

Our economic future and success lies in our capacity as a country to invest and prioritise innovation and research. It is through them that our country can continue to be competitive and attractive to investment in an ever globalised world. Innovation is a pre-condition for both economic growth and job creation.

We have indeed come a long way in a relatively short period of time. From an economy dependent on a military base, we have managed to transform our economic fabric.

Today, we are home to a number of highly specialised and innovative manufacturing concerns with high value added clusters developing in Malta. This has helped our country to be one of the economic best performers in the European Union registering the third fastest employment growth rate.

Basing ourselves on our performance, we are now continuing with our efforts to embed research and innovation at the heart of our future economy. Work has started on the €30 million life sciences park which will provide the foundations for the emergence of an advanced research-based bio-medical sector in Malta.

In addition, the launch of the digital games strategy attests to our determination to place research and innovation at the forefront of tomorrow's economy. Our efforts in this regard have been recognised and highlighted by the European Research and Innovation Scoreboard that has classified Malta as a growth leader.

Our achievements are the result of our strategies and priorities, of our vision. My Government has adopted an integrated and strategic approach to research and innovation.

In implementing our vision and transforming it into reality, the Malta Council for Science and Technology has been an important catalyst. Through its work, the Council continues with its efforts to create an innovative culture that permeates both the public and private sector, both our laboratories and factories; both the small & medium sized enterprises and young entrepreneurs; both our schools and higher educational institutions.

In all our efforts the Malta Council for Science and Technology is an important partner.

Our key focus remains education and here the Council is contributing a lot through its programmes. Through its science popularisation campaigns, the Council is bringing science closer to our students.

In addition, it has managed to sign important collaborative agreements with important international agencies and institutions which will allow our students to pursue their research at world renowned laboratories.

The Council will continue intensifying its educational role as work progresses on the €22 million National Interactive Science Centre which will offer a new hands-on dimension to science education.

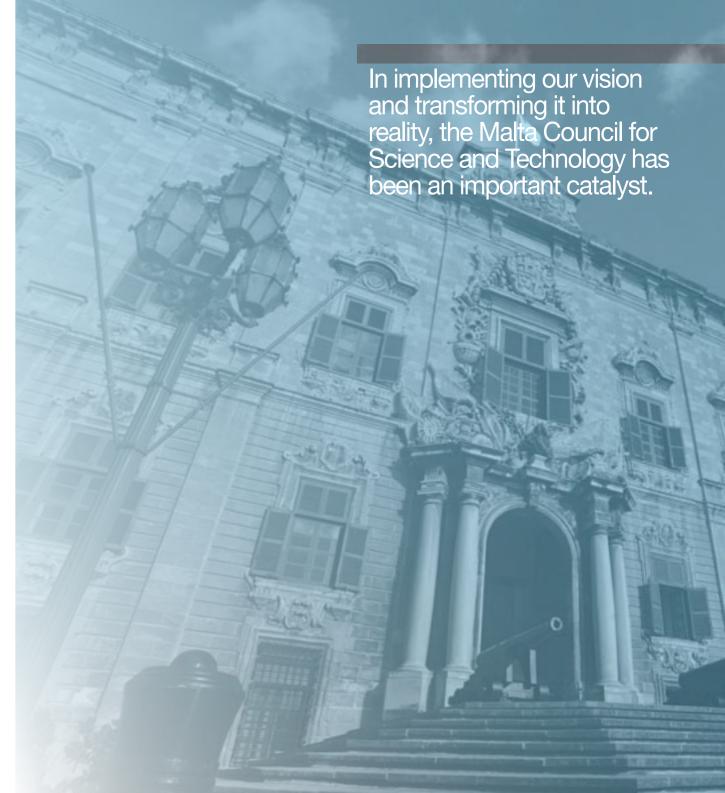
In addition, the Council is also assisting Government in its efforts in ensuring that we create the right conditions for the research base to grow alongside manufacturing and other economic sectors.

As part of our strategy, Government continued to launch a number of specialised schemes to support private endeavours in research. We have seen over €30 million in investment and are achieving a number of successes which will continue to translate into new investment and additional job opportunities for our youths.

My Government will continue investing in research and innovation because we believe in the potential of our people, of our students and of your business class.

Whilst thanking the Hon Jeffrey Pullicino Orlando and his team for their dedication, energy and professionalism I wish them further successes. Their work is a direct investment in our country's potential and can translate into tangible benefits in the near future.

The Malta Council for Science and Technology is and will remain an important partner in our national strategy for research and innovation.





It is my pleasure to present this annual report, detailing the work undertaken by The Malta Council for Science and Technology in 2011. Our team has continued to grow and to implement its declared mission, namely raising the profile and standard of science, technology, research and innovation in Malta. It has done so through many initiatives, such as the preparation of a new R&I strategic plan, continued work on the development of a National Interactive Science Center and the disbursement of €1.1million for research and innovation projects.

The Council has also strived to build further synergies with other main players in this field. Indeed, I remain a strong believer in the fact that we can only achieve our goals if we work together efficiently and effectively. To this end, the Malta Council for Science and Technology strives to work closely and maintain open relationships with all stakeholders in the fields of education, enterprise and academia. Beyond local collaboration, our work in formal and informal international fora also remains a priority.

The main priorities with which we kicked off in 2012 are the negotiations on the new European research and innovation funding programme, Horizon 2020. The Council, as Malta's national contact organization on FP7, is the entity responsible for preparing position papers for negotiations. In so doing, the Council strives for increased accessibility of funding by local researchers who have the potential to excel in international consortia. We will do so by ensuring that funding mechanisms are accessible to small states with all our limitations.

On the local front, the development of the National Interactive Science Centre has remained a key pillar of the work of the Council in its ongoing attempts at challenging the mistaken perception some have that science subjects should be avoided as they are more difficult than other academic disciplines or, which is even worse, that science should be confined to the class room or the laboratory.

The development of the National Interactive Science Centre is a project which is particularly close to our heart as it is an investment in present and future generations. It will be targeting future generations at grass root levels.

Today's children are, potentially, tomorrow's researchers, academics and professionals. That is why I am pleased to report that in 2011, central Government allocated a budget of €1.5million towards this project which is in total expected to cost approximately €22 million.

The National Interactive Science Centre will encompass more than 3,500 square meters of indoor and outdoor exhibition space which include areas dedicated to science shows, workshops for hands-on experiments, debates and discussions and a planetarium. It aims to create a new generation of scientists and science enthusiasts which have an active interest in science, research and innovation. By providing fun and engaging opportunities, the National Interactive

Science Centre will promote careers in science, technology and science communication. The National Interactive Science Centre will host over 200 hands-on exhibits and workshops that will engage students in a fun and interactive manner. It will also serve as an entertainment and education platform (known as edutainment), to bring together students, families, and professionals to expand the science, engineering and technology human capital base.

We are satisfied to note that science, technology, research and innovation are emerging as key pillars of the Maltese economy. Currently over 32% of jobs are in the area of science and technology. This further confirms the importance of the role of the Malta Council for Science and Technology in promoting and supporting science, technology, research and innovation and justifies the investments being made by the Government in these areas.

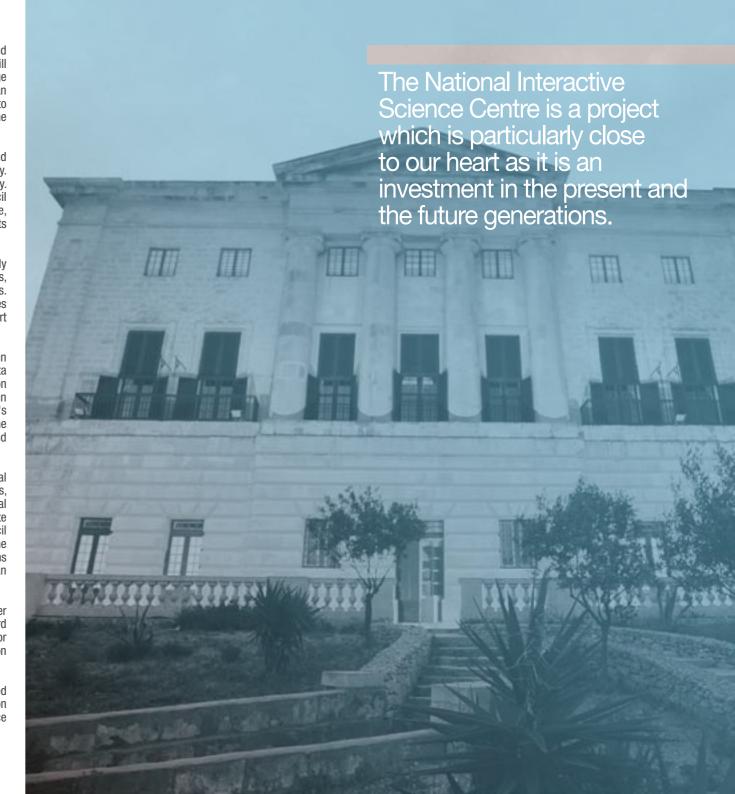
Indeed, over the last few years, the Government has increasingly supported this sector through a range of initiatives targeting business, academia and government using both national and European funds. Investments in niche areas, namely digital gaming and life sciences are also being undertaken, thus ensuring that we specialize in a smart way.

These investments have contributed towards improvements in Malta's research and innovation performance. Since 2009 Malta has been classified as a Moderate Innovator within the Innovation Union Scoreboard and remains one of the growth leaders within this group. From the latest figures published, it is clear that Malta's research and innovation performance is improving, reflecting the importance of such economic activities for the country's growth and competitiveness.

The figures also show that human resources remain a potential Achilles' heel in Malta's R&I system, hence our continued efforts, in collaboration with other stakeholders, to build and retain local capacity in science and technology. It therefore encourages us to note that the Government has once again shown its support to the Council and the local research community by increasing the allocation for the National R&I Fund for 2012 to €1.6 million. This effectively means that over the span of two years, the National R&I Fund has more than doubled.

I look back with much pride on what the Council has achieved over the past year, and I cannot fail to mention and thank the Board of Directors and all the members of staff at the Malta Council for Science and Technology for their unfailing commitment, dedication and support. Much more lies ahead of us.

The challenge is indeed great. But I am confident, and indeed convinced, that together with our stakeholders we will embark on another year which will see us striving to raise the profile of science and technology in Malta.





Looking back on the past year, I am pleased to note how the Malta Council for Science and Technology has kept on building on the work and successes of previous years and has continued to receive further support to enable it to achieve its objectives. In 2011, the staff complement increased by a further nine full time members over 2010, and the funding allocation for the 2011 National R&I Programme increased by 57% over 2010 and is expected to increase again by 58% in 2012. Positive progress has been registered in all five main work areas of the Malta Council for Science and Technology.

In the area of policy and strategy, the Malta Council for Science and Technology provided technical analysis and prepared draft Malta positions on all research dossiers discussed in the EU Council Working Party on Research, and more recently the dossiers discussed at the Space Working Party. The appointment of a dedicated attaché for R&D&I in 2011 was highly welcomed, as it further signifies the increased importance being given to this sector and the importance of ensuring representation in key formal and informal forums. On its part, The Council has continued to provide technical backup and support for relevant COREPER and Competitiveness Council (Research) meetings. The Malta Council for Science and Technology also continued its work of representing the Maltese Government in several European forums.

In 2011, the policy and strategy unit of Malta Council for Science and Technology worked extensively on the development of a new national R&I strategic plan for 2011-2020. A draft plan, built on six pillars (policy design to action, human resources, funding, innovation, research infrastructures and international cooperation) was issued for public consultation in December. Through this draft plan, it is proposed to continue to invest our efforts in human capital. In addition, it focuses on supporting the whole innovation chain, from idea to market, and gives increased attention to the importance of innovation in all its forms.

This year saw the continuation of work on another two strategy documents, both relating to priority sectors for R&I in Malta. These are 'health' and 'value-added manufacturing'. The main aim is to identify potential niche areas for research and innovation in these sectors and what is necessary in order to capitalise on emerging opportunities where Malta could have a comparative advantage.

In addition, in 2011, the EU FP7 project entitled 'Policies for Research and Innovation in Small Member States' (ERA-PRISM) came to an end with a final conference held in Malta in September. Malta coordinated this project, which brought together partners from several countries seeking ways to be active and effective members of the European Research Area.

In the area of national funding, as mentioned earlier, in 2011 the budget allocation for the Research and Innovation Fund was increased to €1.1M, through which eight projects were funded. As in earlier years, the programme funded collaborative projects between academia and industry in the areas of national priority, namely energy and environment, health and biotechnology, information and communications technologies and value added manufacturing.

In 2011, a standard schedule for launching and evaluation of the R&I Programme was also established. Since the programme was first launched in 2004, a total of 45 projects with a total budget of over €4.5M have been funded. In 2011, the Malta Council for Science and Technology also worked on the development of a Commercialisation Programme, which will be launched in 2012. The focus of the Commercialisation Programme shall be on ensuring that research does reach the market and generate wealth, which can then be cycled back into further R&I investment, making it sustainable. The aim of this programme is for technology owners to study the feasibility of taking the technology to market addressing all the requirements particularly to attract investment. The Programme is particularly intended for the successful recipients of funds under the R&I Programme to help them move their technology closer to market.

Another main function of the Council is that of National Contact Organisation for the Seventh Framework Programme for Research and Technological Development. Here too one can note positive strides and achievements. Indeed, by the end of 2011, a total of 113 FP7 projects with 126 Maltese beneficiaries have successfully been awarded funds. The total funds awarded to Maltese beneficiaries amounts to over €11.4 million since the launch of FP7. Over the past few years, the Council has significantly strengthened its capacity in this regard, and besides regular meetings with researchers, several information sessions and training workshops are regularly held.

The Malta Council for Science and Technology also administers a scheme which supports researchers wishing to participate in FP7 brokerage events abroad. In addition, the Council is also the national coordinator of the COST (European Cooperation in Science and Technology) programme. This is one of the longest-running European instruments supporting cooperation among scientists and researchers across Europe. Between 2008 and 2011 the Council increased its support to participation in COST, and indeed, from participation in 1 new COST action in 2008, Malta was involved in 18 new COST actions in 2011.

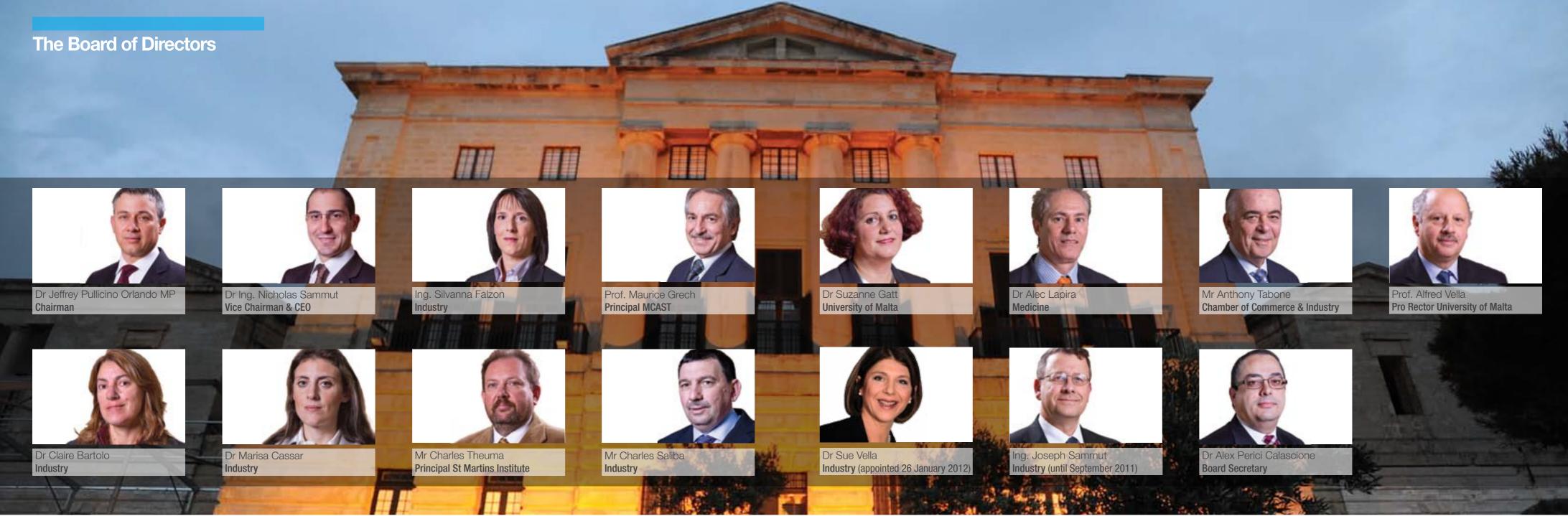
The Council continued with its work to develop Malta's National Interactive Science Centre (NISC). The budget for this project is estimated at €22 million and the Council's Science Popularization Unit has undergone a further increase in capacity to support it in its work.

In 2011, the Council issued and awarded a Services Tender for architectural works, including design & supervision for the Interactive Science Centre, while background research for the development of content including interactive exhibits was also undertaken. In addition, other work included the procurement of services to develop a Cost Benefit Analysis and a draft Business Plan. The planning stage for this project started in the third quarter of 2010, and it is expected to be completed by the end of 2014. Also in 2011, the Council embarked on the coordination of an FP7 project entitled, "Networking primary science educators as a means to provide training and professional development in Inquiry-based-learning" (acronym: PRI-SCI-NET), with a total budget of over €2.8 million and with 15 other international partners. In its ambition to establish primary science education in its own right, the project aims to make a significant contribution at European level through developing forty-five science activities designed in the approach of inquiry-based learning.

In addition to all of the above, 2011 brought with it a new image for the Council, following a re-branding exercise which included the development of a new, more interactive website. Numerous press events were also held to disseminate information on the Council's work and the projects it funds.

I am satisfied that through its work, the Malta Council for Science and Technology is contributing to the building of a knowledge-based society and economy. I look forward to another year of work and dedication towards this aim.





The Malta Council for

Science & Technology
Annual Report

The Team

Strategy and Policy Unit

Ms. Nadine Castillo - Executive Director

Ms. Ramona Saliba Scerri Executive S&T Officer

Ms. Christine Perici Economist & Innovation Policy Executive

Dr. Jennifer Cassingena Harper Consultant (PT)

National Delegates

Dr. Janet Mifsud - COST National Coordinator Prof Chris Scerri - R&I Health Strategy Dr. Gordon Cordina - R&I Health Strategy Ms. Claire Briffa - Procurement Mr. Ian Gauci Borda (PT) Dr John Betts - Space Policy

FP Funding Unit

Ms. Anthea Fabri FP7 National Coordinator Ms. Diana Spiteri

FP7 Executive - Health, Energy Ms. Marie Claire Tonna

FP7 Executive - ICT Ms. Denise Bartolo

FP7 Executive - Environment

Part-Time FP7 Executives

Ing. Alexandra Camilleri - KBBE Mr. Ian Gauci Borda - INCO

Ms. Karen Fiorini

Ms. Joanna Pullicino - KBBE

Dr. Brian Warrington Dr Mark Mifsud

Dr Suzanne Gatt - Pri-Sci-Net

Ms. Laura Sue Armeni - Pri-Sci-Net

Ms. Moira Dillon - Environment

Prof. Ing. Joseph Micallef - ESFRI and ERIC Prof. Salvinu Busuttil - EUROCEAN

Dr. Joe Sultana - EUTAROM fusion

Dr. David Zammit Mangion - FP7 Transport PCM and ETP ACARE

Dr. Ing. Anton Bartolo - ERAC Knowledge Transfer Group and GPC Ms. Christine Scholz - ERAC SGHRM Ms. Jacqueline Fenech - ERAC SGHRM

Ing. Mark Anthony Azzopardi - Transport NCP Dr Ing. Saviour Zammit - FP7 ERC and COST National Committee

Mr. Johann Caruana - FP7 and SMEs

Mr. Joel Azzopardi - GMES

Dr Maria Attard - JRC NCP and COST National Committee

Dr Joseph Buhagiar - Coal and Steel Committee Dr Bertram Mallia - Coal and Steel Committee

Dr Aldo Drago - GMES Committee

Dr Marion Zammit Mangion - Helsinki Group Women in Science

Dr. Ing. Nicholas J. Sammut Vice Chairman & CEO

R&I Technology Commercialisation

National Funding Unit

Mr. Eric Flask - Executive Director

- ERDF Executive (Manufacturing Platform)

Mr. Jonathan Borg (PT)

Ing. Joseph Sammut - Executive Director R&I Commercialisation (as from February 2012)

Science Popularisation Unit

Ms. Melanie Giorgi - Executive Director

Board of

Directors

Project Leader

Ms. Mariella Pia Tabone (joined in 2012)

Interactive Centre S&T Executives

Mr. Christopher Bugeja

Dr Elena Yasnetskaya

Ms. Elaine Manicaro

Ms. Isabel Fereday (PT)

Ms. Rachael Blackburn (PT)

Mr. Elton Micallef (PT)

Ms. Emily Tozzi (PT)

Interactive Centre Executive S&T Administration

Ms. Giselle Calleia

Mr. Gaetano Avallone

Finance Department

Mr. Charles Attard Bezzina -Financial Controller

Ms. Rosanna Schembri - Accounts Executive

Ms. Diane Degabriele - Accounts Executive

CEO's Office

Ms. Christine Grixti - Personal Assistant

Ms. Marion Attard Bezzina - Receptionist/Secretary

Mr. David Micallef St. John - Public Relations

Mr. Joseph Borg Camilleri
- Administration Executive

Support Staff

Mr. Gianni Baldacchino - Messenger

Mr. George Mifsud - Forman

Mr. Alan Ellul - Maintenance

Mr. Mario Falzon - Maintenance

Mr. Jesmond Fava - Maintenance

Mr. Tarcisio Fenech - Maintenance

Mr. Emmanuel Seychell - Maintenance

Mr. Joseph Ellul - Maintenance

Ms. Vanessa Borg - Cleaner

Mr. Nicholas Schembri Assistant to Chairman

Dr. Peter Gatt (studying abroad) Geological Service

National Research Ecosystem Central Government Academia (University of Malta Malta College for Arts Science and Technology) Office of The Prime Minister Ministry of Finance Economy & Investment Ministry of Education Sectorial Ministries Ministry of Health Elderly & Community Ministry of Justice & Home Affairs Ministry of Education & Employment Ministry for Resources & Rural Affairs Ministry for Infrastructure, Transport & Policy Unit Scholarship & Schemes Malta Enterprise: Enterprise & Promotion The Malta Council for Science & Technology Research & Innovation (R&I) Structural Funds Managing Authority National Commission for Higher Education Science Policy R&I Funding Administration of Scholarship & Schemes Communications Administration & Management of Ministry for Gozo Structural & Cohesion Funds Ministry of Foreign Affairs





The main function of the Policy and Strategy Unit is to continue building on the national R&I framework in order to facilitate further investment in these economic activities, including addressing the existing gaps in the system. This is done through the drafting of strategies for R&D and the Unit, has remained part of the team on a part-time basis. Innovation as well as the evaluation of policies developed by others in these fields. In this regard, the Unit supports other Ministries in policy issues within the R&I context.

The Malta Council for Science and Technology participates through necessary feedback in order to make sure that any proposals are in Malta's best interest. To this end the members of this Unit participate in EU forums and provide the necessary support to any participation at Ministerial level.

