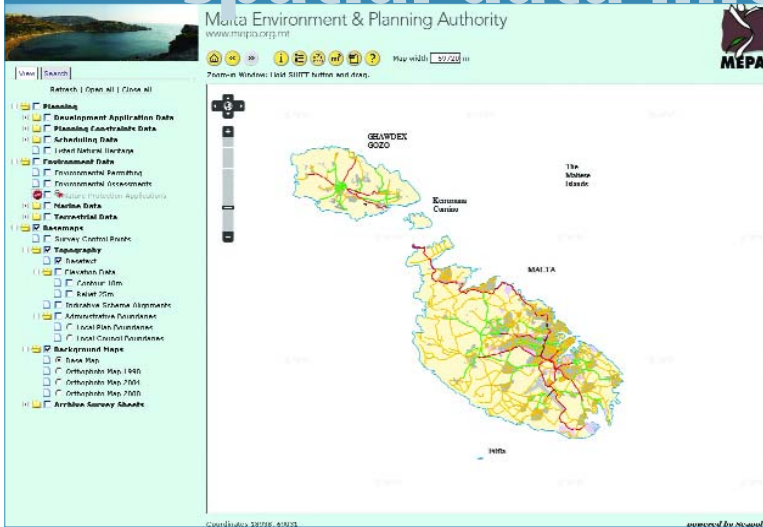


# Malta spatial data initiative



**Above: A screen grab of the Malta Environment and Planning Authority's (MEPA) map server.**

SITUATED IN THE STRAIGHTS between Sicily and North Africa, Malta is the smallest state in the European Union with a land area of just over 300 square kilometres and a population of just over 400,000. This means that it is one of the most densely populated parts of the EU.

**A need for change** We live in a rapidly developing world where massive online information systems have enabled both scientists and the public to interact with

**Upgrading monitoring capacity** The Maltese Islands are now in the final stages of acquiring a comprehensive monitoring system (strategy, hardware, software and data) that will serve as a basis for cross-thematic research. This follows the development of an extensive blueprint on spatial data enhancement in the physical, social and environmental domains. It is being made possible through the creation of fundamental datasets that will put Maltese terrestrial and bathymetric baseline data, as well as thematic data, into the public domain. This development formed part of a €4.6 million project, entitled Developing National Environmental Monitoring Infrastructure and Capacity, co-financed by the European Regional Development Fund (85%) and the government of Malta (15%). The government finance comes under its Operational Programme 1 – Cohesion Policy 2007-2013 – Investing in Competitiveness for a Better Quality of Life.

The project is enabling the procurement of equipment, information management systems, environmental baseline surveys, training of staff, and the enhancement of the national monitoring programmes. Malta is thereby upgrading its current monitoring capacity, as well as acquiring new environmental

**Mapping and GI, free and online** Helped by funding from the EU and aiming to meet the requirements of various Directives, Malta now has an enviable integrated spatial information system with datasets available for many uses. **Saviour Formosa**, University of Malta, and **Elaine Sciberras**, Malta Environment and Planning Authority, explain how the island is developing the very comprehensive web portal that will make mapping, imagery and a variety of thematic datasets accessible to everyone.

remotely-located data across the globe. This access to data, and eventually to information, has led to the realisation that there are still both technical and social barriers to accessing such data. In small states, data availability is less than perfect for a range of reasons including a lack of baseline information and a lack of both human and financial resources to manage these relatively large datasets. Malta is no exception.

The need for change has been realised since the mid-1990s when a review was carried out on the geographic information legacy acquired since independence in 1964 and which was then subject to rapid changes in visualisation and data transfer. Two main action areas were identified at the time: those related to digital mapping and data collection, and those related to the application of GIS in an operational context. A national mapping agency was set up in 1988 and there was a transition to a fully digital scenario between 1994 and 1998. At that time, GIS was first introduced to Malta and a map server was launched in 2000 with datasets and procedures aligned to EU standards culminating in the creation of thematic information systems and leading to a shared environmental information system.

monitoring data, including data acquired through new technologies, such as lidar and sidescan sonar.

This initiative will bring together different experts aimed at ensuring compliance with EU spatial and environmental monitoring requirements and is instrumental in spanning the divide that has existed between fieldworkers and surveyors, information specialists and thematic analysts.

The project delivers terrestrial and bathymetric data at sub-metre resolution suitable for detailed environmental modelling and for EU reporting purposes. This will give administrators, academics and commercial enterprises information for comprehensive land use planning, environmental monitoring and the resultant socio-security impacts.

