '93)

In 1998, a 2nd order network of 142 points was established, all of which were also pre-marked for photogrammetric purposes.

Levelling Network

The Precise Levelling Network of Malta comprises a total of 300 Primary Bench Marks (see figure 4 below). Emplacement, as

well as observations commenced in 1989 and until the end of that same year there were already 116 bench marks in place. Included in the observations were the then existing 30 bench marks from the 1970 network, the values of which were consequently changed to the results yielded by the new adjustment. The Datum to which the network is referred is the mean sea level as resulting from tidal observations at the Valletta Grand Harbour. The Malta Maritime Authority is the organisation in charge of the Tide Gauge.

Overall a total distance of 330 km of precise levelling were observed. The last network adjustment was done in 2001 using Star*Lev adjustment software. The network has a standard deviation of $0.001\text{m}/\sqrt{\text{km}}$.

As part of the on-going maintenance programme, the Mapping Unit is currently replacing all the 116 Bench Marks emplaced in 1989 owing to the inappropriate markers emplaced at the time. It is planned that the remaining 50 bench marks will be finalised by the end of the current year after which a new adjustment will follow.

Earlier this year, the Mapping Unit has also finalised the 2nd order levelling for the island of Malta. This network comprises a total of 500 bench marks all emplaced in the urban areas.

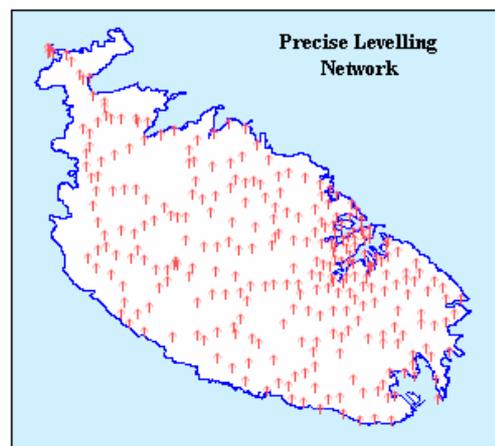


Fig. 4

The above networks form the basis of all mapping and other surveying activities in Malta. From its part, the Mapping Unit also provides continuous support to local and international organisations in the field of scientific research and other projects of an economic nature.

Presently, the Unit is seriously considering the possibility of setting up a Permanent Reference Station. A preliminary study was recently carried out on the technical issues and financial aspects in running this project. There is no doubt that a permanent station on the island would not only serve to provide real time data to users in the area but will also have its weight in the configuration of EUREF, given that this will be one of the stations at the extreme south of the Network.

Conclusion

This is the first country report submitted for Malta in a EUREF symposium and it is hoped that in the future there will be full and direct participation in all activities and programmes implemented by EUREF.