This year the Unit saw a further expansion to its team. Towards the last guarter of the year, Ms Nadine Castillo joined the policy team as a Director, while Dr Jennifer Cassingena Harper, the former director of

The Unit is made up of two full time members, Ms Ramona Saliba Scerri, who is responsible for research policy and Ms Christine Perici, who is in charge of innovation policy.

the Unit also in policy developments at EU level and provides the In addition, during 2011, the Unit was supported by a number of experts in different fields, including, Mr Ian Gauci Borda, Dr Brian Warrington, Dr Ing Anton Bartolo, Prof Joseph Micallef, and Ms

It is worth noting that during 2011, Mr Luke Incorvaja joined the Permanent Representation of Malta to the EU as Research, Innovation and Technology Attaché. This is a very positive development and it is the first time that Malta has a dedicated Attaché to the areas of Research, Innovation and Technology.



The National R&I Strategic Plan 2011-2020

Towards the end of 2011, the Council launched for public consultation the new draft national strategic plan for research and innovation spanning until 2020. This Plan builds on the achievements and lessons learnt over the past years and takes into consideration the present economic realities as well as national and European developments over the past few years, in particular the EU flagship initiative 'Innovation Union' which was launched towards the end of

The work on the strategic plan started in October 2010 with an evaluation of activities undertaken over the 2007-2010 period.

During 2011 several workshops with relevant stakeholders were international cooperation; innovation; policy design to action and held, together with a series of bilateral meetings. Through these funding. discussions, the Council managed to identify further existing gaps in the national R&I systems as well as introduce new concepts and ideas The pillars represent the fundamentals of the entire R&I ecosystem. It which will lead to further investment in research and innovation.

This plan also took into consideration the outcomes of the analysis 2011-2020 plan. On the basis of the feedback received the strategic of the European Innovation Scoreboard which was undertaken by the same Unit during 2011. The draft National R&I Strategic Plan its approval 2011-2020 proposes 74 recommendations which are grouped under six pillars, namely, human resources; research infrastructures;

was decided that the vision, mission and strategic principles expressed in the 2007-2010 strategy are still valid and were thus retained in the document will be updated accordingly and forwarded to Cabinet for



The National Health Research and Innovation Strategy

In 2011, The Malta Council for Science and Technology continued the work on the development of a research and innovation strategy for the health priority area which started in mid-2010. In February 2011, a wide consultation exercise with health professionals was undertaken in order to try to identify potential niche areas for health R&I in Malta and what Malta would need to do in order to capitalise on emerging opportunities where it could have a strategic advantage.

The outcomes of the consultation exercise were discussed by six focus groups, which focused on the following themes: airway diseases and environment; social, health behaviour and psychology; neurology, muscolo-skeletal/ locomotor and mental; design of devices/equipment and ICT applications; cardiac/coronary, diabetes and obesity; and genetics, pharmacogenetics, family related, pharmaceutical production, cancer and dental.

A first draft of the strategy was produced which the steering group analysed and discussed. An updated draft is currently being prepared and this will be issued for public consultation in 2012.

The Steering Group, which was setup for the purpose of this strategy, is chaired by Dr Alec Lapira (Council Board Member) and its members include Dr Janet Mifsud, Prof Christian Scerri, Dr Gordon Cordina, Dr Nicholas Sammut, Dr Jennifer Cassingena Harper and Ms Ramona Saliba Scerri. Since her appointment, Ms Nadine Castillo is also a member of the steering group.

Digital Games Strategy

This initiative, coordinated by Malta Enterprise and Industry is a collaboration with The Malta Council for Science and Technology and the University of Malta on the development of a National Games Initiative. In 2011 this partnership met primarily at the working level where Dr Jennifer Casingena Harper represented the Council. The working group has adopted a structured approach addressing 4 main pillars, covering:

- The outcomes of the consultation exercise were discussed by six focus groups, which focused on the following themes: airway education, enthusiasts)
 - 2. Competence Building proposal
 - General Strategy (infrastructure, legislation, incentives, stakeholders, etc)
 - 4. Promotion Overseas

In 2011 work on a Digital Gaming Strategy for Malta was undertaken by a group of experts led by Professor William Latham, Director, Games Audit Ltd, UK. The Report was completed in 2011 and finalised in February 2012. A launch event was organised in April 2012 presided over by the Prime Minister.

In 2011 efforts to promote awareness and build competencies continued with the organisation of Gamezing 2011.





The ERAC Working Group on Knowledge Transfer

The main objective of this working group is to enhance the level of knowledge transfer by exchanging information on the status and progress of policies and initiatives which promote and enhance knowledge transfer and by identifying and disseminating good practices relating to policies and programmes for improving knowledge transfer and the management of intellectual property.

Throughout the year various outcomes of expert groups were presented and discussed. These included the outcome of the expert group study on international knowledge transfer (IKT), the outcome on indicators which had been tasked to come up with a proposal for a composite indicator on knowledge transfer for existing data sets and the outcome of the expert study done for the Commission in 2009 on model agreements for research collaborations between the private and public sector.

Also the group was kept informed about the status and first results of the Commission study on knowledge transfer which DG RTD commissioned to support the monitoring of implementation of the 2008 KT Recommendation. Malta actively participated in the group's discussion and provided official feedback as necessary. Malta's delegates to the Working Group on Knowledge Transfer are Ms Christine Perici and Dr Ing Anton Bartolo.

The Monitoring Committee for Euro-Mediterranean Cooperation in (RTD) (MoCo)

Through the Council, Malta has been very active in this forum which facilitates discussions between Euro-Mediterranean countries with the aim of monitoring and stimulating Euro-Med cooperation in Research and Technological Development (RTD). In 2011, the MoCo met once in Sveged, Hungary where main areas of discussion included the exploration of possibilities for regional innovation and the creation of synergies with other EU Policy Areas. A proposal for the creation of Euro Mediterranean research areas was also discussed.

During 2011, Malta involved itself in a number of projects related to Euro Med collaboration including the hosting of the 8th Euro-Mediterranean Ministerial meeting on Industry on the 11th and 12th of May 2011 together with the collaboration and agreement with Tunisia during the 9th Session of the Maltese-Tunisian Joint Commission held on 13th and 14th June, 2011 where it identified areas of cooperation in Research & Innovation (R&I) in the field of Science & Technology (S&T)

During the latter meeting, the two sides agreed to develop and facilitate cooperation in scientific and technological activities, with a view to promoting a knowledge-based society aimed at mutual economic and social development. The initiatives include technology transfer initiatives in full respect of Intellectual Property Rights. Collaboration with Tunisia includes also participation in projects and sharing of best practices. Malta's delegates to the Monitoring Committee for Euro-Mediterranean Cooperation are Ms Denise Bartolo, Mr Ian Gauci Borda and Mr Eric Flask.

European Research Area Committee (ERAC) High Level Group for Joint Programming (GPC)

The GPC (Groupe de haut niveau pour la Programmation Conjointe) responsible for identifying the themes for joint programming has matured further in 2011 coming up with a Draft Rules of Procedure of the GPC during the Annual Joint Programming event of 9-10 November in Brussels.

This was a major event addressed to research funders and programme managers which allowed the stock taking of the lessons learnt with the different types of public-public partnerships. Indeed the event provided a good forum to discuss cross cutting issues and best approaches for future public-public partnerships. Amongst other things, the GPC is currently discussing ways to involve industry in Joint Programming Initiatives (JPIs) and tap into Structural Funds mechanisms to fund JPIs. Additionally, ways to harmonise JPIs with other EU initiatives such as EIP are being sought.

Malta's delegates to the European Research Area Committee are Dr Ing. Nicholas Sammut, Ms Nadine Castillo, Ms Ramona Saliba Scerri and Mr Ian Gauci Borda.

RTD Evaluation Network (EUevalnet)

The EUevalnet is a platform for discussing, analysing and sharing information and best practice on issues related to evaluation methodology, together with use of research indicators and measurement of research impact.

The network aims to enhance dialogue and cooperation between various stakeholders including ministries and agencies, academics and experts, and the European Commission working in the area of Research and Technological Development (RTD) evaluation. Through this network, the quality of the use of RTD evaluation as part of evidence-based policy making is improved and strengthened.

The main focus of the meeting held in Warsaw in 2011 was the analysis of different RTD programme evaluation methods within Member States and the possibility of improving such processes through the sharing of best practices.

Malta's delegate to the EUevalnet is Mr Eric Flask.

Steering Group on Human Resources and Mobility (SGHRM)

The SGHRM has been active since 2002 and is tasked with the promotion, monitoring and reporting on the implementation of the Researchers' Partnership at EU and national levels.

These include EURAXESS portal, the European Charter and Code of Conduct for the Recruitment of Researchers, and the Scientific Visa. In 2011 a number of working groups were established, covering HR issues, portability of grants, researchers' training, monitoring and indicators and during 2012 it is expected to see the results of these efforts.

The Malta Council for Science and Technology implemented Legal Notice 102 of 2008 regarding the admittance of Third Country Nationals for Scientific Research Purposes (Scientific Visa) and is currently raising awareness regarding this procedure amongst the local research stakeholders.

Malta's delegate to the Steering Group on Human Resources and Mobility is Dr Brian Warrington.

European Strategic Forum on Research Infrastructures (ESFRI)

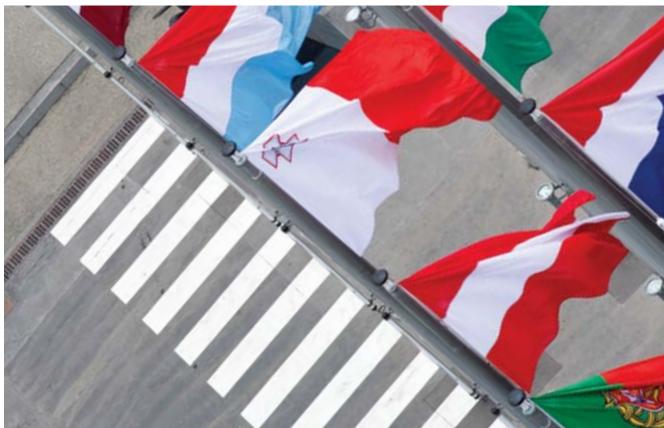
Way back in 2004 ESFRI was mandated to prepare a European Strategic Roadmap for Research Infrastructures.

In 2006 a list of 35 Research Infrastructure proposals was presented, while in 2008 these were updated to 44 proposals. Within this forum there are five thematic working groups: Physical Sciences and Engineering; Biological and Medical Sciences; Social Sciences and Humanities; Environmental Science; Energy, and the e-Infrastructure Reflection Group.

In 2010 there was a second update of the European Roadmap for Research Infrastructures which aimed at describing the infrastructural needs for the next 10 to 20 years, identify the vital new European Research Infrastructures of different size and scope, and include medium-sized infrastructures. These also included the fields of Humanities, Biological, Medical Sciences and Bioinformatics.

Additionally in 2010 there was an update of the infrastructures dealing with Energy, Food and Biology. The implementation of these roadmaps is currently ongoing. Malta's delegate to the ESFRI is Prof. Ing. Joseph Micallef.





The European Research Infrastructures Consortium (ERIC) Committee

The European legal framework for the ERIC Committee is designed to facilitate the joint establishment and operation of European research facilities, reaping the advantages and tax exemptions applicable to international organizations.

During 2011, the first ERIC status was awarded by the Commission to the cross-border databank SHARE, dealing with surveys on population ageing. A number of other Applications for ERIC status were submitted in 2011.

Malta's delegate to the ERIC Committee is Prof. Ing. Joseph Micallef.

High Level Space Policy Group

The aim of this group is to bring together representatives from 29 ESA and/or EU member states. This forum acts as a meeting point for discussing the practical implementation of the European Space policy programmes and prepares the meetings of the Space Council.

During 2011 the High Level Space Policy Group was involved in drafting the 8th Space Council Orientations concerning added value and benefits of Space security for European citizens which were eventually adopted by the Space Ministerial Council in December 2011.

These orientations spell out the policy orientations on Space, security and sustainable development, as well as provide policy orientations for Exploration.

Malta's delegates to the High Level Space Policy Group are Dr. Nicholas Sammut. Dr. John Betts and Mr Ian Gauci Borda.

Strategic Forum on International Scientific and Technological Cooperation (SFIC)

The main objective of SFIC is to facilitate the further development, implementation and monitoring of the international dimension of ERA by sharing information and consultation between the partners (Member States and the Commission) in order to identify common priorities which could lead to coordinated or joint initiatives.

In addition the group is also responsible for coordinating activities and positions vis-à-vis third countries and within international fora.

During 2011, SFIC continued its work on the externalisation of research beyond the European Union. In addition progress continued to be registered on all three of the Pilot Initiatives (China, US, India). With regard to China a series of events were organised aimed at stimulating stronger bi-lateral links between the two sides.

Furthermore, SFIC is currently finalising a China roadmap which should be completed in early 2012. With regard to the United States a high-level event was organised in Washington which brought the two sides together to discuss how the partnership could best be served. SFIC is currently in discussion regarding the 'next steps' on such a partnership.

With regards to India, in 2011 there was an agreement to open two coordinated calls in the field of water purification and water waste management and biotechnology, from which each side will be making available €16 million.

An awareness raising and information campaign was also organised across India's main research and innovation hotspots.

It is also pertinent to note that SFIC dedicated part of its work programme to its contribution to the ERA consultation. Malta's delegate to SFIC is Mr. Ian Gauci Borda.



Fusion for Energy (F4E) Governing Board

The F4E Governing Board is responsible for taking a number of important decisions as well as the supervision of F4E in the implementation of its activities. The Board decides and makes recommendations on a wide range of matters related mainly to Fusion and its main activity, that is, the ITER project.

implementation of the project by agreeing on the necessary procurement to proceed with the project. Furthermore, Malta's representative on the Board has been asked to serve on a dedicated configuration of the Governing Board relating to the annual assessment of the organisation.

Eventually the work of this group will be presented to the Ministers at the Competitiveness Council, who had asked for the annual report to keep track of the implementation of the project.

Malta's delegates for the Fusion for Energy Governing Board are Mr. lan Gauci Borda and Dr. Nicholas Sammut.

Board of Governors of the Joint Research Centre

Dr Jennifer Cassingena Harper recently completed a third term as Malta's delegate to the EU Joint Research Centre Board of Governors. This body oversees a network of EU institutes and provides policy and research support to the European institutions.

During 2011 it has been undergoing a process of internal restructuring During 2011, the Governing Board continued to follow the to address the grand challenges and Europe 2020 Innovation Union Flagship initiative. During her term of office, Dr Cassingena Harper served on a number of the Board's working groups.

> Malta's new delegate to the Board of Governors of the Joint Research Centre is Dr. Nicholas J. Sammut.



Enterprise Policy Group (EPG) Subgroup on Innovation

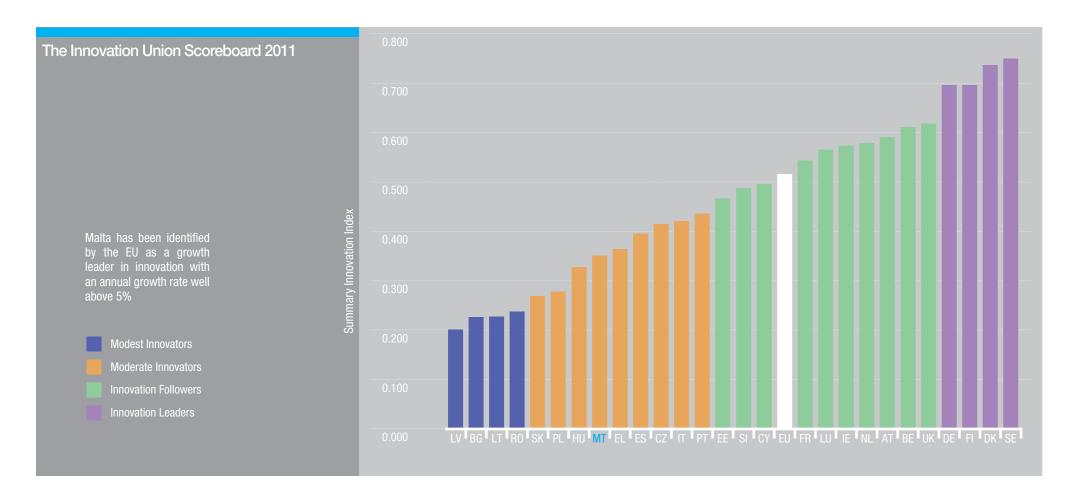
The sub-group on innovation provides advice on innovation policy issues in particular the Lead Markets Initiative as well as the Europe 2020 Innovation Union Flagship initiative. Throughout the course of 2011 the group was updated on various initiatives being undertaken by the Commission in particular the mid-term review of the implementation of the LMI action plans. In this regard possible future directions of the LMI was presented together with an overview of the final evaluation, which was being conducted by an external evaluator. Malta actively participated and provided input to the group on several issues, including the preparation of a common position on the future of European R&I funding as well as IPR valorisation. Malta's delegates to the Enterprise Policy Group are Ms Christine Perici and Mr Joe Borg Camilleri.

Conferences and Workshops

Members of the policy team participated in various workshops and conferences organised throughout 2011. These included:

Workshop on "Integration of Innovation in the Common Strategic Framework for Research and Innovation", which was part of a series of meetings organised as follow-up of the Common Strategic Framework for EU Research and Innovation Funding (Horizon 2020 - CSF) consultation

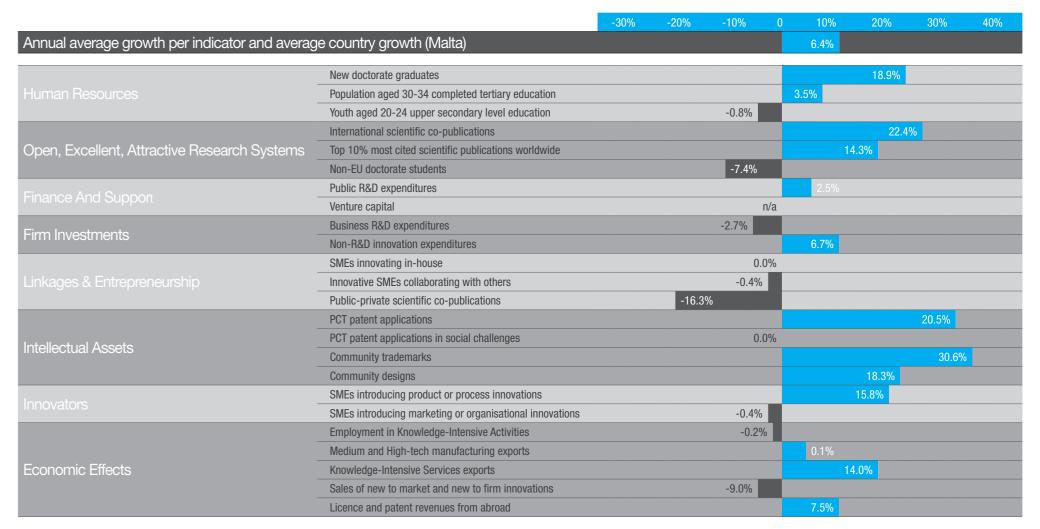
- The first European Conference on "New Procurement Strategies for Innovative Protective Textiles"
- The First European Innovation Convention
- Conference on Public Procurement for EU Funded Projects
- EU Commission Joint Research Centre Institute for Prospective Technological Studies (JRC-IPTS) 4th edition of the International Seville Conference on Future-Oriented Technology Analysis (FTA) on FTA and Grand Societal Challenges.
- EU Commission DG Research Workshop on "Responsible Research & Innovation in Europe"
- EU Commission DG INFSO Workshop on "Enabling Technologies in the Common Strategic Framework"
- Ministerial Conference on European Research Area entitled "Intellectual Capital Creative Impact" preceding the informal meeting of the Competitiveness Council.



During 2011, the first edition of the Innovation Union Scoreboard (IUS) was issued. This was based on the previous European Innovation Scoreboard however it is in line with the European 2020 Innovation Union flagship initiative which was launched in October 2010. The aim of this new tool is to monitor the implementation of this initiative as it provides a comparative assessment of the innovation performance of the EU27 Member States as well as the relative strengths and weaknesses of their research and innovation systems.

This new scoreboard is composed of 25 indicators which are considered to better capture the performance of national research and innovation systems within the Member States. It should be noted that these 25 indicators are not all new, 19 indicators were retained from the previous 'European Innovation Scoreboard', of which, 12 indicators were unchanged, two indicators were merged and five indicators were partly changed in order to have a broader or narrower definition. In addition, seven new indicators were introduced. In similarity with the previous addition, the indictors are grouped into three categories, enablers (human resources, finance and support), firm activities (firm investments, linkages & entrepreneurship, throughputs) and outputs (innovators, economic effects).

The results of the 2010 Innovation Union Scoreboard (published in 2011), show that Malta is among the Moderate Innovators group. However, Malta has been classified as a growth leader together with Bulgaria, Estonia, Romania, Portugal and Slovenia with an average annual growth rate well above 5%.



The average performance was measured using a composite indicator, the Summary Innovation Index (SII), on the basis of 24 indicators.

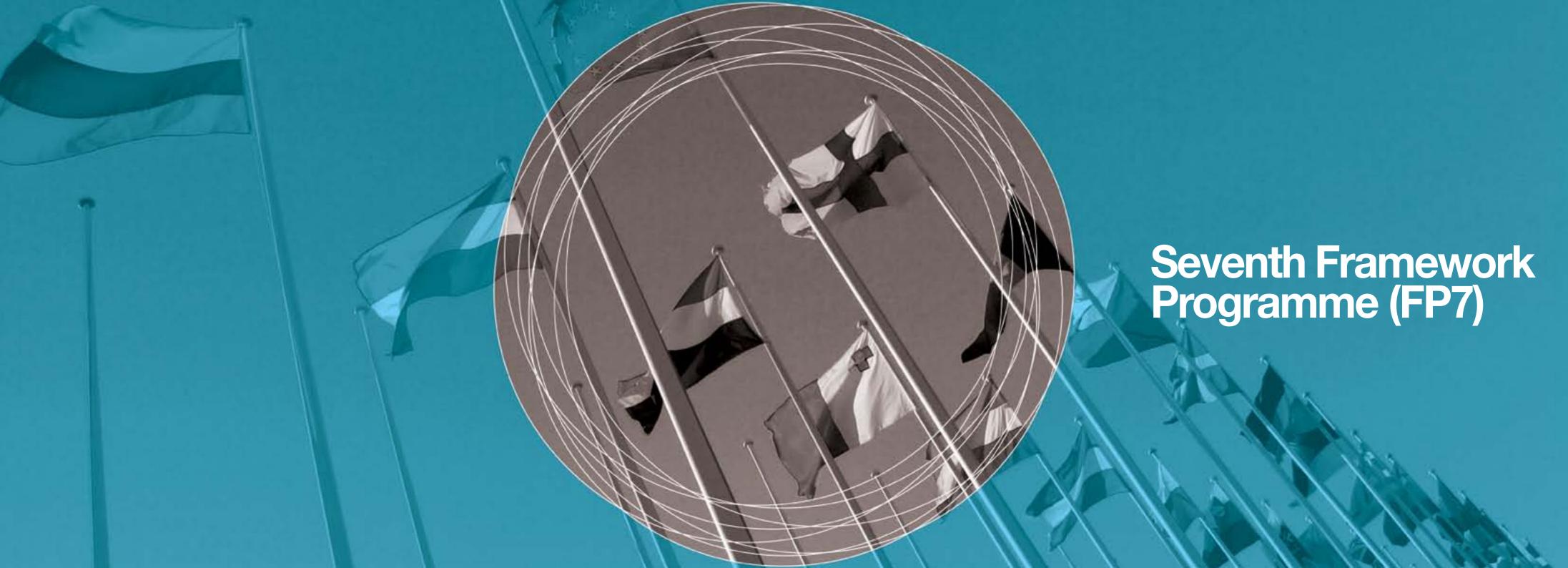
The results show that Malta has experienced growth in just over half of the indicators, that is, 13 out of 24 indictors, while 8 indicators have registered a decline. It can be noted that 2 indicators have remained the same while no data is available for the indicator on venture capital.

