

A Glance at some UoM Research Projects



AGRICULTURE

• **RTDI project on Medicinal Plants which links the areas of Pharmacy and Agriculture.** An international seminar was held in November 2005 involving participants from the north and south of the Mediterranean Basin. One of the aims of this research is to examine the active components in local herbs and plants with a view to their commercial viability. If this materialises it will give a new and alternative crop to Maltese farmers.

BIOTECHNOLOGY/ PHARMACEUTICALS

• **BIOPATTERN (FP6 Network of Excellence).** This project involves personnel from the Department of Mathematics; Department of Electrical Power and Control Engineering; Department of Electronic Systems Engineering. The Biopattern Network of Excellence integrates key elements of European research to enable Europe to become a world leader in eHealth with the Grand Vision of developing a pan-European, coherent and intelligent analysis of a citizen's bioprofile; to make the analysis of this bioprofile remotely accessible to patients and clinicians; and to exploit bioprofile to combat major diseases such as cancer and brain diseases. The 'bioprofile' is a personal 'fingerprint' that fuses together a person's current and past medical history, biopatterns – basic information providing clues about underlying clinical evidence for diagnosis and treatment of diseases – and prognosis; it also combines data, analysis and predications of possible susceptibility to diseases.

• **SENSATION** The Department of Electronic Systems Engineering is involved in this EU funded project that falls under the areas both of Biotechnology and ICT and deals with advanced sensor development for attention, stress, vigilance and sleep/wakefulness monitoring.

ENERGY

• **Marie Curie Training Fellowship on Electrical Energy Conversion & Efficiency E.U. funded project.** This project involves personnel from the Department of Electrical Power & Control Engineering. Marie Curie ECON2 has three research themes as follows: Distributed Power and Renewable Energies; High Frequency Power Conversion and Motor and Generator Drives and Applications. The current projects in Malta are concerned with the development of new control strategies for enhanced drive train performance, in particular sensorless control of ac drives in the low and zero speed region. The projects are looking at novel signal injection techniques to be experimentally verified on surface mounted permanent magnet synchronous machines and off-the-shelf induction machines. The applicability of the same techniques to the increasingly popular DTC drives is also being investigated, with the potential benefit of extending their performance to the low speed region.

• **High Concentration Photovoltaics for Power Generation (HICON-PV) (FP6 project).** The Institute for Energy Technology is a partner in this project which aims at designing and testing the performance of specific solar modules under a concentration of 1000 suns. The Institute has the task of evaluating the potential of such technology in islands and the evaluation of simulation programmes specifically designed for this project.

EDUCATION & ENGINEERING

- **TREE** There is a total of 92 partner universities and research institutions involved in this project which is concerned with the standardisation and accreditation of courses in engineering education throughout Europe in which the Department of Metallurgy and Materials Engineering is participating.

ENGINEERING, MATERIALS RESEARCH

- **INNOVATE (Leonardo)** International On-Line Vocational Programme in Surface Engineering. The project aims to develop a new methodology of transitional open and distance vocational training programmes in the field of Surface Engineering. Partners include International federation of heat treatment and surface engineering and the Institute of Materials, UK

- **Realising the Technological, Environmental and Economic Potential of Active Screen Plasma Surface Engineering (FP6 project).** This project seeks to establish a coordinated and pro-active Europe wide knowledge base, plus an information, educational and training network, to accelerate the development of the full potential and industrial take-up of a world leading process capability in novel active screen plasma surface engineering.

ENVIRONMENTAL TECHNOLOGY

• Atmospheric Pollution Research

Researching atmospheric pollution in the Central Mediterranean. Global atmospheric Watch Station appointed by WMO. The main aim of this project is to measure ozone, carbon monoxide, sulphur dioxide and PM10 at background level. However, meteorological parameters such as temperature, relative humidity, wind speed and wind direction have been continuously monitored at Giordan Lighthouse since 1997. Also urban measurements of ozone, temperature, relative humidity, atmospheric pressure together with windspeed and wind direction and solar radiation are being recorded at the Xewkija station.

HEALTH

• Research on Communication Disorders in the Maltese population (FP6 project).

The main objectives of this project are to reinforce and develop the research and training capacity within the Communication Therapy Division of the Institute of Health Care as well as to develop specific research collaboration with the partner institution and the provision of unique research base within the European community related to bilingual populations with communication disorders.