**Outputting to the public** GIS and geomatics specialists will particularly relate to the high resolution 3D terrestrial data coverage using a combination of oblique aerial imagery (Figure 1) and LIDAR data (Figure 2), as well as the bathymetric survey of coastal waters within one nautical mile of the coast, using a combination of LIDAR, acoustic scans and physical grab

**“This initiative... is instrumental in spanning the divide that has existed between fieldworkers and surveyors, information specialists and thematic analysts.”**

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sampling. The main outputs being disseminated to the public comprise:

- LiDAR scan: terrestrial digital surface model (DSM) and digital terrain model (DTM) for the land surface (316 sq km)
- Bathymetric LiDAR aerial survey - depths of 0 m to 15m within one nautical mile from the Maltese coastline (38 sq km)
- Bathymetric scan: acoustic (side scan sonar) DSM and an acoustic information map of the seabed (361 sq km)
- High resolution oblique aerial imagery and derived orthophoto mosaic and tiled imagery of the Maltese Islands
- Satellite imagery (GeoEye, RapidEye, Quickbird) for the islands

In addition to these products, modern geospatial technology has been acquired and implemented:

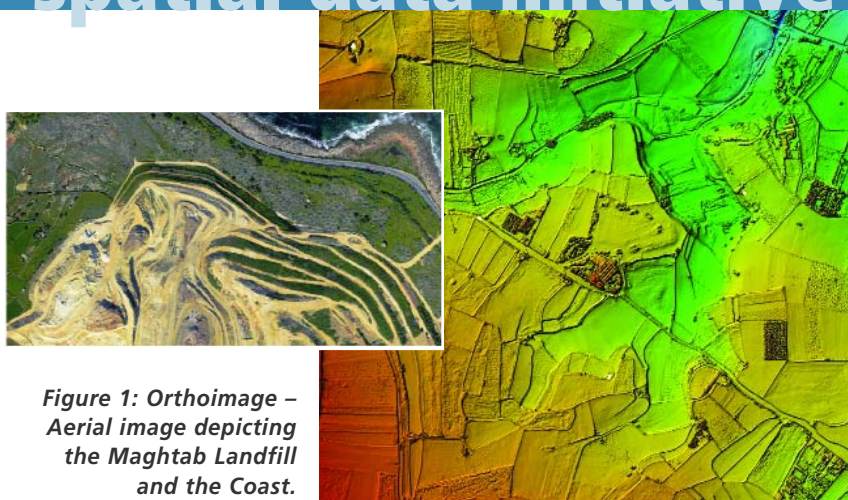
- Remote GPS-enabled cameras (remote capture GPS receiver)
- Integrated GI infrastructure (workstations, servers, with both raster/image and vector capabilities)
- 3D scanner and 3D printer
- Handheld data collection devices for field surveys
- Global Navigation Satellite System (GNSS) station

This data will be enhanced by information acquired from the other project themes such as air, water, noise, radiation and soil information as well as the integration of the Census 2011 dataset.

**Enhancing knowledge** Mapping the terrestrial and seabed topography has various applications. It will provide a basemap for the environmental strategy being developed as well as studies required by the EU's Corine land cover programme, the Water Framework Directive and the Marine Strategy Framework Directive. These aim to provide more effective protection for land and marine environments, which in turn affect the well-being of the island's population.

Knowledge gained by thematic experts will therefore be enhanced for studying, monitoring, analysing, and protecting those areas that are vulnerable to degradation and exposure. Spin-offs from the results include updated nautical charts, viewshed analysis and cross-thematic studies in the physical, social and environmental domains. Following the delivery of the aerial and marine surveys from Terraimaging, and the AquaBioTech Group, users will be able to generate DTMs for use in various applications such as urban and transport planning, environmental impact assessments, infringement analysis, security review, modelling of run-off water, enforcement of land use provisions and many others.

Of paramount importance remains the assurance



**Figure 1: Orthoimage – Aerial image depicting the Maghtab Landfill and the Coast.**

of free delivery of all data to the general public. This is the result of an integrated exercise to adhere to requirements outlined by the European Commission's COM (2008) 46 "Towards a Shared Environmental Information System", the INSPIRE Directive and the Aarhus Convention.

Public access will be ensured through the development of a viewing and analytical dissemination tool employing a web portal, which will be compliant to the EU's Shared Environmental Information System (SEIS) and which will be launched in the near future. Malta's spatial information is coming of age!

## About the authors:



*Saviour Formosa is a senior lecturer at the University of Malta. His research covers the spatio-temporal analysis of crime and its social and physical relationships using spatial information systems. His expertise is in the implementation of cross-thematic approaches*

*with emphasis on thematic and spatial data structures, visualisation, modelling, web-mapping, analysis and dataflow management and reporting. He has led projects on Aarhus, INSPIRE, ERDF, ISEC, ESPON and serves as contact point for various international fora. Dr Formosa has a Ph.D. and MSc from the University of Huddersfield and a BA from the University of Malta.*



*Elaine Sciberras is a senior projects officer within the Information Resources Unit at the Malta Environment and Planning Authority. She is currently part of the team managing a European project to develop national environmental monitoring infrastructure and capacity. Dr Sciberras holds a*

*B.Sc. from the University of Malta, a M.Phil. and PhD from the University of Cambridge.*

**Above: Figure 2 – Lidar image depicting the countryside in Malta.**



**Of paramount importance remains the assurance of free delivery of all data to the general public.**