In particular, a growth of over 10% was observed for new doctorate holders (18.9%); international scientific co-publications (22.4%); top

10% most citied scientific publications worldwide (14.3%); PCT patent applications (28.4%); community trademarks (39.6%); community designs (18.3%); SMEs introducing product or process innovations (15.8%); knowledge-intensive services exports (14.0%) and license and patent revenues from abroad (17.5%).

Notwithstanding that eight indictors experienced a decline, there was only one indictor which registered an over 10% drop, namely the indicator on public-private co-publications (16.3%).

These results are indicative of the progress which the country is making in the sphere of research and innovation.



FP Funding Unit



The Seventh Framework Programme (FP7) bundles all researchrelated EU initiatives under a common roof, playing a crucial role in growth, competitiveness and employment.

FP7 is one of the world's largest international research programmes, and is managed by the European Commission (EC). Grants are determined on the basis of Calls for proposals and a competitive peer review process. The programme is divided into four main pillars (not including the Joint Research Centre (JRC) and the European

different research bodies in trans-national cooperation, whilst other Member States (MS). aiming to consolidate European leadership in key scientific and

technological areas:

- People supporting researchers' mobility at all stages of their
- Ideas funding bottom-up frontier research:
- **Capacities** aiming to enhance the research capacities in Europe.

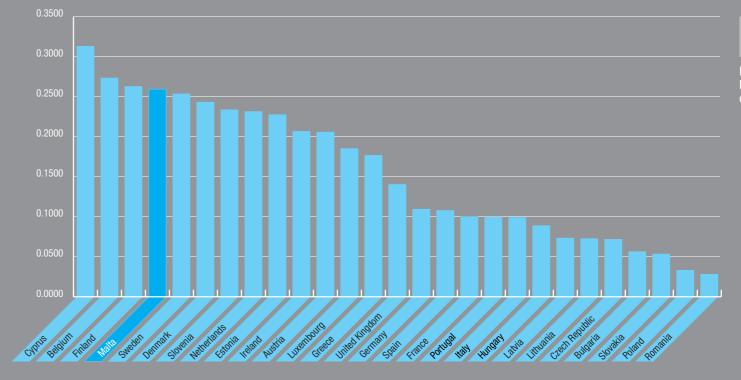
This FP7 Unit within the Malta Council for Science and Technology is Malta's leading information and advice service on the FP7.

Atomic Energy Community (EURATOM)), covering all scientific and The Unit, comprising of both National Contact Points (NCP) and Programme Committee Members (PCM), strives to highlight the - Cooperation supporting research activities carried out by importance for Malta to enter into high national priority projects with

The main role of the Unit is to ensure a high level of networking and lobbying alongside other EU MS for the sole reason of promoting Malta's assets and qualities.

In 2011, the FP7 Unit has strengthened its capacity by recruiting another full-time executive.

By the end of 2011, Malta has had a total of 113 FP7 Projects, tapping into approximately € 11 million in funds. As explained in the graph on the right, Malta placed in 4th place in FP7 participation and funds allocated per capita.



FP7 Funding (in EUR Million) per capita (per 1,000 inhabitants)

Malta is fourth in Europe if one considers Number of Projects (or funding) per

FP7 Information Sessions for Newcomers

Prior to the publication of the FP7 Calls, the Unit had organised an information session for newcomers. The information session aimed at giving a broad overview of the funding programme, including aspects of participation and information on how to get support.

The main target group for this session were participants with no or very limited experience in the FP7. The session was attended by over 60 participants and due to demand, the session was repeated.

Activities Held in 2011

Throughout 2011, the FP7 Unit has been very active in enticing new participants to participate actively in the Programme.

A targeted approach has been adopted to promote participation within the different sectors - public, private and academia. Our client database currently has over 1,000 subscribers from all sectors and these receive updated information from the Commission on the publication of Calls for proposals, notifications of meetings (both locally and abroad) and on specific partner searches. Action Plans addressing all thematic areas have been devised to tackle issues related to the areas, so as to ensure best practices and effective measures.

The FP7 Unit continues to attend a number of meetings abroad in order to give visibility to Malta's position to the Commission on participation within the FP7.

How can WE HELP YOU?

Information Sessions on Thematic areas and Schemes

Information sessions on all thematic areas of the FP7 were organised by the NCPs throughout the year. The events were as follows:

- 12 April Marie Curie Fellowships;
- 22 June 'Food, Agriculture and Fisheries, and Biotechnology':
- 27 June Research Potential and Regions of Knowledge;
- 25 July Energy and Environment;
- 26 July Training Session for Small and Medium Enterprises (SMEs);
- 27 July –Health;
- 28 July Security and Space:
- 1 August Nanosciences, Nanotechnologies, Materials and New Production Technologies;
- 28 August Information and Communication Technologies;
- 1 September Funding Options for Research, Technology, Development and Innovation (RTDI) Providing a Voice for SMEs;
- 14 October –Socio-economic Sciences and Humanities.



Financial Workshop

The Unit organised a FP7 Financial Workshop on the 27th October 2011 at Villa Bighi, Kalkara, on the Financial Issues of the Programme.

This interactive workshop gave the participants a detailed insight into the financial aspects of the FP7, covering basic financial rules, direct costs, overheads rates, cost reporting and payments. The Workshop also covered the financial workings required when submitting an FP7 project proposal.

The workshop was targeted at financial staff and administration staff, researchers, project managers who were involved or were willing to get involved in FP7 projects.

Other Events

Additionally, the FP7 Unit also organised specific information sessions to targeted groups, including ST Microelectronics, the Chamber of Engineers, the Faculty of Engineering and the Biology Department at the University of Malta.

The Malta Council for Science and Technology's NCPs were also invited as speakers at various information events organised by MEUSAC, Malta Enterprise and the Water Services Corporation.

Brokerage Events Scheme 2011

The Malta Council for Science and Technology constantly aims at reaching out to the key players within all the scientific areas funded under the FP7, so as to assure Malta's visibility and willingness to participate in EU projects. Hosting Brokerage events on the Maltese Islands is the most effective way to promote Malta's competitiveness and resources it has to offer; however, attending such events is also of value towards recognition and building affiliations. This brokerage scheme has been calculated as being a very successful one, calling for an extended action plan for the year 2012.

These brokerage events market scientific and technological partnerships between EU Member States and International Cooperation Partner Countries (ICPC), boosting networking and the marketing of innovative ideas which contain an EU added-value and advanced technology solutions.

Ten researchers belonging to different sectors have been supported financially by The Malta Council for Science and Technology to attend FP7 Brokerage Events organized in the year 2011. The events covered where the following:

- Solar Energy for Science Brokerage Event, Hamburg;
- ICT Proposer's Day, Budapest;
- NMP+PPP Brokerage Event, Strasburg;
- FUMAT, Warsaw
- Challenge Social Innovation, Vienna;
- Food Brokerage Event, Murcia; and
- A number of proposal preparation meetings.

Activities Planned for 2012

The FP7 Unit will, in 2012, make every effort to continue supporting Maltese entities in participating in the final year of the FP7. A number of information sessions and training workshops are currently being planned for 2012.

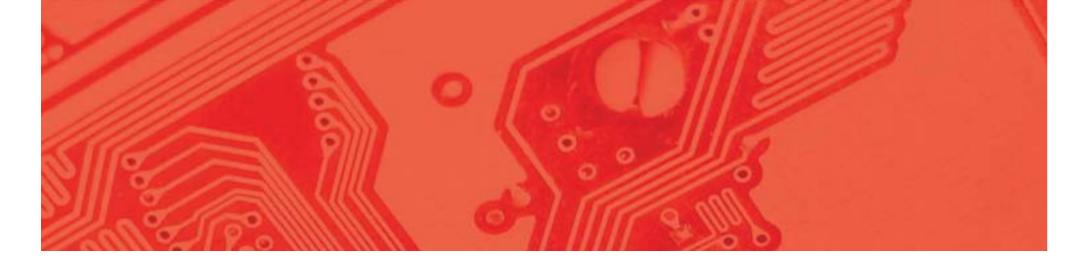
The Unit will also be developing a researchers' directory to map expertise in the different sectors in Malta. This activity will serve to promote successful FP projects to entice new participants and to create small networks amongst researchers and other contact points to facilitate the dissemination of information on the Framework Programme.

The Unit is participating actively in discussions on the Horizon2020 Programme (successor of the FP7) to ensure Malta's position within the final documents. For this reason, the Unit works closely with the Strategy and Policy Team in seeking feedback from local experts.

One-to-one Meetings

The NCPs attended numerous one-to-one meetings throughout 2011. The aim of these meetings was to inform participants about the FP7 calls and advise and assist whenever necessary.

The NCPs have also assisted proposers in preparing and reviewing their FP7 project proposals.



Cooperation

The core of FP7, representing two thirds of the overall budget, is the Cooperation programme.

This Specific Programme supports all types of research activities carried out by different research bodies in trans-national cooperation and aims to gain or consolidate leadership in key scientific and technology areas.

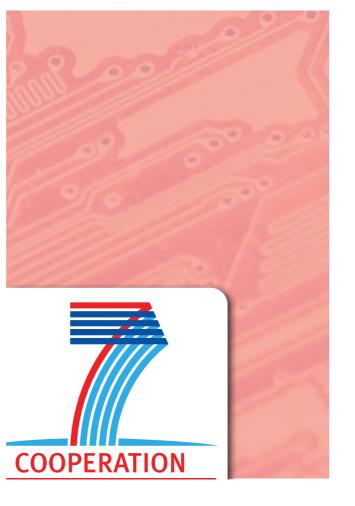
For the duration of the FP7, €32 billion have been allocated to the Cooperation Programme. The budget is devoted to supporting cooperation between universities, industry, research centres and public authorities throughout Europe and beyond.

The Specific Programme is subdivided into 10 distinct themes:

- Food, Agriculture and Fisheries, and Biotechnology
- Information & Communication Technologies (ICT)
- Nanosciences, Nanotechnologies, Materials and New Production Technologies
- Energy
- Environment (including Climate Change)
- Transport (including Aeronautics)
- Socio-economic Sciences and the Humanities
- Security
- Space

Each theme is operationally autonomous but aims to maintain coherence within the Cooperation Programme and allows for joint activities cutting across different themes through joint calls. The 10 themes reflect the most important fields of knowledge and technology where research excellence is particularly important to improve Europe's ability to address its social, economic, public health, environmental and industrial challenges of the future.

Collaborative research aims to establish excellent research projects and networks able to attract researchers and investments from Europe and the entire world. This is being achieved through a range of funding schemes including Collaborative Research Projects, Networks of Excellence and Coordination and Supporting Actions.



Health

Considered as a prime theme under the Cooperation pillar, the central objective of research for Health under FP7 is that of ensuring a continuous development in global health-related issues. With a total of €6.1 billion allocated, precedence is being given to specific areas namely, biotechnology, the translation of research for human health, generic tools and technologies for humans, with an emphasis on the inclusion of high-tech SME's and international cooperation.

Strong EU-based biomedical research will enhance competitiveness of the European pharmaceutical and healthcare industries. Therefore it is imperative that the EU creates an environment conducive Throughout the project, NCPs were given the opportunity to attend to innovation in the public and private sectors. Enhancing the competitiveness of health related businesses and industries, while addressing worldwide health matters, are further fundamental objectives under Health.

The National Contact Point for Health is Diana Spiteri (diana.a.spiteri@ gov.mt) +356 2360 2128 and Joanna Pullicino (joanna.pullicino@gov.

Health NCP Net (HNN)

Health NCP Net (HNN) is a network of Health NCPs. The main focus of the project is to share the existing know-how and to utilise already existing resources. The main activities of the project are primarily benchmarking, networking, transnational brokerage events as well as training NCPs in every aspect of their duties. Less experienced NCPs as well as Contact Points in International Cooperation Partner Countries (ICPCs), also have the opportunity to rapidly acquire the know-how accumulated in other countries to perform their work

information sessions on diverse topics such as Ethics, Communication and Patient Involvement.

In 2011, the Health NCPs were also invited to attend trainings on FP7 Legal & Financial issues, such as on Audits and Intellectual Property Rights (IPR) and have received training on the organisation of events. Furthermore, a series of partnering events were organised, such as the Health Partnering Event 2011 in view of the July 2011 FP7 Health Call. The Partnering Event offered the possibility to present project ideas or company expertise in order to extend cooperation with international partners in the Health sector. There was also a possibility to participate in pre-booked bilateral meetings to establish new contacts and partnerships.

The total budget allotted to The Council over the duration of the project is €142.310.



Food, Agriculture Fisheries & Biotechnology

The main aim behind this thematic area is to provide for safer, ecoefficient and competitive products and services for agriculture. fisheries, food, health, forest-based and related industries. With funding of more than €1.935 billion for this theme over the duration of FP7, research is carried out on the safety of food and food chains, diet-related diseases, consumer food choices and the impact of food and nutrition on health.

The main research activities include:

- Sustainable production and management of biological resources from land, forest, and aquatic environments.
- Tools to implement relevant strategies, policies and legislation supporting the European knowledge based bio-economy.
- The integrity and control of the food chain ("fork to farm") is researched addressing food, health and well-being.
- products and processes.

The National Contact Point for Food, Agriculture & Fisheries & Biotechnology is Alexandra Camilleri (alexandra.a.camilleri@gov. mt) +356 2360 2360 and Diana Spiteri (diana.a.spiteri@gov.mt) +326 2360 2128.

BIO-NET

BIO-NET supports the successful participation of research centers, universities and innovative SMEs in EU-funded FP7 "Knowledge Based Bio-Economy" research projects.

Funded by the EC, the BIO-NET project combines the efforts of NCPs for the FP7 Knowledge Based Bio-Economy theme in all European countries. By joint collaboration in activities that have a high impact when performed on an international level, BIO-NET aims to provide high quality support for organisations that wish to participate in FP7

The main objective of the "BIO-NET" project is to offer advice and support to organisations that are interested in EU-funded research projects in the KBBE thematic priority of the FP7.

The BIO-NET NCPs support aims to help improve the quality of • Life sciences and biotechnology for sustainable non-food research project proposals submitted in the KBBE theme of FP7 and to lower the barriers for newcomers, in particular young researchers and SMFs.

> The BIO-NET network of NCPs assists interested parties by providing information and tailor-made training sessions. It also offers support in consortium building by locating suitable project partners and organising matchmaking events.

Finally, BIO-NET aims to improve the quality of NCP services throughout Europe by exchange of best practices, experience and common tools

The total budget allotted to The Council over the duration of the project is €30.559.



Information & Communication Technologies (ICT)

To boost innovation, creativity and competitiveness, the EU has earmarked a budget of €9.05 billion, so as to ensure that ICT research activities will cover strategic priorities in areas of European industrial and technological leadership, such as communication networks, embedded computing, nanoelectronics and technologies for audiovisual content. Furthermore, the aim is to drive growth and sustainable development for the coming decades in order to meet the demands of the society and the economy.

ICT is opening up many new opportunities for European citizens and consumers. There is a wide range of applications including healthcare provision, transport systems, as well as innovative interactive systems for entertainment and learning. Considered as the largest research theme under FP7, the facilitation of the creation of new forms of networked business processes and applications, as well as new engineering approaches for the application of ICT in manufacturing will be further enhanced towards ensuring Europe's global leadership in ICT.

The National Contact Points for Information and Communication Technologies (ICT) are Marie Claire Tonna (marie-claire.tonna@gov. mt) +356 2360 2143 and Eric Flask (eric.flask@gov.mt) +356 2360

Idealist 2011/ Idealist 2014

The main objective of Idealist2011, concluded in late 2011, was to reinforce the network of National Contact Points (NCP) for ICT under FP7, by promoting further trans-national cooperation within this network. This cooperation was not just between ICT NCPs but also amongst similar networks in parallel themes (Security, SSH, ENV, Transport, Energy, Health, etc), particularly within the context of joint calls with cross-cutting scientific areas, such as the Public-Private Partnerships (PPP).

It was built upon the experience gained over more than 13 years from the six preceding projects covering FP4 to FP7. It has continuously strived for the provision of training and twinning for the less experienced NCPs and is also renowned for partner search quality support. IDEALIST2014 has also focused on strengthening NCP cooperation with support for Member States (MS), Associated Countries (AS) and International Cooperation Partner Countries (ICPC) and on supporting SMEs in the ICT sector and for organisations new to the FP. It also served to promote opportunities and Idealist services ensuring a higher visibility of the NCPs.

In 2011, this project has been responsible for trainings, and project meetings, which have proved to be a resourceful means of knowledgesharing. It has also been responsible for the organisation of bilateral meetings at prominent FP7 events, such as the ICT Proposer's day held during the Hungarian Presidency.

The total budget allotted to the Council over the duration of the Idealist2011 project is €17.955.

The main objective of Idealist2014 is to continue the efforts of the previous seven Idealist projects. Furthermore Idealist2014 aims to address national and cross-border audiences to stimulate. encourage and facilitate the participation in current and future community ICT research of organisations of all types. Special focus is put on newcomers and SMEs, including organisations from MS, AS and ICPCs which comprise countries from Eastern European Partner Countries (EEPC), Mediterranean Partner Countries (MPC) and selected ICPCs with high technical and economic potential.

The total budget allotted to the Council over the duration of the Idealist2014 project is €60,706.



Nanosciences, Nanotechnologies, Materials and New ProductionTechnologies (NMP)

The core objective of the 'Nanosciences, Nanotechnologies, Materials and new Production Technologies (NMP)' theme is to improve the competitiveness of European industry and generate the knowledge needed to transform it from a resource-intensive to a knowledgeintensive industry.

NMP research also aims to strengthen the competitiveness of European industry by generating 'step changes' in a wide range of sectors and implementing decisive knowledge for new applications between different technologies and disciplines. Funding the NMP research theme will benefit new, high tech industries and highervalue, knowledge-based traditional industries, with a special focus to the appropriate dissemination of research results to SMEs.

The transformation of European industry into a knowledge-intensive one is essential in order to produce high added value products, which in turn is crucial to create new industries, and meet customer requirements as well as growth, environmental, health and other societal expectations.

Emphasis has been given to the following activities:

 Nanosciences and nanotechnologies - studying phenomena and manipulation of matter at the nanoscale and developing nanotechnologies leading to the manufacturing of new products and services.

- Materials using the knowledge of nanotechnologies and biotechnologies for new products and processes.
- New production creating conditions for continuous innovation and for developing generic production 'assets' (technologies, organisation and production facilities as well as human resources), while meeting safety and environmental requirements.
- Integration of technologies for industrial applications focusing on new technologies, materials and applications to address the needs identified by the different European Technology Platforms.

The National Contact Point for Nanosciences, Nanotechnologies, Materials and New Production Technologies (NMP) is Alexandra Camilleri (alexandra.a.camilleri@gov.mt) +356 2360 2360.

NMP Team

The NMP Team project, finalised in 2011, aimed at closer collaboration between the NMP NCPs in Europe and beyond, through the normalisation of the differences in knowledge and improvement in the quality of services provided across the NCP network.

To this effect, NMP Team created an interactive partner search system and website open to all clients; has maximised networking opportunities for clients through brokerage events, joint stands and joint awareness campaigns; has ensured the standardisation of skills through documentation and training actions; and has forged stronger links with all NMP related platforms, networks and EU initiatives in

During 2011, NMP Team has increased its visibility by being present at international newtworking events, such as Future Materials for Grand Challenges (FGMAT), during the Polish Presidency and Information Sessions such as one organised for the Private-Public-Partnership

The total budget allotted to the Council over the duration of the project is €82.689.



It is of utmost importance to not only dramatically curb greenhouse gas emissions, but to identify and develop adequate and timely solutions, which are to be justified by the alarming trends in the and to enhance ICPCs' and SMEs' participation. global energy demand. Such proceedings would effectively ease the devastating consequences of climate change, the detrimental volatility of oil prices and geopolitical instability in supplier regions. These main objectives within Energy under FP7 are supported with a budget of €2.35 billion by the EU MS and the European Parliament (EP) allowing for the transformation of the current energy system into a more sustainable one, making it less dependent on imported fuels.

Energy efficiency, which includes rationalising the use and storage of energy, will be enhanced, therefore addressing the pressing challenges of security of supply and climate change. The end result ought to be a diverse mix of energy sources, in particular renewable ones, energy carriers and non-polluting sources.

The National Contact Points for Energy are Diana Spiteri (diana.a.spiteri@gov.mt) +356 2360 2128 and Alexandra Camilleri (alexandra.a.camilleri@gov.mt) +356 2360 2360.

C-Energy +

The main objectives of C-Energy+ lie in increasing the quality of Energy proposals through the support of professionals Energy NCPs

These objectives are being achieved through the continuous training for Energy NCPs and through the provision of networking for researchers and SMEs in the energy sector.

During the year 2011, C-Energy+ organized and participated in several events including the SET-Plan Conference 2011 during the Polish Presidency and at ENERGISSIMA. Renewable Energies and Environmental Technologies National Convention and Exhibition in

The total budget allotted to the Council over the duration of the project is €21.142.





Environment

is to enhance the proper administration of the environment. For the development of environmentally-friendly technologies, tools and services, an increase in knowledge in relation to the interaction among the ecosystems, climate, biosphere and human activities is

Strengthening the EU's position in world markets for environmental technologies will contribute to sustainable consumption, production, delivering sustainable growth through business opportunities and improved competitiveness, while protecting our cultural and natural heritage. For the success of these, the EU has earmarked a total €1.89 billion for funding this theme.

The National Contact Points for Environment are Denise Bartolo (denise.bartolo@gov.mt) +356 2360 2360 and Diana Spiteri (diana.a.spiteri@gov.mt) +356 2360 2128.

Environment-NCP-Together

The central objective of funding the Environment research theme
This project aims at reinforcing the cooperation between the NCPs for the Environment Thematic area. The network is the main channel of communication between the EC and the community of potential participants. The network is also seeking to enhance the cooperation with the ICPCs, in particular emerging countries like China and India or developed countries like Australia and New Zealand.

> In 2011, the network organised a consortium meeting and a training session for NCPs in Malta, which focused on proposal pre-screening and evaluation.

> The total budget allotted to the Council over the duration of the project is €49.800.





Transport

The core objective of Transport under FP7 is to build up safer, greener and smarter European transport systems for the benefit of all citizens. Moreover, research related to transport will also have direct impact on other major areas such as trade, competition, employment, environment, cohesion, energy, security and the internal market. While aiming to respect the environment and boost the competitiveness of European industries, it is imperative to address the different political technological and socio-economic challenges in a cost-effective manner on issues such as Aeronautics, Air Transport, Waterborne Transport as well as Sustainable Surface Transport.