INFORMATION COMMUNICATION TECHNOLOGY ICT

- **ALIPRO (FP6 project).** This is an EU project that is pushing for a better integration of research programmes on mobile communications in Europe. The consortium is led by the Polish MOST Foundation and its aims are to accelerate the improvement and alignment of mobility-related national and regional activities and programmes in the new member states and accession candidate countries, strengthening their integration on a European level. ALIPRO will achieve this goal through benchmarking, vision-building and roadmapping as well as dissemination of the results to the relevant stakeholders through a web-based information platform, a workshop, and presentations

at relevant national events. In this context, ALIPRO will conduct a survey on the national programmes in each country.

Another important goal of the project is to gather mobile-technology experts from the new member states and accession candidate countries and involve them into the work of eMobility, the Mobile and Wireless Communications and Technology Platform for concentrating European research resources in the mobile and wireless area.

• **TWISTER** – is a 3-year ongoing project concerning communications in deprived areas in which the Department of Communications & Computer Engineering is involved. The aim of the TWISTER project is to provide applications and services that meet the needs of user communities in rural areas. These services are provided over a communications infrastructure that covers rural areas in the most efficient manner, integrating satellite and terrestrial technologies. Within that framework, the following drivers and associated objectives have been identified as key:

1. Provide content and applications adapted to meet the needs of rural areas.
2. Investigate and validate in real operational conditions and on test beds the integration of DVB-RCS satellite communications standard with wireless type terrestrial technologies.
3. Develop and validate a set of service metrics allowing to quantify key parameters for network sizing such as resource utilisation at different points in the network topology or end-to-end quality of service.
4. Complement ESA activities on interoperable terminals by validating the performance of these terminals at end-to-end application level in a real operational environment.
5. Improve the use of satellite capacity. Potential techniques that have already been identified are multicast protocols adapted to satellite environment, intelligent caching mechanisms or higher coding/modulation schemes.
6. Define and disseminate a set of technical and quality guidelines for resellers on the installation and exploitation of DVB-RCS services.

• **MedVu (Eumedis) Mediterranean Virtual University – a project concerning the use of technology for Distance Learning.** The Mediterranean Virtual University (MVU) is a 4 million Euro EUMEDIS funded project which is coordinated by the University of Strathclyde, Glasgow. It concerns the setting up of a Virtual University between 11 partners, aimed at developing e-learning training modules in various domains. Through MVU, course participants will be able to register for and learn at their own pace, a number of topics using state-of-the-art multi-media training material. MVU, which has been running for several months, has reached a stage where a number of modules are available. Four of the modules are being developed at the University of Malta, 2 by the Department of Computer Science & Artificial Intelligence and 2 by the Department of Manufacturing Engineering.

MARINE SCIENCES

• **European Marine Protected Areas as tools for Fisheries management and conservation (EMPAFISH).** This is a Department of Biology research project.

The project has three general objectives:

1. to investigate the potential of different regimes of Marine Protected Areas (MPAs) in Europe as measures to protect sensitive and endangered species, habitats and ecosystems from the effects of fishing;

2. to develop quantitative methods to assess the effects of marine protected areas.
3. to provide the EU with a set of integrated measures and policy proposals for the implementation of MPAs as fisheries and ecosystem management tools.

TOURISM AND CULTURE

• **La Navigation du Savoir – Euromed Heritage II.** The Mediterranean Institute is involved in a project which aims at the creation of closer collaboration between the EU Mediterranean countries and the North African littoral. The project focuses on the historical docks of the Mediterranean and how these can be developed into profitable areas through cultural tourism.

• **Atelier I Mediterranean south/east dialogue – Erasmus Thematic Network.**

This is a Faculty of Laws project which aims to widen the cultural horizons of people in various work contexts and professions through the use of new didactic means as well as conferences and meetings. It also aims to reinforce the role of universities in the integration process and the development of individual territories.