So as to guarantee safe transportation of both people and goods, easing of the negative effects and consequences of increased mobility in relation to the environment, energy usage, safety, security and public health, are to be properly executed. This is done by means of the €4.16 billion earmarked by the EU.

The National Contact Point for Transport is Diana Spiteri (diana.a.spiteri@gov.mt) +356 2360 2128.

ETNA - European Transport NCP Alliance

The European Transport NCP Alliance (ETNA) project aims at the development and implementation of a coordination mechanism for stimulating closer cooperation among NCPs. ETNA facilitates the improvement of the overall quality of NCP services across Europe in the area of transport and increase the transparency of EU research to ensure equal access for all.

This will be accomplished by fulfilling the following basic objectives of the project, which include reinforcing the network of NCPs by promoting trans-national cooperation; identification and promotion of best practice; provision of training and twinning measures tailored to the specific needs of transport NCPs; improvement of networking with other networks, organisations and initiatives with the ultimate goal of acquiring and disseminating information beneficial to the research community and instrumental in facilitating a higher average quality of submitted proposals; and development of tools and practical initiatives which benefit cross-border audiences – in particular for supporting potential participants in the search for project partners.

The Malta Council for Science and Technology is an Associated Partner (AC) of the ETNA Project, therefore, benefiting from training activities organised, as well as attending events organised by the network, such as SEETRANS 2011 - Transport Research Opportunities for South East Europe in the EU, held in Ljubljana, Slovenia.







Security

The primary aim of the Security theme is to invest in knowledge and develop further technologies in order to protect citizens from threats such as terrorism, natural disasters and crime while respecting privacy and safeguarding fundamental rights.

Moreover, research in the timeframe of the FP7 will address the following areas:

- Security of citizens:
- Security of infrastructures and utilities;
- Intelligent surveillance and border security;
- Restoring security and safety in case of crisis;
- Security systems integration, interconnectivity and interoperability:
- Security and society:
- Security research co-ordination and structuring.

Via the EU MSs and the EP's Funding of €1.4 billion, as a result of co-operating and coordinating efforts on a Europe-wide scale, the EU can better understand and respond to risks in a constantly changing world. Security related research is expected to generate new knowledge and promote the application of new technologies in the field of civil security.

The National Contact Points for Security are Marie Claire Tonna (marie-claire.tonna@gov.mt) +356 2360 2143 and Denise Bartolo (denise.bartolo@gov.mt) +356 2360 2360.

Seren 2

This project is a continuation of the efforts undertaken in the former project SEcurity REsearch Ncp network phase I (SEREN I).

Like the preceding project, this project aims to tackle and overcome the difficulties of building international partnerships. So as to foster the participation in the security research field, the network will organize joint brokerage events and awareness campaigns with a focus on promoting good project ideas and on identifying ways and means for the end-user involvement. To support these activities, special tools will be developed and implemented, such as a matchmaking tool for competencies.

Security research (policies, new programmes, conferences and workshops) will be monitored and analysed to provide synthesized information to stakeholders at all levels.

The total budget allotted to the Council over the duration of the project



Space

Space-based science is an important driving force for new technological The purpose of the COSMOS project has been to build a strong network Monitoring for Environment and Security).

theme over the duration of the FP7.

- Space-based application at the service of European society;
- Exploration of space:
- Research and Technological Development for strengthening Space measures for SMEs.

gov.mt) +356 2360 2143.

COSMOS

developments that have an impact on our daily lives; it is also a strategic of Space NCPs in order to identify and exchange good practice, industrial sector for growth and its applications underpin economic activity and elaborate and conduct training courses for the NCP staff, gather and government services. In order to manage the consequences of natural disasters provide up-to-date information on Space and neighbouring topics and climate change, the European Union opted to invest in GMES (Global and develop common concepts to raise awareness for the FP7 Space Programme and the Space NCPs.

Balancing efforts by MSs and other key players such as the European Space COSMOS, as the network of Space NCPs, provides additional services Agency (ESA), the EU has allocated more than €1,430 million for funding this such as a joint newsletter which provides the latest news on Space, including Space relevant calls and events, a central help desk on Space in FP7, support for consortia building through partner search Research activities during the lifetime of FP7 will be drawn from the following events and common information days with details on open FP7 Space calls, as well as the publishing of relevant partner searches. Special features published on the COSMOS website also provide information about other Space programmes, Space actors and about support

The National Contact Point for Space is Marie Claire Tonna (marie-claire.tonna@ In 2011, a series of bilateral meetings, brokerage events, and conferences were held in different parts of Europe, including international cooperation with non-EU countries such as South Africa and Russia.

> The total budget allotted to the Council over the duration of the project is €17,923.





People

The People Specific Programme acknowledges that one of the main competitive edges in S&T is the quantity and quality of its human resources. To support the further development and consolidation of the European Research Area (ERA), the overall objective is to make Europe more attractive for researchers by seeking to transform Europe into an attractive continent that supports innovation, knowledge creation and encourages researchers to stay.

the rest of the world, a series of EU research funded actions have been supporting the on-going training, research and mobility of highly qualified scientists. By meeting the above objectives, the proliferation of centres of excellence in the EU and their contribution in new areas and communication and intercultural skills training. of research and technology have been encouraged.

By means of a set of Marie Curie Actions, the People Programme continues to improve the human potential in European research and development by covering all stages of a researcher's professional life, from initial training to lifelong learning and career development. job training. To achieve the objective to stimulate mobility between sectors and increase knowledge sharing through joint research partnerships, the EU has allocated a total budget of €4,750 million for the duration of is €33,705.

The National Contact Points for People are Anthea Fabri (anthea. fabri@gov.mt) +356 2360 2141 and Alexandra Camilleri (alexandra.a.camilleri@gov.mt) +356 2360 2360.

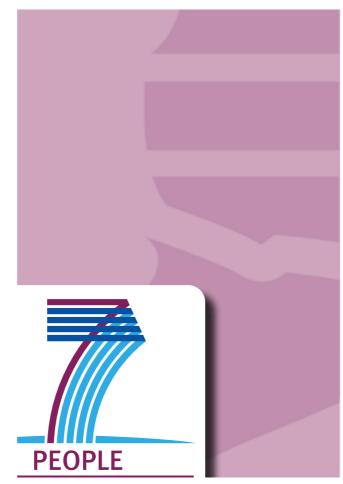
PeopleNetwork

The network for People NCPs came to an end in December 2011. The PeopleNetwork Project aimed at developing a coordination mechanism for stimulating closer cooperation among NCPs for the People Programme in FP7. The network was useful in facilitating the improvement of the overall quality of NCP services across Europe and in increasing the transparency of EU fellowships and training opportunities.

As this Pillar caters for both researchers located within the EU and In fact, throughout 2011, the network organised a number of training sessions for NCPs including training on financial issues organised in collaboration with the Research Executive Agency (REA); training on IPR issues and proposal writing; workshop on the Euraxess portal;

> In April 2011, The Malta Council for Science and Technology hosted a group of People NCPs from the Netherlands, Turkey and Montenegro in a twinning visit which aimed at learning from the experiences of our colleagues through on-the-

> The total budget allotted to the Council over the duration of the project





Ideas

The Ideas Programme, applied through the European Research Council (ERC) and funded through the EU which has allocated the sum of €7.51 billion, aims to reinforce excellence, dynamism and creativity in European research and improve the attractiveness of Europe for the best researchers from both European and third countries, it also aims at sustaining risk-taking and high-impact research and promoting world-class scientific research in new, fast emerging fields. In order to fulfil these objectives, the ERC funds research of the very highest quality at the frontiers of knowledge thus supporting the EU's Europe 2020 strategy for smart, sustainable and inclusive growth and the EU's flagship Innovation Union initiative.

The main concept behind Ideas is that first-rate researchers are best placed to identify new opportunities and directions at the frontiers of knowledge to reinforce excellence, dynamism and creativity in European research. These in turn will feed back into society and find their way to the industries and markets, and translate into the broader social innovations of the future.

Frontier research which is supported by the Ideas Programme, is a key driver of wealth and social progress because it offers new opportunities for scientific and technological advancement, and is instrumental in producing new knowledge leading to future applications and markets. The ERC is expected to reinforce Europe's dynamic character, making it more attractive to leading scientists from both Europe and third countries, as well as for industrial investment.

Three types of the ERC grants are available, both operating on a "bottom-up" basis without predetermined priorities, across all fields

- The ERC Starting Independent Researcher Grants (ERC Starting Grants) boost the independent careers of excellent researchers by providing adequate support at the critical stage where they are starting or consolidating their own independent research team or programme .:
- The ERC Advanced Investigator Grants (ERC Advanced Grants) encourage substantial advances at the frontier of knowledge by supporting excellent, leading advanced investigators to pursue ground breaking, high-risk/high gain research.
- The ERC Synergy Grants will enable small groups of Principal Investigators (with a designated Lead Principal Investigator) and their teams to bring together complementary skills, knowledge, and resources, in order to jointly address research problems at the frontier of knowledge going beyond what the individual Principal Investigators could achieve alone.

The National Contact Point for Ideas are Anthea Fabri (anthea.fabri@ gov.mt) +356 2360 2141 and Saviour Zammit (saviour.zammit@





Capacities

The Specific Programme Capacities addresses the need to enhance the excellence of research and innovation capacities throughout Europe.

These needs will be met by supporting modern and effective research infrastructures, strengthening the innovation capacity of SMEs, strengthening the research potential of European regions, realisation of the full research potential of the enlarged Union, building an effective and democratic European knowledge society whilst playing a leading role at world level.

The Capacities programme is provided with a budget of €4.07 billion to operate in seven broad areas:

- Research infrastructures
- Research for the benefit of SMEs
- Regions of knowledge and support for regional research-driven
- Research potential of Convergence Regions
- Science in society
- Support to the coherent development of research policies
- International cooperation

This Specific Programme is designed to maximise the leverage and impact of European level research spending within the available budget, with a strong element of continuity and with major new approaches, creating capacity for tomorrow's research excellence.

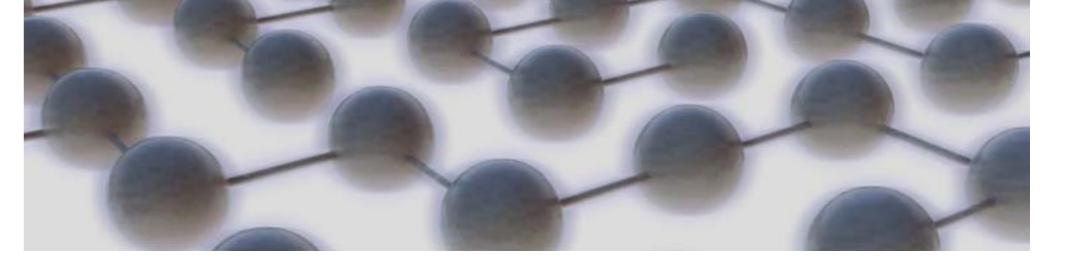
Whenever appropriate, synergies and complementarity will be sought with other community policies and programmes.

This specific programme will enhance research and innovation capacities throughout Europe and ensure their optimal use. The objectives will be achieved through initiatives in six areas listed below and for which objectives are further detailed in their respective Work

This specific programme also aims to:

- support the coherent development of policies;
- complement the Cooperation programme;
- contribute to EU policies and initiatives to improve the coherence and impact of Member States policies;
- find synergies with regional and cohesion policies, the Structural Funds, education and training programmes and the Competitiveness and Innovation Programme





Research Infrastructures

Keeping in mind that Research Infrastructures (RI) play an increasing role in the advancement of knowledge, technology and their exploitation, they need a broad range of expertise to be developed and should be used and exploited by a large community of scientists and industries on a European scale. Thousands of scientist and students from universities, research institutes or industries from Europe and abroad, benefit from research infrastructures, proving that research infrastructures are of crucial importance for research, education and innovation.

RIs stimulate industrial impacts and play an outstanding role in building the boundary between science and industry. Industry uses research infrastructure facilities in collaboration with researchers which clearly stimulates industrial impacts and plays an outstanding role in building the interface between the two. These facilities, resources or services have the ability to bring together people and investment and to contribute to national, regional and European economic development.

In this context, the EU Member States have earmarked about €1.715 billion for funding this theme over the duration of FP7.

The National Contact Points for Research Infrastructures are Diana Spiteri (diana.a.spiteri@gov.mt) +356 2360 2128 and Denise Bartolo (denise.bartolo@gov.mt) +356 2360 2360.

EuroRIsNet/EuroRIsNet+

The EuroRis-Net which closed in 2011 consisted of more than 35 partners from Member States, Associated countries, including countries such as Russia. Canada and South Africa.

The main aim was to "put" the RIs and their key role in the "spotlight of ERA", through several coordination activities and high level services offered by the Network. EuroRIs-Net also aimed at raising awareness on the capacities and capabilities offered by RIs and their important role on the further improvement and development of the European excellence on all Research fields; the enhancement of the innovative base of the European Industry the strengthening of the dialogue with ICPC countries with important RIs for mutual benefit.

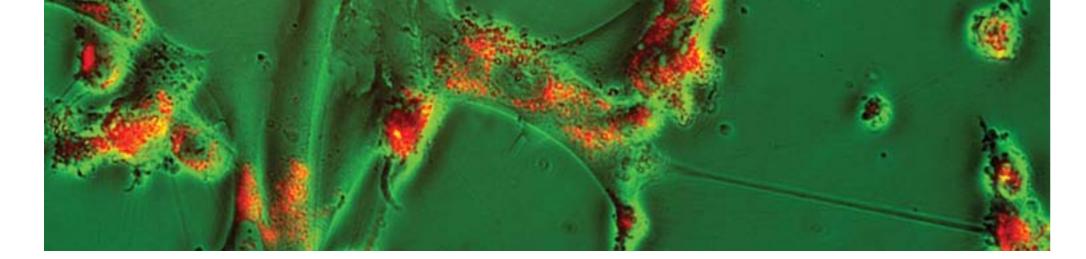
The implementation of EuroRIs-Net will ensure:

- The coordination and synergies between NCPs networks;
- The raised awareness across Europe;
- The offer of a high quality of RIs NCP service across Europe for the benefit of users, Scientific Society, Industry, potential proposers and projects' consortia.

The total budget allocated to the project EuroRls-Net was of €1.8 million of which €22.598 were allocated to The Council.

Following the closure of EuroRIsNet is EuroRisNet+ which aims to further improve data collection and dissemination, enhancing visibility of access opportunities to Research Infrastructures and introducing an active forum for RI stakeholders. The role of NCPs within the RI's Programme is that of endorsing and publicizing the paramount function of strengthening EU competitiveness.

The total budget allocated to the project EuroRls-Net+ is of €949,984 of which €17.108 were allocated to The Council.



Research for the Benefits of Small and Mediumsized Enterprises (SMEs)

European SMEs are an essential source of growth, employment, entrepreneurial skills, innovation and economic and social cohesion. technological innovation which will help them survive and prosper in the long run.

The main advantages for SMEs taking part in FP7 are:

- higher funding rates:
- a wider choice of funding schemes:
- the acquisition of new knowledge;
- increased potential for new products and services.

Under FP7, SMEs can strengthen their overall position through networking and relationship building with international partners, access to research centers of excellence, and development of research and innovation.

Actions have been encouraged across the entire field of S&T, utilising a bottom-up approach. Research for SMEs and Research for SME associations are two dedicated measures which will be implemented. These two measures primarily address the large community of SMEs with a capacity to innovate but with limited research capabilities. The EU Member States have earmarked a total of €1,336 million for funding this theme over the duration of FP7.

The National Contact Points for Research for the Benefits of Small and Medium- sized Enterprises (SMEs) are Marie Claire Tonna (marie-It is therefore essential to unlock the potential through research and claire.tonna@gov.mt) +356 2360 2143 and Denise Bartolo (denise. bartolo@gov.mt) +356 2360 2360.

TransCoSME

The TranCoSME project has served to support the European network of NCPs for the SME-specific measures in their support to applicants in their respective countries.

The objectives have sought to ensure the delivery of a better quality of service, to increase the efficiency of the work and to enhance networking between the NCPs in Europe. These goals have been achieved by training measures and by setting up tools which help SME NCPs during all steps of their daily work, from identifying innovative SMEs over partner searches to proposal writing. The background objective of the project has been to raise the quality of proposals submitted in the SME-specific measures of FP7 and to increase the quality of consortia.

The total budget allotted to The Council over the duration of the project is €17,923.

Regions of Knowledge

Regions are increasingly being acknowledged as essential players in the EU's research and development landscape. The actions undertaken in this area intends to enable European regions to strengthen their capacity for investing in and carrying out research activities. While this can be beneficial for regions locally, it is also a way to maximise their potential for successful involvement in European research projects.

With an earmarked budget of €126 million, the main aim is that of developing "research clusters" which unite public and private actors and help maximise the region's potential. This would facilitate the creation of a dynamic environment that can attract or retain the best researchers.

The National Contact Point for Regions of Knowledge is Marie Claire Tonna (marie-claire.tonna@gov.mt) +356 2360 2143.

Research Potential on Convergence Regions

Keeping in mind the knowledge and experience existing in particular regions of Europe, this action seeks to upgrade research potential, particularly in the less advanced regions that are remotely situated from the European core of research and industrial development.

With an allocation of €340 million for the duration of the FP7, this action provides support in the form of investment, staff, networking or advice such as:

- Transnational two-way exchanges of research staff between selected organisations in the convergence regions;
- Acquisition and development of research equipment and the development of a material environment:
- Organisation of workshops and conferences to facilitate knowledge transfer- promotional activities and dissemination;
- "Evaluation facilities" through which any research centre in the convergence regions can obtain an international independent expert evaluation of the level of their overall research quality and infrastructures.

The National Contact Point for Research Potential on Convergence Regions is Marie Claire Tonna (marie-claire.tonna@gov.mt) +356 2360 2143.

ResPotNet

The project, which concluded in 2011, aimed to support research and industrial communities in the EU's convergence and outermost regions to fully utilize their research potential, to strengthen their capacities and to increase their participation in the Framework Programmes.

The Network offered researchers and institutions in the convergence/ outermost regions the necessary conditions to establish contacts within more advanced European regions for their development and to contribute to the overall European research effort.

The Network had also provided the means for improved information and support services across Europe, facilitated transnational collaborations, raised awareness on EU policies and funding schemes and promoted coherent development and growth in the enlarged and diversified Union.

The total budget allotted to The Council over the duration of the project is €25,038.

Science in Society

This thematic area mainly focuses on bridging the gap between science professionals and those without a formal science education. Science in Society (SiS) further aims to promote a taste for scientific culture in the public at large. Some of the initiatives, therefore, are to the realisation of the concept within SiS. aimed at triggering the curiosity of young people for science and at reinforcing science education at all levels.

stimulating young people to take on science studies so that industry's personnel needs are better supported in the longer term. Special attention given to improving communication between the scientific world and the wider audience of policy-makers, the media and the The total budget allotted to The Council over the duration of the general public.

With an earmarked total of €330 million in funding on behalf of the EU MS and the EP, initiatives will be undertaken to not only improve governance of the European research and innovation system but to set landmarks for an ethically sound research endeavor in the light of fundamental rights. The funding is to further include the integration of the gender dimension in all areas of research.

The National Contact Points for Science in Society is Denise Bartolo (denise.bartolo@gov.mt) +356 2360 2360 & Marie Claire Tonna (marie-claire.tonna@gov.mt) +356 2360 2143.

EUROSIS

Transnational exchange of experiences and dissemination of best practices can constitute an important supporting element in an NCPs work. This project, concluded in 2011, did just that, whilst contributing

EUROSiS brought together all the NCPs for the SiS program in order to create a network and continually improve their services through the This area further seeks to provide support to issues such as exchange of good practices, communication of all the representatives, strengthening and improving the European science system and to and the creation of a well structured partner search tool. Furthermore, several events have been organised in order to train both the new NCPs as well as the already experienced ones.

project is €18,725.



International Cooperation

International Cooperation (INCO) continues to further integrate the EU into the worldwide community and thus, help advance research and technology in those countries that are building their own knowledge capacity. These will, on one hand lead to enriching European research with the pool of knowledge generated around the world, while enhancing, on the other hand, the S&T awareness and competence of societies and companies in developing countries.

INCO addresses three interdependent objectives:

- Supporting European competitiveness through strategic partnerships with third countries in selected fields of science;
- Facilitating contacts with partners in third countries with the aim of providing better access to research carried out elsewhere in
- Tackling specific challenges that third countries face or having a global character on the basis of mutual interest and mutual benefit.

With an allocated EU MS budget of €180 million, international research and development will contribute to achieve sustainable development and to produce global public goods. International cooperation will also seek to help close the gap between different countries in the world.

The National Contact Point for International Cooperation is Denise Bartolo (denise.bartolo@gov.mt) +356 2360 2360.



The Joint Research Centre (JRC)

The Joint Research Centre (JRC) has undertaken the challenge of reinvigorating the organization by creating a new vision and strategy for 2010-20. This was necessary to address grand societal challenges on a European scale, as well as globally, for which scientific and technological support requires more integrated, pro-active and crosspolicy action.

The new strategy firmly positions the JRC alongside the 'Europe 2020' strategy, the Innovation Union, the ERA, and the European Commission's research priorities for years to come. The JRC aims to pay increased attention to the grand challenges by providing assessments of policy options to key customers rather than solely focusing on sectoral policy support and analysis. The strategy recognizes the need for Europeans research to be more issue driven, capable of providing sustainable solutions in broad areas of EU interest and promoting growth and investment.

The JRC continues to strengthen the interface at a higher strategic level with its customers and stakeholders such as the EP, the European Council and Member State (MS) ministries and research centres.

The JRC develops its capacity to anticipate future areas of policy making by initiating a corporate capacity to provide horizon scanning and anticipation intelligence while pro-actively complementing the customer-driven approach.

The National Contact Point for Joint Research Centre (JRC) is Alexandra Camilleri alexandra.a.camilleri@gov.mt +356 2360 2360.

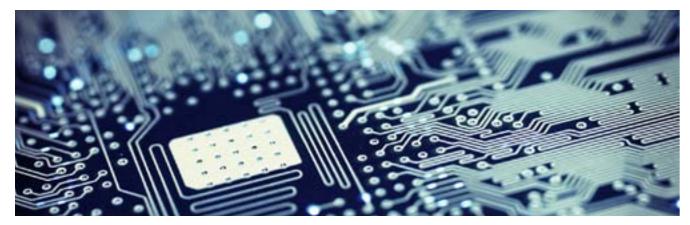
Euratom

Established in 1957, the European Atomic Energy Community (Euratom) is legally separated from the European Community and retains its own Framework Research Programme. Nonetheless, it is managed by the common Community institutions. The Framework Programme for nuclear research and training activities will comprise community research, technological development, international cooperation, dissemination of technical information and exploitation activities as well as training.

Two specific programmes are planned:

- Fusion energy research
- Nuclear fission and radiation protection

These programmes' objective is to develop the technology for a safe, sustainable, environmentally responsible and economically viable energy source while enhancing in particular the safety and security performance, resource efficiency and cost-effectiveness of nuclear fission and other uses of radiation in industry and medicine.





PLACES NETWORK

Places Network is an FP7 project which aims to develop a common platform for a wide and diverse community of actors (third party project participants) to promote the cooperation in their science communication activities, at city/regional level.

For the coming four years, 67 science communication institutions, including The Malta Council for Science and Technology, will be supported to work with their Local Councils and policy makers to plan and implement their long-term co-operation for the "city of scientific culture". This is to be achieved through the establishment of a formal City Partnership (CP) through developing a 5 to 10 years local action plan (LAP).The CP will also engage in a local survey and there is also the chance for further funding to launch the developed LAP.

In addition to this, 3 PLACES partner networks (ECSITE/EUSCEA/ ERRIN) have created a cyber-platform for members to organize meetings networking the various types of actors and producing thematic reports and concrete recommendations. There is also an independent European team of academic researchers who will be assessing the impact of activities in 10 science centres, 10 events and 10 cities among the PLACES participants.

The numerous operational links stimulated by PLACES will generate much new knowledge which will be used to define, at a European level, models and recommendations toward various political levels.

With PLACES a European community of professionals from 28 countries will share and exchange experiences and information around the dedicated cyber-platform OPEN to be maintained permanently as a new service of dissemination after the project completion.

The Malta Council for Science and Technology aims to use this experience of developing action plans through working with Local actors to promote scientific culture within the Maltese community.

The total budget allocated to the project is €5,916,108.80 and the budget allocated to the Malta Council for Science and Technology is €14.400.

The National Contact Point for Places Network are Dr Suzanne Gatt and Ms Laura Sue Armeni.

FarHorizon

The FarHorizon project (using Foresight to Align Research with Longer Term Policy Needs in Europe) project aims at piloting the use of foresight to align strategic and applied research with longer-term policy needs in Europe.

During the project four areas with different sectoral characteristics were selected with the advice of an independent panel to ensure that the pilot covered a range of circumstances.

Success scenario workshops were used to engage policymakers and those responsible for research. The methodology involved consideration of key drivers and wildcards to produce a vision of success. This was compared with the ability of the research and innovation ecosystem in the area to deliver a roadmap for change. A final policy conference was organised to discuss the outcomes and to disseminate the approach to other policy domains.

The project resulted in the publication of a number of reports which are available on the project website which can be accessed at http://farhorizon.portals.mbs.ac.uk/. A number of foresight briefs were also published on the European Foresight Platform www.foresight-platform.eu/briefs-resources/.

The total budget allocated to the Malta Council for Science and Technology is €22.133.

The National Contact Point for Places Network are Dr Brian Warrington and Dr Jennifer Casingena Harper.



Black-Sea ERA-NET (BS-ERA.NET)

BS-ERA.NET is a networking project aimed at integrating the participating countries from the Black Sea extended region in the ERA by linking research activities within existing national, bilateral and regional RTD programmes. BS-ERA.NET is financed by the European Commission within the FP7 and managed by a consortium of 17 institutions from 13 European countries. The types of the activities that are planned during the implementation period of the project are as follows:

- Information exchange between Member States and Candidate countries and with Black Sea Region countries promoting an effective and efficient international scientific EU cooperation strategy at EU level;
- Definition and preparation of joint activities;
- Implementation of the designed mechanisms and instruments in order to harmonize the stand alone activities at national and regional level.

The overall strategy of the project takes into account the current situation existing in the Black Sea Region concerning the aspects of the institutional structures, decision making lines, bureaucratic threats and access to information.

The total budget allocated to the Malta Council for Science and Technology is €108,712.

The National Contact Point for BS-ERA.NET is Mr Ian Gauci Borda.



CIVISTI

The Malta Council for Science and Technology participated in three foresight projects funded under the FP7 Blue Skies Programme which came to an end in 2011.

The CIVISTI (Citizen Visions on Science, Technology and Innovation) project is a European research foresight project funded by the Socioeconomic, Sciences and Humanities (SSH) Programme of FP7.

The project was based on the concept that ordinary citizens have a valid contribution to make to the process of defining scientific research agendas. Through the project, a methodology was developed which would facilitate the engagement of ordinary citizens in a cost-effective manner and enable them to contribute to the policy development process. Citizen panels were established in the seven European countries participating in the project to document a number of visions representing the concerns and wishes of the participating citizens. The results of these activities were reviewed by a team of experts and converted into concrete recommendations which were submitted to the relevant authorities within the European Commission for consideration in future framework programmes.

Further information is available on the project website at www.civisti. org. A foresight brief was also published and is available at www. foresight-platform.eu

The project was finalised in February 2011 with a total budget allocated to the Malta Council for Science and Technology of €41,659.

The National Contact Point for CIVISTI was Dr Brian Warrington.



SESTI

The SESTI Project (Scanning for Emerging S&T Issues), concluded in 2011, was centred on the development of techniques to identify weak signals and emerging issues in a systematic, efficient and effective way. It also pursued the application and implementation of such techniques by linking them in a meaningful way to existing policy processes. Three thematic areas were addressed, namely cognitive enhancement, health and energy. For each area, a number of emerging issues were identified, a background paper was prepared, and a workshop was organised to discuss and analyse the identified issues with the participation of thematic experts and policy-makers.

The final results were presented to the EC at a conference organised through the project. In this project the The Malta Council for Science and Technology was responsible for preparation and publication of Horizon Scan briefs, newsletters and annual reports. The Malta Council for Science and Technology was also responsible for the organisation of the final conference which was held in Brussels.

Further information is available on the project website at www. sesti.info. A number of foresight briefs were also published and are available on the European Foresight Platform www.foresight-platform.eu/briefs-resources/

The total budget allocated to the Malta Council for Science and Technology is $\ensuremath{\mathfrak{c}}32,252.$

The National Contact Point for SESTI is Dr Brian Warrington.





SEAS-ERA (2010-2014) is another project funded by the EU FP7 ERA-NET Scheme. SEAS-ERA is a partnership of the leading Marine RTD Funding Organizations in 18 countries. In addition, a range of observers are associated with the project.

SEAS-ERA aims at coordinating the national and regional RTD activities whilst also embracing marine and maritime research in its entirety.

This over arches previous initiatives which only targeted specific areas or basins and, therefore, constituting a stable and durable structure for empowering and strengthening marine research all across Europe. The main objectives are as follows:

- Contribute to the setting up of a European Marine and Maritime Research Agenda:
- Foster synergies at regional and pan-European level;
- Propose a plan for a better and sustainable use of the existing Marine Research Infrastructures (MRIs);
- Reduce imbalances among regions through human capacity building:
- Enhance public awareness towards marine and maritime scientific and policy issues in Europe.

Therefore, SEAS-ERA constitutes a platform for developing a European integrated policy oriented structure to promote knowledge

and expertise in any sea related area; the overarching element of SEAS-ERA, its ambition to embrace the whole spectrum of marine and maritime research, makes it an open forum for knowledge sharing, a real arena where all the sea related knowledge can meet.

The total budget allocated to the Project is €2 million, €22,199 of which has been allocated to The Malta Council for Science and Technology.

The National Contact Point for SEAS-ERA is Dr Mark Mifsud.



OpenAIRE

The Malta Council for Science and Technology is also a partner in the OpenAIRE project. At the Competitiveness Council of November 2007, the European Union agreed to take action to promote open access to scientific data and publications arising from research funded through EU or through national public funds.

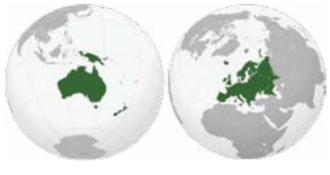
The OpenAIRE project is a support action with the objective of promoting the open access philosophy and facilitating the move towards open access by developing a European repository for scientific information.

The Commission has also undertaken a pilot initiative where open access publishing obligations have been included in the grant agreements in a number of projects funded through the Seventh Framework Programme (FP7).

The Malta Council for Science and Technology has also introduced similar requirements in projects funded through the national RTDI programme.

The National Contact Point for OpenAIRE is Dr Brian Warrington.





CIA4OPM

The 'Common Impact Assessment for Optimizing the Policy Mix' (acronym: CIA40PM) is an OMC-Net project aimed at establishing a network of policy actors from 15 European organizations (representing Belgium, France, Spain, Bulgaria, Turkey, Austria, Sweden, Iceland, Czech Republic and Malta) with the goals of information exchange and peer learning on the assessment of (socio-) economic impacts of public funding (policies and instruments) of Research, Technological Development and Innovation (RTDI) in the areas of:

- enhancement of private R&D investment,
- improved cooperation between public research institutes and private enterprises, and
- 3. improved management of research institutions and universities.

The project sought to develop improved, harmonized methodologies (toolbox/manual) for the alignment/coordination of impact assessment of public RTDI funding, as well as to assess the usefulness of impact assessment tools in the development of an appropriate policy mix. In this project, The Malta Council for Science and Technology was the Work Package leader of the 'Communication and Dissemination' Work Package. Malta hosted the last meeting of the consortium in March 2011 and was involved in the publication of a report with the main findings from the project.

The total budget received was €990,458 of which The Malta Council for Science and Technology's budget was €91,515

The National Contact Point for CIA40PM is Mr Ian Gauci Borda.

PACE-NET

PACE-Net, another project financed under the International Cooperation (INCO) scheme, aims to strengthen bi-regional sustainable dialogue on S&T between Europe and the Pacific. It brings together partners from the European Union and from the Pacific which engage in specific activities aimed:

- To reinforce existing S&T dialogues and networks and promote regional integration for those networks. PACE-Net will seek to increase the cooperation between the research organisations and universities in the region;
- To identify S&T INCO activities and programmes towards the Pacific region. The PACE-Net will set up dialogue fora bringing together the relevant Science and Technology experts and stakeholders to establish the priorities areas for FP7, including SICAs:
- To strengthen the coordination of S&T cooperation and the complementarities with activities and programs carried out by other European instruments. PACE-Net will examine possible synergies or complementarities with EU activities, especially with respect to challenges faces by developing countries. In particular, synergies with the European Development Fund (EDF) shall be found.

PACE-Net dialogue activities led will be fed by a preliminary critical and analytical work on the current S&T cooperation landscape in the region. The outcomes of the project will be transmitted to main Pacific fora gathering key stakeholders of the Pacific Islands Countries and Territories (PICTs).

The total budget allocated to the Malta Council for Science and Technology is €62,274. The National Contact Point for PACE-NET is Mr Ian Gauci Borda.

MIRA – Mediterranean Innovation and Research Coordination Action

The aim of the MIRA project, financed under International Cooperation (INCO), is mainly to develop a scientific and technological partnership between the European Union and the Mediterranean Partner Countries (MPC).

Throughout 2011, this has been done through dedicated dialogue platforms, identifying topics of common scientific interest promoting the creation of an Observatory of EU-MPC scientific cooperation, and promoting the development of the Euro-Mediterranean Innovation Space and other joint initiatives with a research component such as the Horizon2020 Program of de-contamination of the Mediterranean. Moreover, it provides support to the functioning of the Monitoring Committee for Euro-Mediterranean Cooperation in S&T (MoCo)

The total budget allocated to the Malta Council for Science and Technology is €215,070.

The National Contact Point for MIRA are Ms Joanna Pullicino and Mr Ian Gauci Borda.

ERAPRISM

The Policy Unit recently completed a 28 month FP7 project, ERA-PRISM aimed at promoting the open method of coordination of EU member state policies in research and innovation. The project was based on a concept developed by the Malta Council for Science and Technology, bringing together a consortium of largely The total budget of the project was of over €1Million and €159.367 small European countries (Iceland, Estonia, Latvia, Slovenia, Luxembourg, and Malta). The proposal targeting the design of European policies which are tailored to the specific context and framework conditions of small countries was approved by the European Commission and has been well-received in various fora.

The ERA-PRISM project results highlight the fact that despite the diversity in systems, funding frameworks and performance of small states, they share a common need for policies which take account not only of the history of the research and innovation system but also of size, scale and scope of the system and the economy. The project emphasized the need to combine numbers with stories when assessing a small country's performance in research and innovation since in-depth look at the statistics provides important insights into factors accounting for poor or above average performance.

Small countries can provide micro-insights into such factors and the statistics often provide a rather limited picture of existing / potential capacity. Small countries have much to benefit from working together to understand better how to overcome their constraints and learn from each other as to what is feasible through targeted investments.

This work provides useful insights for regions in larger member states and efforts are underway to keep this concept alive beyond the end of the project in September.

The project was coordinated by The Malta Council for Science and Technology and the project results are available from the dedicated website www.eraprism.eu.

was allocated to The Malta Council for Science and Technology. The project was coordinated by Dr Jennifer Casingena Harper.





PRI-SCI-NET

PRI-SCI-NET, "Networking primary science educators as a means to provide training and professional development in Inquiry-basedlearning", is a coordinating and support action FP7 project funded by the European Union under the science in society call. With a total budget of 2.8 Million Euros, PRI-SCI-NET is coordinated by the Malta Council for Science and Technology under the direction of Dr. Suzanne Gatt in collaboration with a consortium of 10 Europe wide partners.

In its ambition to establish primary science education in its own right, the project aims to make a significant contribution at European level through developing forty-five science activities designed in the approach of inquiry-based learning. The materials will be produced in no less than 15 different European languages for use by primary science teachers across Europe. This initiative will be supported with in-service training sessions on the use of inquiry-based learning at national level in 13 of the partner countries, three international training courses and two international primary science conferences on the implementation, utilisation and assimilation of inquiry-based learning to lay sound foundations for increased interest and collaboration in the field.

This project also addresses the need to see an increase in the uptake of science subjects by younger students who and which, in the long run, would promote increase in the number of graduates in science and technology.

In recognition of the need for increased communication and reciprocal sharing of knowledge amongst researchers, teacher-trainers and practitioners, the project also aims to host a dual network platform.

One network targets science education researchers and teachertrainers working in the area of primary science while the second network assumes a more practical approach and targets primary school teachers and teacher-trainers with the scope being to create an arena where knowledge, experiences, initiatives, activities and opportunities for good practice in Inquiry-based science learning can be shared, hence, promoting collaborative progress in the field of primary science education.

This is also intended to further encourage teachers along with researchers to share and discuss their experiences in their course of success. PRI-SCI-NET operates through five main work packages including management; identification and development of educational resources; setting up of network ICT platforms for teachers and primary science educators; organising training activities as support work packages; and disseminating project outcomes.

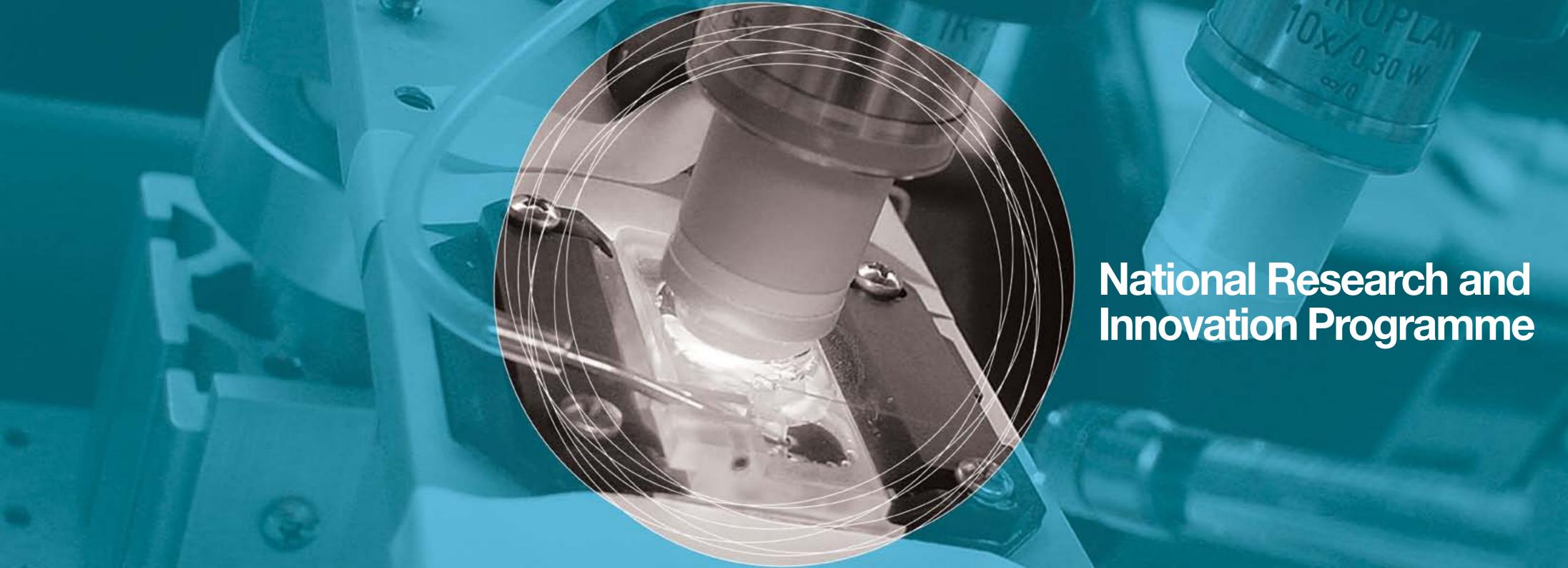
It builds on previously successful EU project such as the Hands on Science Project and The Implementation of Scientific Thinking in (Pre) Primary Schools settings, a Socrates Comenius 2.1 Project (STIPPS). Pri-Sic-Net provides learning tools and space for dissemination of

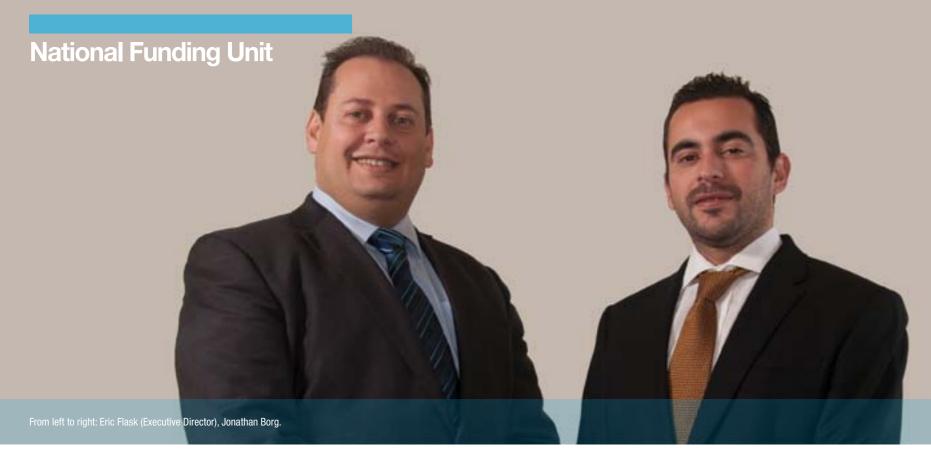
working experiences in search for a larger and more-ranging network among primary school professionals. Major project milestones include:

- Compilation and Trialing of 45 science teaching activities using Inquiry Based Learning published in 15 languages:
- The creation of a network platform for European educators and researchers in primary science;
- Two International conferences:
- Four 20-hour national training courses for educators in thirteen countries:
- Three International teacher-training courses:
- Dissemination of Progress in International conferences and partner countries; and
- Policy Briefs to be presented at a European Level.

The total budget allocated to the Malta Council for Science and Technology is €415.804.

The National Contact Point for PRI-SCI-NET is Dr Suzanne Gatt and Ms Laura Sue Armeni.





In support of the National Strategic Plan for Research and Innovation, the Council provides state financing in the form of grants for research. development and innovation in science and technology. One such funding instrument is the National Research and Innovation (R&I) Programme aiming at supporting knowledge transfer between academia and industry.

The programme focuses on the four priority sectors identified in the above mentioned strategy, namely Environment and Energy Resources. ICT, Value Added Manufacturing and Health and Biotechnology.

The Council administers such a funding programme through the National Funding Unit. The unit is also coordinating an EU Funded project on Manufacturing Research under the European Regional Development Fund (ERDF).

Indeed the €700,000 project entitled 'Manufacturing Research Platform' aims at promoting the benefit of research across various manufacturing sectors in Malta.

Other funding programmes that support commercialisation of research results and knowledge transfer for 'in market' development. are currently being considered by the Council.

R&I Programme 2004 - 2011

The National R&I Programme 2011 saw a 57% increase in funding over the previous programme with an allocation of € 1.1 million. For this Programme, a total of 40 proposals were submitted, ranging across all scientific fields and requesting a total of € 5.8 million.

As with previous programmes, the submission and evaluation of proposals was split into two stages. Following the first stage proposal evaluation, 4 proposals were deemed ineligible, whilst a total of 26 proposals requesting a total budget of €3.8 million were short listed.

These were required to submit a detailed proposal for final evaluation and funding. Subsequent to final evaluation and based on the

available budget, a total of 8 proposals were selected for funding. These projects are split across three focus areas, namely, Energy & Environment, ICT and Value Added Manufacturing.

This method of selection ensured that the projects with the highest technical score were selected, ensuring that the funds were awarded to the best and 'lowest risk' projects. The above table summarises the proposal selection by sector.

To date a total of 45 projects with a total budget of over €4.5M have been funded through the National R&I Programme since its inception in 2004.

To ensure that funds are spent according to what has been agreed through the Grant Agreement, a formal and professional auditing procedure has been implemented. Such a procedure also ensures that public funds are used as efficiently and effectively as possible whilst ensuring that real tangible outcomes contributing to the achievement of Malta's National R&I targets are achieved.

Since 2004, 280 proposals were submitted with a total request of €32.5M, making the National R&I Programme one of Malta's most oversubscribed funds.

R&I Programme 2012

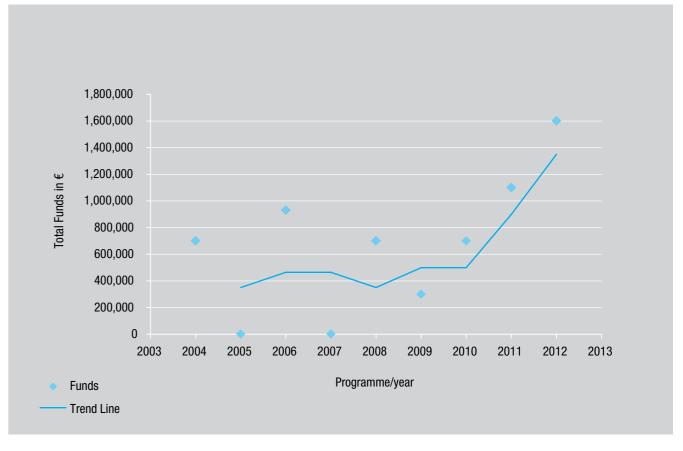
Proving its commitment in R&I, the Government allocated the sum of €1.6M for the R&I Programme 2012, an increase of 58% over 2011.

As in previous years, the focus of the programme is technology transfer between academia and industry with specific focus on the four priority sectors identified in the National R&I Strategy namely Environment & Energy Resources, ICT, Value-Added Manufacturing and Health & Biotechnology.

For the 2012 edition of the R&I Programme, Government shall be earmarking total funding of €200,000 for a proposal in Offshore Solar Technology as a sub-priority sector of Energy and Environment. Another €200.000 was earmarked for the creation of a Research Commercialisation Fund.

The R&I Programme 2012 shall also see changes in the Rules for Participation in terms of layout, definitions and additional sections based on the feedback received from interested stakeholders coming from government, industry and academia.