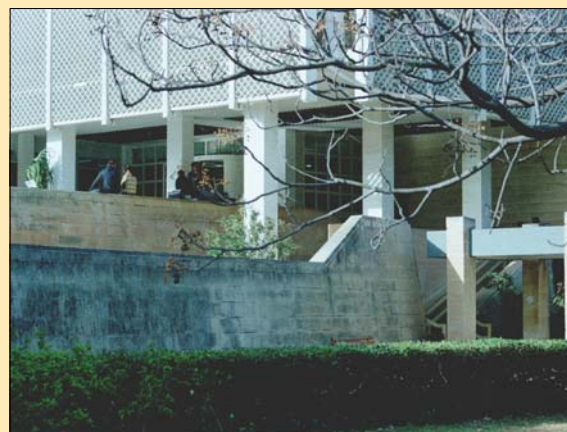
TRANSPORT

• **FLYSAFE (FP6 project).** This is a very large and valuable project involving the safety of landing and take off of aviation transport. The University of Malta and Air Malta plc are participating in the FLYSAFE consortium that has successfully bid for a research contract with a proposal worth in excess of 50m Euro in the 2nd call of the Aeronautics Thematic Area of EU Framework Programme 6 organized by the Research Directorate in Brussels. The consortium, headed by Thales Avionics of France, brings together top European industry and research organizations to develop the next generation safety avionics for commercial aircraft. Partners include BAE Systems, Airbus Industrie, Rockwell Collins, Diehl Avionics, DLR, NLR, UK Meteo, Cranfield University and Darmstadt University. The University of Malta will be responsible for the development of warning systems that will alert the crew of an impending danger of collision on the ground and in the airport terminal area. The work, which is led by Dr Ing David Zammit-Mangion of the Department of Electronic Systems Engineering, Faculty of Engineering, will be conducted in close collaboration with a team of researchers from Cranfield University who are responsible for the development of the displays associated with the system. Air Malta, under the direction of Captain Laurence Gatt, Manager, Technical and Projects, will be providing end-user input to various activities within the whole programme. This is considered by the consortium to be crucial in the design and validation phases.

EDUCATION - CIVIL SOCIETY – ENVIRONMENTAL EDUCATION - CREATIVITY

• **Civil Society Project under Jean Monnet European Centre of Excellence**

The European Documentation and Research Centre (EDRC) as a Jean Monnet European Centre of Excellence is involved in a project which oversees the assimilation in Malta of the *Acquis Communautaire* in key areas, including transposition of legislation and the impact on Maltese institutions, politics, policy-making and society in general. The ultimate target audience is civil society as a whole. A main area of focus is social inclusion.



• **Biology, Health and Environmental Education for better Citizenship (FP6 project).** The aim of this project is to improve understanding of how different aspects of citizenship, including affective and social dimensions, are promoted through Biology, Health and Environmental Education. The Centre for Environmental Education & Research (CEER) as the Malta partner will develop a critical analysis of syllabus and schoolbooks as well as of teachers' and teachers-to-be conceptions. The project will be largely comparative across the 20 countries involved in the survey.

• **The European Network of Sport Science, Education and Employment (ENSSEE) European Commission.** This project involves personnel from the Department of Mathematics, Science & Technical Education. To encourage greater European cooperation amongst all organizations involved in the development of education, training, research and employment in sport and physical education, in order to develop better quality sporting opportunities for all. The ENSSEE is a non-profit making association founded in 1991 and the members are higher education institutes, vocational training associations, sports organizations and professional associations responsible for educational research and employment programmes in sport.

INTERDISCIPLINARY PROJECTS

• Phonetics and Phonology

This research involves personnel from the Institute of Linguistics as well as from the Department of Computer Science & AI in the analysis of prosodic structure and intonation. Work in this area of linguistics in the English Language is very advanced, but still very much in its early stages in the case of Maltese. It is therefore Maltese that features more prominently in this research although some work on Maltese-English as well as on dialects of Maltese is being undertaken. Research continues into the production of commercial products, in this case particularly products having a speech-related interface such as Text-to-Speech systems, which have been and continue to be developed for many languages. As part of the MLRS project, a corpus of written Maltese is being compiled while research will also focus on the compilation and annotation of a spoken corpus of Maltese. This field of study, at the cross-roads between areas including linguistics, computer science and speech technology, has implications for continuing development of better quality information technology products such as, for example, mobile telephony systems having a speech-related interface whose intonational interface sounds less robotic than that in products available at present.



• eMaps

E-MAPS is a European Masters Programme in Performer Studies with a totally unique nature and dynamic within which would-be researchers start considering the highly complex training process which contemporary performers undertake (be they active in theatre, dance or sports) as a locus for research in the fields of Learning, Memory and Creativity. Academics in the five participating universities – Malta, Roma "La Sapienza", ParisXIII, Leicester De Montfort, and Poznan Adam Mickiewicz – are converging their separate, ongoing research into a unique programme that will offer tuition in five diverse disciplines: Cognitive Neuroscience, Cognitive Psychology, Philosophy, Sports Sciences and Performer Studies. This research involves

UoM's Mediterranean Institute and the Department of Physiology and Biochemistry.