The table on the left outlines the schedule of the R&I Programme



The graph above shows the significant increase in budget since 2004 to date.

))]	Dec 2011	Jan 2012	Feb 2012	Mar 2012
	06 Dec: Launch Announcement & I nformation Session	19 Jan: Pre-registration Cut-Off Date	16 Feb: Deadline for First Stage submission	23 Mar: First stage evaluation results
r B	14 Dec : Additional Information Session			
	Apr 2012	June 2012	July 2012	Oct 2012
)	19 Apr: Deadline for Second Stage submission	29 June: Second stage evaluation results	End July: Signing of Grant Agreement (incl. IP)	01 Oct: Project Start Date





Pervasive Nursing and DocToral Assistant (PINATA)

Coordinator: Dr Alexiei Dingli

Coordinating Organisation: University of Malta (Department of Computer Science and Al)

Consortium: St James Hospital Grant Value: €124.975

The goal of health-care institutions is to provide patientcentric health care services. Unfortunately, this goal is frequently undermined due to human-related aspects. The Pervaslve Nursing And docToral Assistant (PINATA) provides a patient-centric system powered with Ambience Intelligence techniques and SemanticWeb technologies.

Through PINATA, the movement of patients and medical staff is tracked via RFID sensors while an automated camera system monitors the interaction of people within their environment. The system reacts to particular situations autonomously by directing medical staff towards emergencies in a timely manner and providing them with just the information they require on their handheld devices. This ensures that patients are given the best care possible on a 24/7 basis especially when the medical staff is not around.

The main PINATA system has been developed and all deliverables achieved

a. Knowledgebase

b. Ontologies

c. Architecture

I. Device Manager

Wireless Tracking module

This project was also included in 6 publications.



MARine LOgging Notebook (MARLON)

Coordinator: Ms. Analiza Abdilla

Coordinating Organisation: S-TEC (Superyacht Technology Expansion Centre) Ltd. part of MARSEC-XL Cluster

Consortium: Malta College fof Arts, Science & Technology (MCAST)

Grant Value: € 131,784

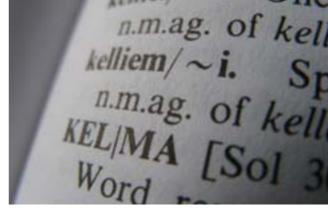
Logbooks are very important artefacts for mariners. However, logging can be a tedious repetitive task, and may thus be logistically cumbersome for busy mariners.

MARLON aims to facilitate this necessary task by providing an electronic solution for logging, where a significant portion of the required data is logged automatically, in virtual communication with the vessel's state.

For this project, the application will be developed for iPad, but MARLON's results can also be used to develop other versions on different platforms.

An online community website will be launched to support the future of digital log keeping. Nonetheless, the idea of automatic/assisted logging has not been explored yet; possibly due to the difficulty of integrating instruments to data logging modules.

The results will be evaluated for possible implementation of digital log keeping in the commercial sector.



Maltese Language Resource Server (MLRS)

Coordinator: Michael Rosner

Coordinating Organisation: University of Malta (Department of

Computer Science and AI)

Consortium: University of Malta (Institute of Linguistics), MITTS Ltd

Grant Value: € 25,623

MLRS had three related objectives, all of which serve the general goal of facilitating empirical research on the Maltese language and developing computer programs that are language-enabled for Maltese

- to develop a framework for the creation, maintenance and deployment of a computational lexicon of Maltese.
- 2. to create a standard, representative, and evolving Maltese National Corpus along the lines of the British National Corpus
- 3. to implement a server for language resources and related tools that would deliver (i) and (ii) in the form of web services
- All three objectives were reached when the project ended in 2008 and several papers were accepted for publication at national and international events.

A revised version of MLRS was released in June 2011 (Borg-et-al 2011) and this is now online at http://mlrs.research.um.edu.mt/. The corpus is now 100 Million words and the new system implements sophisticated online search of the corpus. Mr. Michael Spagnol, originally employed as a project assistant, progressed to University of Konstanz (Germany) to study for a PhD. This has now been submitted and Michael Spagnol is now working on a new collaborative project that concerns the development of a web version of the Acquilina dictionary.



Dependability and Error-Recovery in Security Intensive Financial Systems

Coordinator: Dr Gordon Pace
Coordinating Organisation: University of Malta (Department of Computer Science)

Consortium: Ixaris Systems Ltd Grant Value: € 71.000

As software systems grow in size and complexity, it is becoming harder to ensure the correct functioning of such systems under all conditions. In particular, security-intensive systems such as software which handles online financial transactions, are particularly difficult to test for robustness, since their correctness depends on a combination of the system's behaviour, that of potentially malicious users, all working in a real-time setting.

Potential errors or unexpected sequences of user interaction in the code may lead to huge losses for the service-provider, and loss of trust at the users' end. A number of techniques are currently used to improve software robustness, including extensive testing prior to the online deployment of the systems. However, the difficulty of testing such systems limits the number and type of errors which can be identified. Execution paths not covered in the testing phase may still contain errors which thus remain undetected.

Recently, other approaches have been proposed and explored. One such approach is runtime verification, a complementary technique to traditional testing regimes, which enriches the system with monitors which validate the execution path of the system either at runtime or offline through logs produced by the system.

The traffic load on such a system, and the complexity of the checks which need to be conducted could render it impractical to perform such verification in real time. In this project, runtime verification techniques will be used to monitor such systems for correctness and time-dependent properties. The project will seek to develop techniques to perform this verification asynchronously on separate machines, and to develop a mechanism which will enable the live system to perform a rollback to undo incorrect action sequences should this become necessary.



Low Cost Rapid 3D Head Acquisition (3D-Head)

Coordinator: Mr Thomas Galea Coordinating Organisation: Megabyte Ltd **Consortium:** University of Malta (Faculty of Engineering) Grant Amount: €87.771

The project concerned research towards the development of a 3D acquisition device intended to acquire an ear-to-ear frontal 3D form of a human head based on low-cost multiple cameras and methods to reduce occlusion and the problem of lack of skin texture. This research brings us closer to developing low-cost and good quality 3D object acquisition devices that may bring such devices in a budget range that is more widely affordable.

laboratory set-up for the multi-camera 3D acquisition system. The research led to a novel 3D data extraction algorithm that was published in an international conference in 2011. The project also supported a student in her studies towards achieving a research postgraduate qualification.



Content Based Multimedia Retrieval with Ordered Relevance Feedback (CBMRORF)

Coordinator: Dr Ing Victor Buttigleg

Coordinating Organisation: University of Malta (Department of Communications and Computer Engineering)

Grant Amount: €30.748

Searching the Internet for information using keywords is something that everybody practices and is an efficient way how to retrieve information from an otherwise chaotic repository. In this project we extend this to images. This is a hard problem since no known technique yet exists that enables a computer to extract the semantics of an image. The objective of this project is to use ordered relevance feedback from the user to improve the performance of the search The project has now been concluded successfully resulting in a system. Improving multimedia retrieval is becoming ever more important in a world where the volume of digital images (even at a personal level) is increasing at an exponential rate.

> A computer program was developed that indexes a library of images based on low-level features. A guery is then formed by presenting an example image. The search results are then returned based on these low-level features. The results are then improved by the user providing ordered relevance feedback on the returned images. A graphical user interface facilitates this iterative process.



Cleaner Flight Operations in Departure and Approach in Maltese Airspace (Clean Flight)

Coordinator: Ing. Kenneth Chircop

Coordinating Organisation: Department of Electronic Systems

Engineering, University of Malta Consortium: QuAero Ltd **Grant Value:** € 138.948

The project focuses on the optimisation of flight profiles of commercial aircraft flying in and out of Malta to minimise carbon emissions in Maltese airspace.

New and emerging technologies in flight trajectory optimisation and weather information management will be used to design and develop a new ground-based concept involving stakeholders such as operators and ANSPs to coordinate optimal flight operations and enable pilots to fly better trajectories for minimal fuel burn and reduced emissions.



Digital Gaming Clouds for Mobile Users (DiGiMoCloud)

Coordinator: Dr. Saviour Zammit

Coordinating Organisation: Department of Communications and

Computer Engineering, University of Malta

Consortium: iMovo Ltd Grant Value: € 171.332

A system capable of remote execution of games will be designed and implemented, ANY PC game applications will be executed on a Computing Cloud but played on mobile devices over WiFi and/or 3G.

The special feature of this project/product is that ANY PC game can be played on ANY mobile device be it a Smartphone/Tablet (running ANY operating system) or PC or Laptop equipped with WiFi and/or 3G/4G data connection.

Such a platform is not currently available. Existing Cloud Systems, such as OnLive, either allow you to WATCH games being played from a Smartphone but not PLAY from a Smartphone, or to play games that have been tailor-made for the Smartphones.

The proposed system can play ANY high-end PC game on ANY Smartphone or Tablet device.



Coordinator: Dr. John Abela

Coordinating Organisation: Ascent Software Ltd

Consortium: Dr Bernard Debono. Bioinformatics Consultant

Grant Value: € 125.688

A vast amount of information relating to large-scale pathway and organic molecular structure is freely available over the web under an open standard format. However, comprehensive tools for graphical depiction of this information are still lacking.

This project aims to create an interactive visualization tool for biologists which will assist in the creation of meaningful animations using biological structures. BioStructor will achieve this by automatically creating an intuitive representation of bio-molecular structures (e.g. an ATP molecule) within the context of an animation of the biological process (e.g. the glycolysis pathway) that such structures are involved

Such pathway information will provide a route to construct such interactions in a well-defined way.

The program will also be able to:

a. create new interactions from scratch, and

b. support the importation and display of commonly used representations such as gene-bearing chromosomes, domainbearing proteins, protein-bearing membranes and cell compartments. Functionality will also exist to create additional actors using a combination of basic geometric shapes.

It is believed that the product will have numerous applications, such as the facilitation of distance learning. This innovative application will provide a powerful medium for online forums in biology research and technology, as well as assisting directly in the creation of biomedical training material.

This toolkit is targeted at three main sectors, namely:

- Publishers producing teaching material for biomedical education (e.g. textbooks, lecture and multimedia presentations)
- Academic and biotech/pharmaceutical research industry
- Companies involved in drug design requiring a visualisation tool as an aid in the design and development process.



Realtime Portable Reconfigurable Power Management Interoperable System (Real Promise)

Coordinator: Ms. Analiza Abdilla

Coordinating Organisation: S-TEC (Superyacht Technology Expansion Centre) Ltd, part of MARSEC-XL Cluster

Consortium: Malta College for Arts. Science & Technology (MCAST)

Grant Value: € 127.230

comfort. The large number of onboard entertainment and operational devices are invariably connected to the power system, together with a complexity, nonlinearity and multivariablility. growing trend of increased electric and/or hybrid propulsion.

the management of such intricate power networks, becomes more complex.

An onboard power management system which is able to monitor and display power consumption in real-time is therefore proposed as a means of gauging power usage. Coupled with hybrid systems incorporating energy storage, the power management system displays important information such as remaining autonomy and manner issues concerning implementation, hardware requirements, charging demand.

What-if scenarios are suggested by the system to hint at better operating modes leading to reduced energy use. This is achieved through a software application performing the power management server.



Computational Intelligence Techniques for Control of Complex Systems

Coordinator: Prof. Simon G. Fabri

Coordinating Organisation: University of Malta (Department of Electrical Power and Control Engineering)

Grant Amount: €55,905

The main motivation behind this project was the investigation and Leisure yachts are nowadays premier showcases of luxury and development of the use of computational intelligence techniques for controlling systems whose dynamics are characterized by uncertainty.

This project has contributed a number of innovative Intelligent Control With increased integration however, comes increased complexity and designs for handling complex classes of nonlinear systems using a stochastic approach. The field is still in its infancy and there remains a large amount of open-problems that need to be addressed at a scientific research level. An important consideration that has featured in this project is the idea of not restricting the developed control schemes to theoretical analysis and simulation results only. On the contrary, suitable experimental test rigs were developed for the controllers to be implemented and tested in a practical setting. In this physical limitations, deviations from theory and practical experimental performance could be highlighted. This approach has somewhat bridged the "theory-practice gap" existing between theoretical/ simulation studies and physical, hands-on implementation.

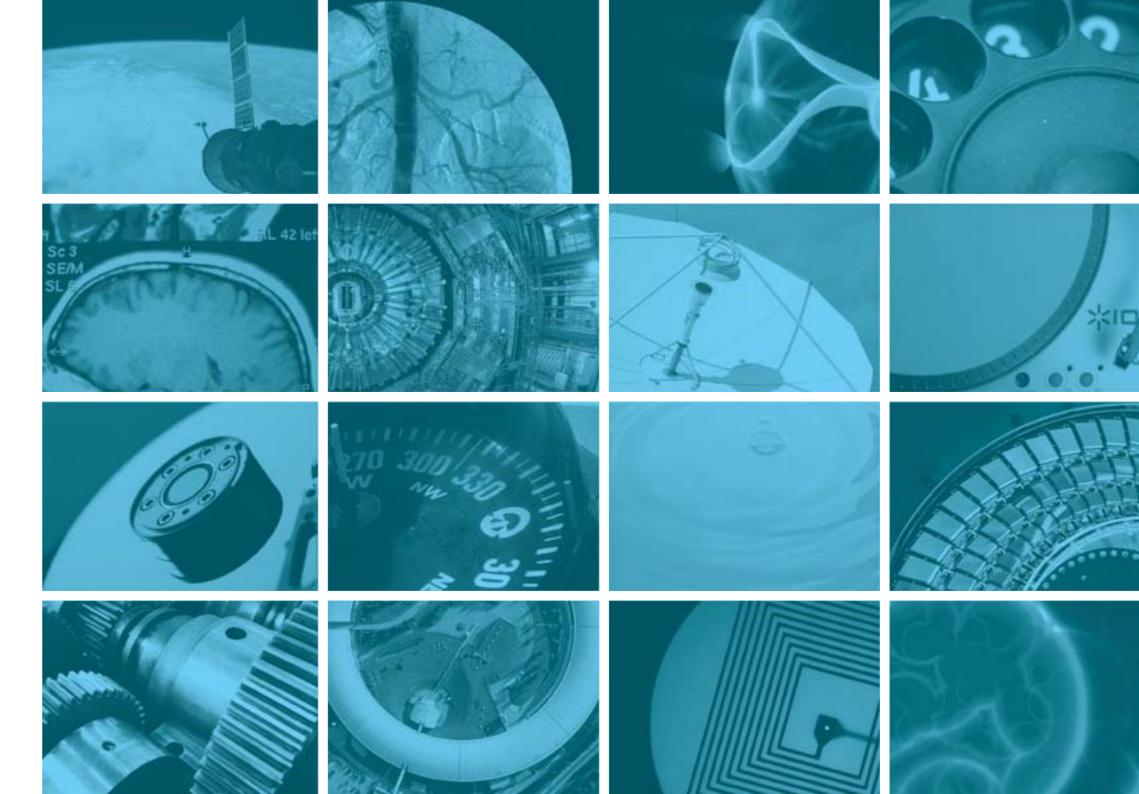
and monitoring functions, operating off an onboard cloud-based The project has placed specific emphasis on robotic platforms for the experimental set ups. In fact by the end of the project, two rigs were set up: a mobile robot platform referred to by the name Neurobot, and

a three degrees-of-freedom manipulator arm. Within the time-span of the now completed project, two major fully-functional experimental test-rigs were designed and implemented - a mobile robot platform and a 3 degrees-of-freedom robotic manipulator.

Several novel neural network-based control laws have been proposed. developed, analyzed, investigated and tested both by simulation and experimentally. The ability of the proposed controllers for handling functional uncertainty in plant exhibiting complex, nonlinear and multivariable dynamics has been shown. These features endow the controllers with intelligent-like capabilities as demanded by state-ofthe-art and future advanced technologies in robotics, automation and autonomous control systems.

The "theory-practice gap" existent between theoretical/simulationbased studies and actual implementation in the area of real-time neural network control has been addressed through the implementation of the developed control laws on the experimental test rigs. These tests show that the theoretical expectations of the designed controllers do carry over to these real-life scenarios in the mobile robot and in the 1 and 2 degrees-of-freedom manipulator cases.

Nine papers were published in conference proceedings and presented at international conferences; two articles were published in journals and two articles appeared as book chapters. In addition, several other non-reviewed internal reports were also compiled as part of the project, including an extensive literature survey. The project supported the research of one PhD student. In addition, the project also supported the work of four undergraduate students who contributed via their final year projects and dissertations.







Dealing with victims of Domestic Violence: An Evaluation of services in Malta and the Province of Trapani (Sicily)

Coordinator: Dr Sandra Scicluna

Coordinating Organisation: University of Malta (Institute of Forensic Studies)

Grant Amount: €27.952

This research study is a comparative study aimed at evaluating the services available for victims of domestic violence in Malta/Gozo and the province of Trapani (in the neighbouring Mediterranean island of Sicily). Victims of domestic violence were considered to be women, men, young persons, children and the elderly. It looked at the needs (shelter, support, guidance, protection, getting started towards recovery and gaining independence) and the protection (police, legal and correctional services) that were being addressed and the needs that remained unanswered. Available structures were assessed and recommendations forwarded.

The objectives of this study were:

- To build on existing local and foreign research/literature on domestic violence
- To build on the existing research project conducted during 2003 by the Domestic Violence Response Team (of the Ministry for Social Policy) compiled by Dr Marceline Naudi
- To provide an inventory of existing services and structures for female victims of domestic violence in Malta/Gozo and Trapani
- To evaluate existing services and structures for female victims of

domestic violence in Malta/Gozo and Trapani

 To compare and contrast the existing services and structures for female victims of domestic violence in Malta/Gozo and Trapani

This project has enabled us to develop a professional relationship with people working in the social/criminology field in Sicily.

This research has opened a new field for social exploration. We have submitted and won a number of EU funded projects with Sicilian partners such as: Life Long Learning partnership proposal PHOENIX - to work with disadvantaged members of society; TCNs - a project under the Integration fund of Third Country nationals and JANUS - a project funded under the HOME directorate, on Crime Mapping. Other projects have also been submitted which unfortunately have not been successful.

We have acquired new knowledge about the Italian legal, educational and social institutions.

This project has raised awareness in the field of domestic violence, especially in Sicily. It has raised awareness about the needs of more services in the province.



Tackling the Image of Scientists (TIMOS)

Coordinator: Dr. Suzanne Gatt,

Coordinating Organisation: University of Malta (Faculty of Education)
Grant Amount: €23.294

The main objectives of this project were to investigate the role of media, including mainly films and television documentaries in promoting the stereo typic image of scientists with students and to develop, from the new findings, educational material for primary and secondary level students that focus particularly on the issue.

The research involved: A review of Literature of other similar research; a questionnaire with people having a science background doing various jobs about whether they feel that they are scientists; the draw a scientist Test with 400 Maltese secondary students; a review of the scientists currently shown on TV; profiling of real Maltese Scientists; and an intervention programme trialled with secondary school students. It was found that Scientists today do not only work in Labs but you can also find them doing policy, in environment, education, public entities, law enforcement, manufacturing design etc. The work of a scientist today is wider - very closely related to industry, environment and government work. The forensic scientist is the most popular image of scientist in the media.

The project contributes to our knowledge of how students and people view scientists and their work. This better understanding helps educators learn how to tackle such images so that more students realise that scientists are real and normal people – attracting more to take up science studies.

The project has been completed and the following deliverables were achieved:

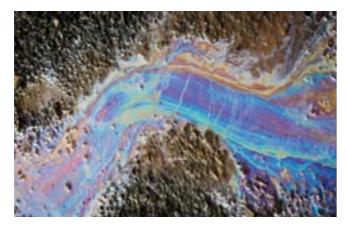
- Literature review on the issue of the image of scientists and the role of media as the initial step;
- Review of Real Scientists at Work in various areas of application actually consider themselves as scientists;
- Profiles of real scientists and their work;
- Research on the image of scientists held by students of different levels and also by lay people;
- A study of the scientist in the media:
- Influence of media on the formation of the stereotypic image of scientists:
- Development and piloting of the educational material for primary and secondary students.

Post-graduate qualifications obtained:

Getting the Right Picture: Helping Secondary School Students adjust their Pre-Conceived Ideas on the Image of Scientists and their Work derived from Media Presentation M.Ed thesis, Godwin DeGabriele

Scientific literacy: interpretations and implication in a Maltese Context M.Ed thesis, Gaetano Bugeja





Research on the Use of Infiltration Boreholes for Flood Mitigation and to Enhance Groundwater Recharge

Coordinator: Ing. Marco Cremona Coordinating Organisation: Sustech Consulting Consortium: Dept of Civil and Structural Engineering, University of Malta, Solid Base Lab, Ltd., Malta Resources Authority (MRA) St. Theresa College Grant Value: € 127.931

Urbanization is increasing all over the world but cities' storm-water infrastructure is generally not being upgraded at the same pace, resulting in flooding during storm events. In urban areas, spaces that were traditionally allocated for rainwater reservoirs are becoming

This project will carry out research on the innovative idea of using boreholes to divert runoff from roofs of buildings into the ground and develop a product (the GEO-INF system) that will meet the dual objectives of flood mitigation and groundwater recharge, while taking up minimum space and set-up costs.

The research will focus on deriving raw data on the permeability and water-filtration characteristics of geological formations, the development of a low-cost filtration/recharge system and a methodology for the drilling of the infiltration boreholes.

The GEO-INF system has the potential to become the state-of-the-art for buildings that cannot incorporate a cistern, and a retrofit solution to already-built buildings without cisterns.



No-discharge Energy-Efficient Prototype for the Treatment of Urban Municipal Effluent (NEPTUME)

Coordinator: Alberto Miceli-Farrugia Coordinating Organisation: Architecture Project Ltd Consortium: Water Services Corporation, University of Malta (Department of Biology) **Grant Value: €185,143**

NEPTUME studies the treatment of municipal sewage using a compact ceramic membrane system with recognised advantages over conventional membrane systems. The treated effluent will be subjected to a follow-on ecological and low energy phytoremediation process, polishing the water for use in public spaces and for irrigation purposes, fountains and more. The research project will set new standards for sustainability in landscaping schemes, agricultural activities, golf courses and recreational areas where sufficient water supply is not available.

NEPTUME combines the latest developments in flat sheet ceramic membrane technology with the nutrient-removal potential of followon biological phytoremediation processes, studying the benefits in the context of the regeneration of the derelict inner-harbour area around Dock One, Cospicua. Little data is available on the application of these technologies in Malta's specific environment. The project will assess the suitability of different macrophytic species, their ability to absorb specific excess nutrients from the water, and their potential as a source of biomass for fuel.

The physical and chemical parameters of the water will be monitored

continually, with real time data ensuring the efficient processing and polishing of the water. Taking advantage of its town centre location, the process and its results will be accessible to the public.

Works to Vault 0 (MBBR)

- Visual and structural survey of property.
- Preparation of detailed works proposals for the refurbishment of the vault together with Bills of Quantities and specifications
- Commencement of works within the vault to accommodate the MBBR and RO equipment.
- Works external to the vault (Xatt ir-Rizg).
- Completion of installation of all external infrastructural belowground services to connect existing interred sewage pumping station, to the vault intended to house the equipment, the vault to the central pump room where the irrigation controls and valves will be housed, installation of connections for the irrigation pipework.

- Analysis of sewage quality in the locality.
- Selection of macrophytes for use in the phytoremediation
- Commencement of supervised cultivation of macrophytes for use within the completed phytoremediation basins.



Deep Offshore Wind (DOW)

Coordinator: Dr Tonio Sant

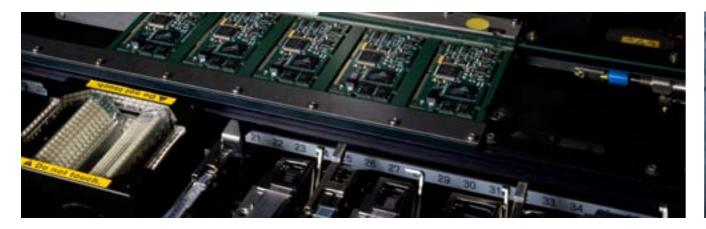
Coordinating Organisation: University of Malta (Institute for Energy Technology)

Consortium: Global Renewable Energy Ltd., Honeycomb Services Ltd. Grant Value: €97.788

Although the availability of shallow water areas in Malta that are less than 30 metres deep is very limited apart from being already over utilised by the industry, there is considerable space with transitional depths up to 70 metres. The main objective of this project is to develop a novel design of a deep water support structure for installing wind turbines at these depths within the South East Offshore Zone of Malta, which also includes Hurd Bank. The design of the support structure will be optimised for Mediterranean wind and sea conditions. Design practise is to be done according to the Det Norske Veritas design standard for offshore wind turbine structures. The project will also evaluate the feasibility and costs for constructing such structures locally and to develop a large offshore wind farm in the Maltese

- A literature survey focusing on design concepts and installation methodologies of offshore wind turbine support structures to
- A site evaluation desk study for the South East Offshore Zone of Malta, investigating the site bathymetry, wind, wave and seabed
- A natural frequency analysis of the intended design which established the main design dimensions of the offshore structure.
- An extreme state analysis through simulation of design load

- cases and a full structure stress analysis.
- A preliminary design of the structure involving the optimisation of the dimensions of the structural members based on natural frequency and extreme state analysis.
- Construction of a model support structure to be used in laboratory experiments.



Solar Hot Water Controller so as to Automatically Control the Use of Electrical Energy Through the Use of Back-up Heater in Inclement Weather, Thereby Reducing Energy Consumption and CO2 Release

Coordinator: Mr Michael Bonello

Consortium: University of Malta (Department of Systems and Control Engineering)

Grant Value: € 104,147

Solar water heaters are an effective and efficient way of producing hot water through solar energy, thereby reducing dependency on fossil fuels and reducing CO2 emissions. Demand for hot water increases during inclement weather, when solar heating alone can not match the requirements. This necessitates the use of a backup electrical heater to complement the solar heater during such periods.

Backup heaters work on the principle of maintaining a reserve of hot water at a preset temperature. Although a backup heater is regulated by a thermostat and switches off automatically when the water reaches a predetermined temperature, it still wastes significant amounts of energy through heat loss.

Consumers tend to switch on the backup heater throughout the winter period, with the result that it remains on even when the solar water heater does not require the heat boost.

As a result, potential savings in energy usage arising from the use of solar hot water systems are not being fully realised in practice.

The project aims to develop an intelligent, innovative and autonomous electronic controller which will reduce the electrical energy consumption of solar water heaters when the temperature of the water is bolstered by the electric heater. The proposed controller will take account of various parameters such as time of day, degree of cloud cover, the temperature of the stored water, the rate of hot water use, etc. Such a controller should result in a much more efficient and Coordinating Organisation: Remote Monitoring & Control Systems effective control of the operation of the solar unit backup heater.



Development of an Innovative Wastewater Recycling Process for Hotels / Large Commercial Buildings / Isolated Communities for environmental protection and cost recovery (HOTER)

Coordinator: Marco Cremona Coordinating Organisation: Sustech Consulting

Consortium: Island Hotels Group, Department of Public Health, TTZ-

Bremerhaven, Germany Grant Value: €112,877

The aim of this project was to develop an innovative water recycling process for application in hotels in Malta and in the Mediterranean region. The system is based on the innovative Membrane BioReactor (MBR) wastewater treatment process used in combination with the well-proven reverse osmosis (RO) process. The combination of these two processes will make it possible to recover as much as 70-80% of the water bought in by the hotel. The process will provide firstclass water to EU Drinking Water standards for the guest rooms of the hotel, while also meeting all second class water requirements (for toilet flushing, laundries and for landscaping).

The HOTER R&I Project was completed in 2009, A HOTER test prototype (with the capability of treating 15,000 litres of sewage a day) was installed in the SAS Radisson Golden Sands Resort and Spa during the first guarter of 2008, and testing commenced in ernest in early Summer 2008. Performance and water quality testing proceeded onto August 2009, after which the equipment was decommissioned and dismantled.

All of the project's objectives were achieved. The project amply demonstrated that the HOTER process is capable of producing 2nd class water and potable water from sewage from a hotel, in a reliable and cost-effective manner.

The project achieved very high visibility during and after the test period. also making it to the finals of the prestigious Good Entrepreneur 2009 competition organized by CNBC and Allianz to reward the Best Green Business Idea in Europe.

HOTER Ltd. was registered in 10th February 2010 with the intention of commercialising HOTER. It is planned that a full-scale HOTER plant be installed in a hotel in Malta by the end of 2012, which would then be the launching board of HOTER worldwide.



BLUE OCEAN ENERGY Conversion of wave energy in a DEXAWAVE scale model converter - focusing on Mediterranean region and wave climate (BOE)

Coordinator: Noel Gauci

Coordinating Organisation: Dexawave Energy Malta Consortium: University of Malta (Institute of Sustainable Energy) University of Malta (Physical Oceanography Unit, IOI-MOC) Grant Value: €195.463

The BLUE OCEAN ENERGY® project (BOE) is based on the adaptation of the DEXAWAVE converter used in the North sea conditions to Mediterranean conditions. This is being done by subjecting a purpose built 1:10 scale model to real Mediterranean sea conditions.

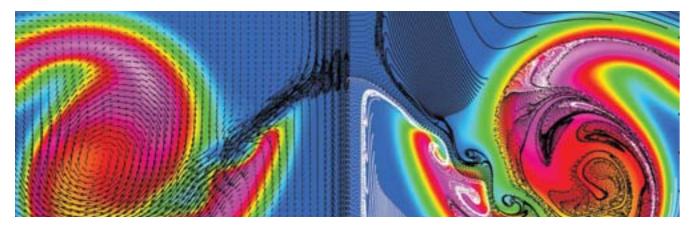
This 1:10 prototype developed for Mediterranean waters and the current project by DEXAWAVE Energy Malta Ltd is establishing the extent to which the eventual full scale project is likely to meet the needs of its beneficiaries in terms of reliable and competitive CO. neutral wave energy off shore Malta.

The 1:10 prototype project in its operational details takes account of all policy, technical, economical, financial, institutional, management and environmental aspects.

This project is also being supported by the Government of Malta, the Ministry for Resources & Rural Affairs, Ministry of Finance, Ministry for Gozo and Eco Gozo, Enemalta Corporation, Gharb Local Council, MEPA, Transport Malta, and various other institutions.

The following are the achievements to date

- Procured and shipped to Malta parts for 1:10 scale model including Datawell wave buov.
- Launched wave buoy off Gozo; currently gathering wave data (9th month).
- Manufactured additional parts, assembled, tested and commissioned
- Deployed mooring system at Marsascala.
- Deployed completed model on location.
- Launched and maintained the project website.
- Published several popular articles.
- Organised a half day event including a boat trip to visualize the
- Completed preparations for wave model implementation around the Maltese Islands.
- Started design of linear generator as an alternative to the current power generator on board the 1:10 model.



High Air Temperature Combustion (HITAC)

Coordinator: Prof Robert Ghirlando **Organisation**: University of Malta (Faculty of Engineering) Grant Amount: €46.588

High air temperature combustion (HITAC) is an innovative technology. in which the incoming air is heated to a very high temperature, such that the combustion takes place with a very uniform temperature gradient. This improves the energy conversion efficiency and reduces considerably the formation of NO.

The aim of the project was to build a computer model of HITAC, using a computational fluid dynamic software, FLUENT, in a furnace in order to be able to analyse the performance of the furnace.

The model was successfully completed and validated against experimental data provided by a Swedish Research Institute, KTH. and also against a model developed by KTH themselves. The model simulated the combustion in the furnace very satisfactorily; indeed the results from our model were closer to the experimental data than the KTH model.

The model was then used to simulate one of the steam boilers at Delimara Power Station. Due to the size of the boiler, it was necessary to scale down the boiler, using a technique developed by another overseas research team, as well as to take advantage of symmetry, in order to reduce the computational time.

Also the fuel used in the boiler simulation was methane rather than the heavy fuel oil (HFO) which is what is actually used.

The simulations showed a decrease in emissions when using methane rather than HFO in conventional combustion.

A further considerable decrease was obtained when the boiler was simulated to be using HITAC combustion rather than conventional

The project was successfully completed. The researcher employed to carry out this project wrote an MPhil dissertation about it which he successfully defended. A copy of the dissertation was presented to The Malta Council for Science and technology. Also a presentation on the project was made to The Council.

It is hoped to submit a paper on this research at a conference on Heat Transfer, Fluid Mechanics and Thermodynamics, being held in Malta this July. The abstract for the paper has been submitted.



Desalination of Sea / Brackish Water by Decentralised Solar Energy Units Solar Desalination

Coordinator: Dr. Ing. Stephen Abela Coordinating University of Malta (Faculty of Engineering) Consortium: Solar Desalination Technik LTD., Water Services Corporation Grant Value: €210.669

The high population density of the Maltese islands coupled with the isolation of the territory have contributed significantly to accentuate our dependence on imported energy. One fact which is particularly worrying is the country's heavy use of Reverse Osmosis technology for the production of one of the most basic needs of its inhabitants.

Even though RO technology ensures a practically inexhaustible supply of drinking water, it is very energy intensive and therefore heavily dependent on imported energy which itself is neither guaranteed nor inexhaustible. This dependence therefore imposes a heavy strain on the country's economy and a sizable contribution on its CO_o footprint.

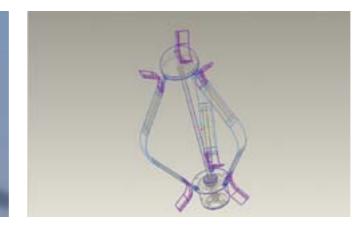
The ultimate aim of the project is therefore to design and develop solar desalination units which are thermodynamically efficient, economically competitive and which could be easily manufactured in Malta.

Such units could be used to guarantee the supply of potable water to the Maltese population. Such units would be manufactured by a local company, SOLAR DESALINATION TECHNIK (SDT) which was set up for this purpose. SDT will market the units in Malta and overseas.

The first stage of this project involved a detailed study of the evaporation condensation phenomena of sea water under preset conditions. For this purpose a software simulation code was developed and a monitored prototype (simple still) was installed at the premises of WSC to validate the correct functionality of this model.

Two additional prototype units were used to investigate the possibility of using multiple condensation surfaces and its effect on the production rate of the units were built in stage two. In addition the degradation of these units was routinely monitored to collect valuable knowledge required for the design of the final optimised units.

In this third and final phase of the project, the two optimised units are at an advanced phase of construction and monitoring. The production of the nano-textured evaporators is well underway and is expected to reach completion.



Development of a family of Augmented Lift - Self Adjusting - Vertical Axis Wind Turbines (VAWT) for urban wind context

Coordinator: Ing. Rvan Xuereb Coordinating Organisation: Econetique Ltd Consortium: Alurwind Ltd Department of Mechanical Engineering, University of Malta Architecture Project (AP) Ltd **Grant Value:** € 128.641

direction.

Vertical Axis Wind Turbines (VAWTs) are a class of wind turbines that, due to their intrinsic design, do not need to be oriented into the wind

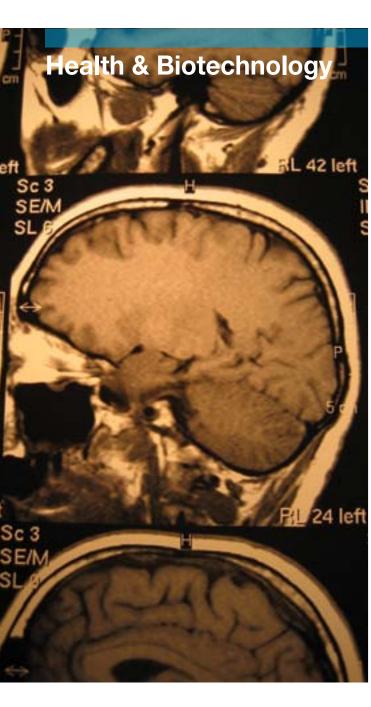
Whilst this gives them a number of advantages over other types of wind turbines, current technology for VAWTs suffer from problems of start-up and maximum torque output.

The SATVAWT project is aimed at developing a novel design adaptation to VAWTs in order to improve their starting speed and control capability.

The development will lead to an increase in efficiency and range of applications, making this type of wind turbine attractive for use in densely populated areas by integration to existing landscape.

The development will also bring about knowhow on the most feasible design for future manufacture and distribution from local industry.







Identification of neuroprotectants from terrestrial and marine plant extracts in neurodegenerative disorders of the amyloid type. (NEUROAMYLOID)

Coordinator: Dr. Neville Vassallo Coordinating Organisation: University of Malta (Department of Physiology & Biochemistry) Consortium: University of Malta (Department of Pathology)

Institute of Cellular Pharmacology Ltd.

Grant Value: €83.000

Neurodegenerative disorders of the amyloid type, which include Alzheimer's disease and Parkinson's disease, are essentially incurable conditions with an increasing prevalence rate in the general population. The aims of this academic-industrial collaborative project include: (i) the identification of novel terrestrial and marine plant metabolites that can impact health through prevention of amyloid pathology; (ii) direct knowledge transfer to local biotech industry, namely the Institute of Cellular Pharmacology (ICP) Ltd., with the potential for new nutraceutical and/or pharmacological entities marketed by the company.

Achieved scientific objectives: We have screened 17 natural polyphenol compounds and 4 botanical extracts in 5 different assays modeling both Alzheimer's Disease and Parkinson's Disease. On the basis of these assays, we have identified 3 polyphenols (apigenin, baicalein and NDGA) and 2 extracts (black tea extract and Padina pavonica extract) showing striking anti-amyloid activity in all of the assays. Structure-activity relationships point to an important novel chemical structure for treatment of these neurodegenerative diseases, which can be exploited pharmaceutically.

Scientific deliverables: 4 publications in high-impact biomedical journals (FEBS Lett., J. of Alzheimer's Disease, Biochim. Biophys. Acta, J. of Alzheimer's Disease and Parkinsonism) implying strong international recognition of our work; another 2 are in the pipeline. Such publications are fundamental for enhancing the research/innovation profile, and hence competitiveness, of Malta in the 'Health and Biotechnology' arena.

Postgraduate student training has been provided for 5 students to date (4 M.Sc. and 1 Ph.D.), including 2 German students from the elite Ludwig-Maximilians-University of Munich, Germany. This underscores the potential of the University of Malta in attracting postgraduate students to carry out cutting-edge biotech research, a potential niche area for the economy. At the same time, training of the 3 Maltese scientists will benefit the local biotech industry (e.g. pharmaceutical companies. Bio-Malta project).

R&D benefits for local industry: ICP Ltd. is very interested in the positive results being obtained by Padina pavonica extract, and is considering issuing a patent on its anti-amyloid activity.

Other spillover benefits: help create a knowledge-based economy by translating our research findings to the local pharmaceutical industry.



Modular Intravenous (IV) Set (MIVS)

Coordinator: Mr Joseph Grima Coordinating Organisation: Baxter (Malta) Ltd Grant Value: €113.513

The main objective of this project was to reduce the amount of raw materials required to manufacture Intravenous (IV) Sets and the packaging materials necessary to supply the product in a sterile state. This was to be achieved by developing a number of components that allow the end user to 'assemble' the IV set s/he needs (in different configurations), with the possibility to re-use some of the components which do not get in contact with the patient or fluid being administered.

Although intrinsically, the end product will reduce the packaging material utilised as the product will be re-used, the packaging material usage at manufacturing had to be revised. To further define the scope of this development, market research was done with major Baxter customers across Europe by means of surveys and visits. Baxter's Regulatory Affairs function was also involved in defining the legislative constraints within which this development should operate.

A device that will be used on IV sets to control the flow of solution was designed. After going through the full development process, including design reviews and risk assessments with key stakeholders, prototype moulds have been constructed to be able to test the device in a laboratory set-up.

At this stage Baxter is evaluating whether to proceed with this project based on the investment required to commercialise the product and the current portfolio of projects being managed at a global level.



Inflammation, Atherosclerosis, and Myocardial Infarction in the Maltese Population (IAAMI)

Coordinator: Stephanie Bezzina Wettinger

Coordinating Organisation: University of Malta (Institute of Health

Consortium: Department of Health Grant Value: €159,090

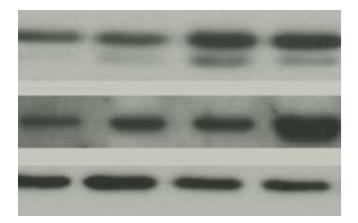
Atherosclerosis results in Myocardial Infarction (MI) or stroke, which are major causes of death in developed countries. Whilst lifestyle factors influencing risk for this disease are known, the genetic component, although shown to be present, has not been determined. A collection of data and samples from Maltese patients with a history of MI and controls will be set up, together with relatives of cases. Samples for DNA, RNA, protein and biochemical analysis will be banked

Levels of selected inflammatory RNA molecules and other molecules will be measured, together with DNA polymorphisms in the relevant genes. This study will help us determine the cause of MI in the Maltese population and the collection will be available for further studies to find new treatments and preventive strategies. Once finalised the collection will also attract further research funds from EU and other sources.

A team of scientists and researchers are working on this project. The collection is ongoing and samples are being banked. Standard operating procedures have been set up including procedures for recruitment, consent, blood sampling, sample processing and storage, physical measurements, DNA and RNA isolation.

A number of doctors and researchers have been trained in various aspects of the project. The ethical procedures in the field of biobanking were thoroughly reviewed.

Ethics consent forms were redesigned in line with developments in the field of genetics and ethics. A research tool was developed following a thorough review of other international studies. Two graduates are furthering their studies on this project and a number of part-timers are employed on the project.



Investigation of chaperone modulators as regulators of diabetes, cancer and stem cell expansion (HOTSPOTS)

Coordinator: Mr Charles Saliba

Coordinating Organisation: Institute for Cellular Pharmacology **Consortium:** University of Malta (Department of Anatomy)

Grant Value: €100.000

This project is a collaboration between the research expertise of the University of Malta's Anatomy department in Stem cells and cancer and the product development skills of the local biotech company ICP. A particular ICP product known to enhance the cell's ability of rapidly unregulated Heat Shock Proteins will be used in three fields. The first to attempt to protect healthy cells over cancer cells in respect to damage from chemotherapy. The second field will be to see if such heat shock stimulation will help expand stem cell populations in blood. Finally we will check if this extract can enhance diabetic white cell function. Starting with the latter-very interestingly, in people with poorly controlled diabetes, it has been shown that a particular aspect of leukocyte function-the oxidative burst function which attacks bacteria is enhanced by using this ICP product. This means that Tex-OE – the relevant product may reduce infections in diabetic people.

The other results relate to chemotherapy. Tex-OE is normally effective in enhancing heat shock protein production and allowing cells to better survive stress. This has been shown by ICP on normal cells. Interestingly, in tumour cell lines, the product does not seem to have such protective effect especially with some drugs such as cisplatin and methotrexate. Thus by giving Tex-OE together with chemotherapy one may protect normal healthy cells from chemotherapy whilst allowing the chemotherapy to continue killing cancer cells.



Identification of Genetic Factors Contributing to Coeliac Disease in the Maltese Population (COELIGENE)

Coordinator: Prof. Christian Scerri

Coordinating Organisation: University of Malta (Faculty of Medicine

& Surgery)

Grant Value: € 50,082

Coeliac Disease is an inflammatory disease of the upper small intestine caused by gluten ingestion in genetically susceptible individuals. This disease was in the past considered as an uncommon disorder with prevalence rates of 1 in 1700, however recent studies have shown that it may be much commoner and may affect as many as 1 in 133 individuals. Gluten is found in a number of cereals including wheat. barley and rye, meaning that those suffering from this condition are affected by a broad range of foodstuffs.

The pathophysiology of coeliac disease is multifactoral and includes both genetic as well as environmental factors. The full spectrum of genetic factors in coeliac disease is largely unknown. One way of identifying the predisposing genes is through the linkage analysis of genetic patterns amongst the family members where at least one (preferably more) of the members has the condition.

This project investigated the genetic profiles of individuals suffering from coeliac disease as well as of their first degree relatives, in a bid to identify genetic risk loci that confer susceptibility to the disease. Following the setting up of a data and specimen bank of individuals with coeliac disease and their family members, a preliminary study on a number of known genetic polymorphisms (mutations that apparently do not produce any pathological change in the protein product) was

performed. A full genome genetic linkage analysis was performed on all members of one family. This linkage analysis identified a number of interesting sites within the genome and a particular locus was identified for further analysis. The study revealed the presence of two polymorphic sites which have been found in all the coeliac cases within this family but not in the unaffected individuals.

Further studies are being conducted to identify the cellular pathology resulting from these mutations. The identification of such pathologies can result in the identification of possible pathways where one can intervene therapeutically and hence produce novel ways of treatment of coeliac disease.

This study has already attracted attention from foreign based biotech companies that have shown an interest to support further research amongst this and other Maltese families both on coeliac disease as well as other related disorders such as diabetes, rheumatoid, arthritis and other inflammatory bowel disorders.



Molecular Characterization and Authentication of Maltese Honey (MolCAMH)

Coordinator: Dr Everaldo Attard

Coordinating Organisation: University of Malta (Institute of Earth

Systems), Golden Island Ltd.

Grant Value: €91,724

The Maltese Islands are renowned for the production of genuine honey from different floral sources depending on the season and the location of the apiary. This project aims to evaluate the quality of the honey produced in the Maltese Islands. The intention is to collect as many samples as possible, from different sources and pollinating seasons. The consortium aims to screen local honey samples for their physicochemical constitution and floral origin.

The physicochemical characteristics that will be studied are moisture content, pH, conductivity, colour, phytochemical analysis and enzymatic activity. All samples will be subjected to DNA analysis to determine the floral origin of the honey and if the honey is of monofloral or multi-floral origins.

A project assistant, Mr. Charles Camilleri, was recruited. Honey sampling commenced with the collection of 16 samples from different localities from Malta for the spring season. Another 29 samples were collected for the summer period and 14 samples collected for the autumn period. This was followed by physicochemical sample analysis. The parameters tested were pH, free acidity, conductivity, HMF, diastase activity, moisture content, proline content and absorbance.

Activities in progress include the identification of pollens in the honey samples, the determination of sucrose, fructose and glucose, and the DNA extraction from the samples. These will complete the honey analysis parameters stated down in the project proposal.

A website is being set up for publicity purposes. This will increase the visibility of the project.



Purchase of Real Time PCR Equipment

Coordinator: Prof. Christian Scerri

Coordinating Organisation: University of Malta (Laboratory of

Molecular Genetics)

Grant Value: € 27.952

Polymerase Chain Reaction (PCR) equipment is a veritable workhorse in the field of molecular genetics. From its humble beginnings as a tool to amplify a section of DNA for further analysis, it has become an analytical tool in itself through the evolution of real time PCR. The purchase of such an instrument has the potential of placing the Maltese researcher in the forefront research involving the identification of expressed genes and thus in the understanding of the cellular physiology.

The PCR Equipment has been procured and is being extensively used at the University of Malta.



The Design of a Series of Non-Steroidal Oestrogen and Androgen Receptor Antagonists

Coordinator: Dr. Claire Shoemake

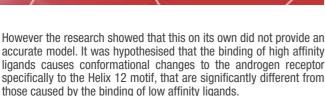
Coordinating Organisation: Department of Pharmacy, University of

Grant Value: € 10.389

Computational Chemistry is emerging at the forefront of contemporary drug design techniques. This specific project targets the oestrogen and androgen receptors, which may lead to the development of breast & prostate cancers respectively. The aim of this project is to create predictive tools via which the in vitro binding activities of oestrogen and androgen receptor ligands may be confidently estimated. It is also aimed to design, in silico, synthetically feasible non-steroidal anti-oestrogens and anti-androgens, which exhibit equivalent binding affinities to steroidal drug molecules which are currently being used.

Three dimensional crystallographic structural co-ordinates of the oestrogen and androgen receptors were obtained from the Protein Data Bank. A series of steroidal and non-steroidal ligands for which ligand binding affinity had been determined experimentally in vitro was obtained from literature.

Numerical predictions for in silico ligand binding affinity expressed as predicted pKd were obtained using an empirical binding estimation of free energy of the ligand to its receptor as implemented in SCORE. and correlated with those elucidated experimentally. Minimisation of the oestrogen and androgen receptor (steroidal and non steroidal) was carried out in order to evaluate the effect of minimisation on the correlations between in silico and in vitro estimations of pKd.



It is evident that the presence or absence of a steroidal nucleus has no bearing on the orientation of Helix 12, and it is also evident that low affinity ligands may be identified through analysis of Molecular Dynamics trajectories of the bound complexes, and that, furthermore, the apo receptor may be used as a vardstick for comparison. It is also evident that Molecular Dynamics studies represent a more reliable albeit numerically unquantifiable prediction of ligand binding affinity.



The Development of an Integrated Personal Mobility Device - Wheels for All (IPMD)

Coordinator: Ing. Vince Maione Coordinating Organisation: MCAST Consortium: Technoline Limited, KNPD Grant Value: €115,763

This project entails the development of an Integrated Personal Mobility Device (IPMD) whose purpose is to provide an paralleled level of independence to persons with severe physical disabilities. This device would be able to transport the user both indoors and outdoors at a range of speeds which are suitable for the safety of the specific user.

The device would also enable the user to move independently in the house and have full independent access to the standard amenities including hanging cupboards, sanitary facilities, bath, and bed. This unprecedented flexibility will be achieved by the incorporation of an innovative docking mechanism. Furthermore, the vast potential of this device could be further extended in the future to enable the user to use independently an adapted stair escalator, generic public amenities and an adapted car.

The mechanical design of the prototype has been developed and most workshop drawings completed. Mechanical parts and material has been procured and delivered. Machining of parts is at an advanced stage to be completed in the next few weeks. Assembly to commence once the machining is completed. The tender for the software design has been adjudicated. Report has been sent to DCC for vetting. Expected to be completed in a week or two. Once tender is finally awarded, a list of electronic control items could then be purchased.



Construction, Operation and Benchmarking of a New Form of Shrimp Aquaculture System - Intensive Vertical Shrimp Culture

Coordinator: Dr. Simeon Dequara Coordinating Organisation: AquaBioTech Innovia Ltd. Grant Value: € 65.222

As traditional fishing continues to decline and many fish stocks are becoming threatened due to overexploitation, consumer demands for fish products has continued to rise and so is the price consumers are prepared to pay for the product.

Aquaculture is one possible solution but presents a challenge in terms of developing the required cultivation techniques in an artificial habitat. Moreover, the cultured produce should be free from chemicals, antibiotics and contaminants. The purpose of this research is to develop and operate two prototype recirculation systems for the intensive culture of Fish and Shrimps. The prototype design is one that has been developed by AquaBioTech Innovia Ltd. and it allows for the high-density culture of fish / shrimps using a synthetic material suspended in the water column so as to increase the viable surface habitat and feeding area.

This high-density culture is believed to produce fish / shrimps of very high quality utilising the entire water column allowing for high yields per meter squared compared to existing cultures. The project focused mainly on new designs of prototypes of recirculation systems for fish cultivation. The prototypes have been developed and successfully tested. Results were very promising and very near commercialisation.



Transcriptional regulation and promoter genetic variation of the chemokine receptor 4 (CCR4) gene with special pharmacogenetic relevance to novel therapeutic targets in asthma

Coordinator: Dr Anthony Fenech Coordinating Organisation: University of Malta (Department of Clinical Pharmacology and Therapeutics) Grant Amount: €40 531

The human CCR4 is a recognised pharmacological target for asthma therapeutics, as confirmed by numerous scientific publications and registered patents for CCR4-antagonist molecules.

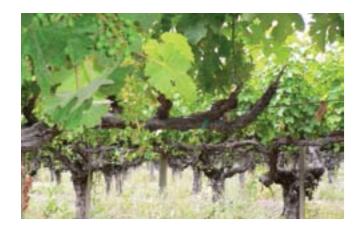
The project aims to pharmacogenetically characterize the transcriptional regulation of CCR4, in order to identify functional variants that would influence the therapeutic efficacy of CCR4antagonists.

The results will contribute towards identifying potential pharmacogenetic-dependent interpatient variation in treatment responses to CCR4-antagonists, and will identify whether specific promoter variants contribute towards the phenotype of asthma.

The CCR4 transcriptional regulatory regions have been experimentally identified and functionally characterized using cloning and mammalian cell transfection strategies. Software-based transcription factor maps have been generated.

A sequencing strategy has been designed, and approximately 1000 PCRs have been prepared, covering two CCR4 promoter regions and the coding sequence from a panel of DNA obtained from asthmatic patients and a control DNA panel.

These PCRs are awaiting sequencing. Following the sequencing runs, identified variants will be functionally studied in homologous and heterologous cell lines, and compared to wild type, in order to derive relevant pharmacogenetic data.



Valorisation of the Indigenous Vine Varieties of Malta: Conservation. Assessment and Innovation

Coordinator: Ms Claudette Gambin

Coordinating Organisation: Viticulture & Oenology Unit (MRAE) **Consortium:** University of Malta (Institute of Agriculture)

Grant Value: € 115.700

Wine fermented from the local grape varieties, including those from the Gellewza and Girgentina varieties, often fail to reach the minimum level of alcohol stipulated by Council Regulation (EC) 1493 of 1999.

In order to overcome this problem, it is customary to add sugar to the extracted grape juice prior to the fermentation process. This practice has only been allowed on the basis of a derogation which comes to an end in 2008.

It is believed that this problem can be overcome, and may be a result of lack of standards and good practice in the cultivation and harvesting of these grapes. This project aims to identify existing local strains which are best suited to cultivation and to demonstrate that correct cultivation and harvesting procedures can yield the desired results. The project will be carried out with the collaboration and participation of a spectrum of local stakeholders.

All identified deliverables of the project are required by the local viticulture and wine industry in order to make cultivation of local grape varieties economically feasible and for the continued production of quality wines using local varieties. The beneficiaries will be the local viticulture community and those involved in the local wine industry.



Screening of Maltese Medicinal and Aromatic Plants for Pharmacological Activity

Coordinator: Dr Everaldo Attard

Coordinating Organisation: University of Malta (Institute of Agriculture) Grant Amount: €49.080

In the past, several studies focused on the uses of Maltese medicinal

and aromatic plants (MAPs) in ethno-medicine. 458 MAPs are recorded to have been used to treat a variety of acute, chronic or terminal illnesses. Of these, only 8% have been scientifically investigated. It is well known that some medicinal plants have multiple traditional uses. We studied the biological activity of these medicinal plants using modern scientific techniques, with a view to identify specific substances of medicinal value.

This project revealed the presence of phytochemicals including flavonoids, alkaloids, terpenoids and lectins in MAPs and extracts exhibited pharmacological activity using the brine shrimp test. Further tests on active extracts include tests for Immunoproliferative activity, haemagglutination and cytotoxicity on cancer and normal cell lines. The plants were included in a database of Maltese MAPs established by the Division of Rural Sciences and Food Systems of the University of Malta. These investigations revealed the potential of these MAPs.

The main deliverables of the project were reached; from the collection of medicinal plants, to the extraction of important plant chemicals and the testing of extracts on various biological systems. The compilation of data, from the results obtained, led to two main publications. The material is also illustrated on a website: http://staff.um.edu.mt/eatt1/

rtdi/rtdi.html to increase the visibility to the general public and other

From the published material, the author has been invited to participate in research projects with the University of Quebec (Canada), University of Milan and University of Perugia (Italy), University of Porto (Portugal), University of Thessaloniki (Greece), University of Almería (Spain), Montesquieu Bordeaux IV University and Agrisup Dijon (France), University of Maribor (Slovenia) amongst others. Most of these (mini) projects are on-going.

Extension of the work to undergraduate and postgraduate students has also taken place and the platform developed through this project is being used to build up to more specific and thorough investigations on Maltese medicinal plants.



Increasing the yield in the production of slow release pellets in the manufacture of tablets and capsules (IYPOS)

Coordinator: Lilian M. Azzopardi Coordinating Organisation: University of Malta (Department of Pharmacy)

Consortium: Starpharma Grant Value: €80.000

In the local Pharmaceutical Industry scenario, Research and Development (R&D) is based on the development of generic formulations. The number of pharmaceutical companies that manufacture slow release solid oral dosage forms is limited due to the specialised knowledge required to carry out research to develop such formulation.

During scale-up, when transferring from the process from R&D to the production phase, it may prove to be difficult to obtain a high yield. A high yield is desirable to reduce the production cost and errors. There is a known problem that a higher yield cannot be obtained due to the wastage produced during the process, mainly the extraction waste.

The objectives of this project are to develop a method to improve the yield of the active pharmaceutical ingredient specific to the production of pellets for the manufacture of solid oral dosage forms and to identify methods to enhance manufacture of modified release formulations.

The production of slow release venlafaxine-hydrochloride pellets was studied to identify the parameters which affect the yield during

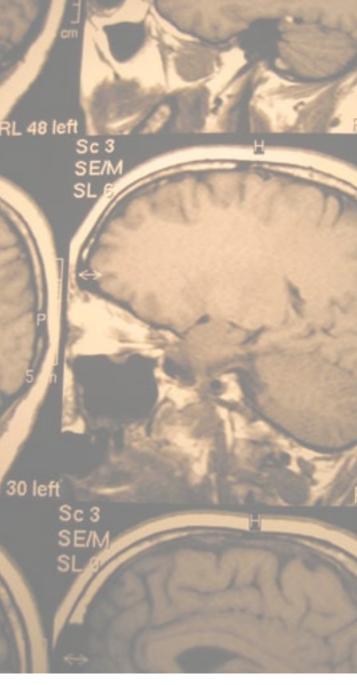
the application of venlafaxine-hydrochloride onto the sugar spheres and the subsequent application of the slow release coating onto the pellets. The parameters impacting the yield were monitored using the Batch Manufacturing and Instructions Record, Samples of pellets were collected from each batch and examined under a microscope. Their surface roughness was rated from 1 to 5, where 1 is a surface densely packed with spikes and 5 is a very smooth surface. After performing a statistical analysis, the extraction waste and selection waste were found to account for 43.6% of the variation in the yield of the active pharmaceutical ingredient. A manufacturing method was devised to decrease the amount of extraction waste produced and is currently being validated.

This project is important in the manufacturing field since information about the production of slow release pellets using a coating pan is limited. This will help the pharmaceutical industry to improve upon the process which is currently being used leading to a decrease in costs and manufacturing time, making the process more economically

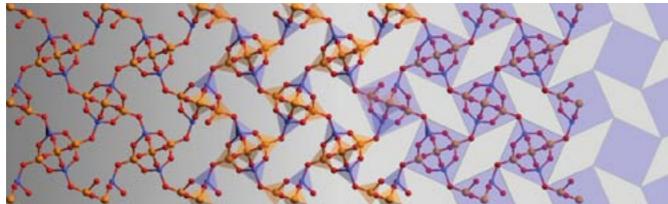
The parameters which have an effect on the yield during the production process were identified.

There was an improvement to the coating pan used and the method which was being used in the production of slow release oral dosage forms which led to a decrease in the number of slow release coatings required to achieve the stipulated dissolution rate. This method is currently being validated.

A post-graduate student reading for a Masters degree is working on this subject as her dissertation.







Manufacture, modelling and testing of foams, with particular emphasis on a new manufacturing method for the production of 'value-added' auxetic foams

Coordinator: Prof. Joseph N. Grima Coordinating Organisation: University of Malta (Auxetics Research Group (UOM-AUX), Department of Chemistry) Consortium: Methode Electronics Malta Ltd

Grant Value: €140.000

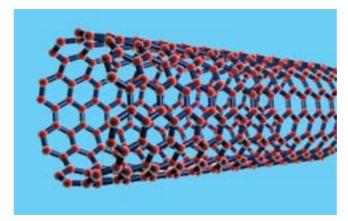
Foams are low density and low stiffness materials which are used in many practical applications such as automotive seats and filters. In this project, we develop a novel methodology for the manufacturing of auxetic foams (foams which get fatter when stretched) from conventional foams through a new and innovative manufacturing process. Mechanical testing of the resulting foams verifies our claim of auxeticity and analysis and comparison of the microstructure of conventional and auxetic foams reveals the geometric features which are essential for obtaining auxetic behaviour in foams.

Prior to this project, only one way for manufacturing these foams has been reported. This new method therefore provides an alternative and possibly cheaper way to make auxetic foams. Auxetic foams are known to have various superior properties when compared to conventional ones, for example, they have better indentation resistance, a greater resilience, enhanced energy absorption and acoustic properties amongst others. Thus, the conversion process of conventional foams to auxetic foams is clearly a value adding process.

In addition we also study the effect of heat and solvents on auxetic foams, an aspect which has been left unexplored before commencement of the project.

In fact studies performed in this project suggest that they have a detrimental effect on auxetic foams. However, auxeticity of the foams can be preserved if the foams are kept in a contained state. This has very important implications vis-à-vis the conditions in which such foams can be used.

- An extensive literature search was done on models used to describe the structure of conventional and auxetic foam and on standards used to test the mechanical properties of foams.
- Various small samples of auxetic foams have been produced using the newly developed process where mechanical testing of the resulting foams suggest that they are auxetic.
- The new process of making auxetic foams has also been
- Most of the work has been presented in a number of international conferences, published in a PhD thesis, an undergraduate dissertation and also in a number of peer reviewed journals.
- The work has also been featured on the front cover of Advanced Engineering Materials.
- The work has also been publicised in press releases and also in various TV programs.



Modelling of Materials with Unusual Mechanical and Thermal Properties

Coordinator: Prof. Joseph N. Grima Coordinating Organisation: University of Malta (Department of Chemistry, Faculty of Science) Grant Amount: €66.853

The purpose of the project was to design and study new/already existing structures and materials which exhibit negative Poisson's ratios (auxetic) and/or negative thermal expansion coefficient (NTEC) in an attempt to (1) produce new materials and structures with these properties; (2) to study the possibility that these two unusual properties co-exist; and to (3) study the effects of stress / temperature changes on the thermal / mechanical properties respectively.

Since this was basic research project, it paved the way for further research which is more related to the production of goods. In fact, after this project a further two projects were awarded by The Malta Council for Science and Technology to the University of Malta aimed at developing auxetic foams and stents.

As discussed above, the deliverables of this project were reached which include the modelling of a number of molecular-level auxetic / NTEC materials, where in fact the possibility of the co-existence of these properties was identified through the zeolite Natrolite. Furthermore a number of new macrostructures were proposed, such as auxetic behaviour from rotating rhombi, which were studied through empirical modelling and analytical modelling. Eighteen publications and one patent were also produced through this project. This project also helped in-full or in-part for five persons to obtain their Post-grad degrees.



ARationalization of Industrial Automation Requirements and Service Provision in Malta, with a Focus on the Development of New Modular Reconfigurable Industrial Automation Systems (AUTOMATE)

Coordinator: Dr Ing. Michael A. Saliba **Coordinating Organisation:** University of Malta (Faculty of Engineering)

Consortium: Cheops (Malta) Ltd., Prominent Group of Companies (Malta), Toly Products Ltd., Malta Chamber of Commerce, Enterprise and Industry

Grant Amount: €138.293

In high added-value product manufacture, where the trend is towards high product variety and relatively low product quantities, there is the need for versatility in automation, potentially through the use of reconfigurable production automation systems.

Due to a lack of appropriate technologies and methodologies, automation in the Maltese manufacturing industry is generally less widespread and effective than it could be, thereby compromising the efficiency and competitiveness of this important sector. In this project a critical investigation of the current implementation of industrial automation in the local context has been carried out, and the existing problems have been identified, particularly in the case of high addedvalue product manufacture. Solutions to the identified problems, with a focus on new research results along the concept of reconfigurable automation, have been developed. Comprehensive guidelines on the implementation of effective production automation systems within the Maltese environment have been defined.

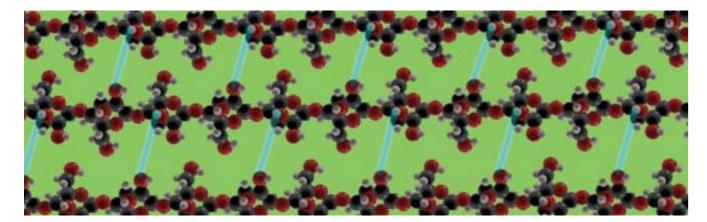
A pilot version of a versatile automation test bed, to help in the development and evaluation of the guidelines, and which is targeted towards use by local industry for trying out new automation strategies, has been set up, and tested successfully on three case studies provided by the industrial partners of the project.

A detailed roadmap has been drawn up for the setting up of a new commercial venture, that will be able to facilitate the implementation and servicing of automation systems in the local market.

Achievements include the development of a new design paradigm for a highly versatile, physical manufacturing automation test bed. This testbed is highly reconfigurable to provide a platform for the development of solutions for a wide range of different manufacturing sub sectors. A new methodology to help manufacturing companies develop effective production automation solutions in a high value added environment in the presence of product variety, has also been developed. Further developments include extensive solutions to actual manufacturing problems stemming from our three industrial partners.

The AUTOMATE project has provided an opportunity for the extensive networking within the local and international manufacturing field and comprehensive training of two automation engineers, as well as the conferment of two Masters degrees. Three refereed international conference papers have been published on the work carried out during the AUTOMATE project, and a further three scholarly publications are in the process of preparation.

A full day workshop on the use of production automation within the Maltese manufacturing industry, was held in 2009.



Innovative Fibre Reinforced Composites Designed for Higher Structural Performance (FiReComp)

Coordinator: Dr. Ing. Duncan Camilleri

Coordinating Organisation: University of Malta (Department of Mechanical Engineering)

Consortium: Composite Solutions Ltd

Grant Value: €100.000

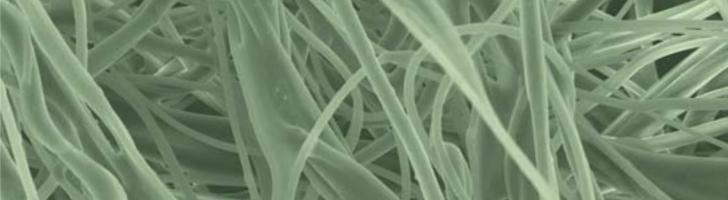
Composite materials offer an attractive alternative to metals in the automotive, aerospace, marine and civil industries. The correct combination of strong, high modulus properties of polymer/ fibre reinforced composites provide means to produce light, yet very strong assemblies. This project looks at various composite structures and establishes optimum percentage composition of reactive thermoset resins and glass fibres through a series of material testing and finite element modelling. The project aims to develop and produce innovative fibre reinforced composites with high structural performance at minimal cost that can be used for manhole covers, gratings, fire hydrants, pressure vessels and many other applications in the marine, civil, automotive and aerospace industries. The objectives of the work programme are summarized below:

- 1. Advance knowledge in understanding the mechanics leading to better structural performance and higher production rates.
- 2. Determine structural properties namely moduli and strength of the constituent phases making up the composite and of the final fibre-reinforced composite via an experimental tensile testing
- Develop and validate an efficient numerical simulation technique to predict structural performance of composite assemblies.

- Perform numerical sensitivity studies to establish design and manufacturing guidelines.
- 5. Establish the influence of material composition, orientation and percentage composition of constituent phases required to meet specific structural performance.
- Disseminate and transfer knowledge to industrial partners for commercial exploitation and to the wider community, providing manufacturing and design guidelines.

The achievements and deliverables reached during the first year of research include:

- Extensive literature review on current state of the art analytical and numerical techniques.
- Preliminary tensile testing of composite materials to establish material properties
- Upgrading of universal testing machine for synchronous measurement of strain and load, including the purchasing of compression and shear fixtures.
- Development of analytical solutions capable of optimizing simple composite structures
- Development of numerical solutions based on finite element analysis that are able to predict the first ply failure design criteria of composite structures
- Development of progressive ply damage analysis numerical solutions that are able to predict the failure load of composite structures
- Design of a composite testing specimen mould for the manufacture of standardized test specimens
- Testing of manhole covers



Application of Copper Carbon Nanofibre Composites in the Thermal Management of Solid State Relays and Power Modules - (C-Cu Thermbase)

Coordinator: Ing. Michael Attard

Coordinating Organisation: IMA Engineering Services Limited Consortium: Power Switch, University of Malta (Faculty of Engineering) Grant Value: €196.366

Copper and carbon nano fibers – both with high thermal conductivities can be prepared at different ratios of dispersion and orientation which results in an improved coefficient of thermal expansion (CTE) in the range 8-10 ppm/K and a thermal conductivity (TC) in the range of 200 to 600W/m/K.

Metal-matrix composites (MMC) with combinations of physical and mechanical properties desirable for specific applications can be obtained by varying and controlling selected parameters in the material formation processes, particularly by increasing the microstructural homogeneity of the composite, while maintaining a constant mixture ratio or volume fraction.

Composite materials can also contract with an increase in temperature. This proves to be of an advantage since current technology utilizes a negatively (concave) curved part to cater for different material expansions and prevent ceramic insulators from cracking under stress. The CTE, which is the degree of expansion divided by the change in temperature general varies with temperature.

Whilst the CTE is effected by the different material layers which behave differently over a time interval related to the soldering application, the TC decreases with increasing temperature.

The anisotropic structure of the composite serves to spread the heat away from the heat spots.

Deliverables already executed through the project include the analysis method and optimum way of processing MMCs, as well as seeing to negative thermal coefficient of expansion of composite materials. Modelling and other technical requirements have also been seen to.

Furthermore, handling of nanofibres and coating of interface layer and copper matrix, development processes suitable for fibre coating. processing of MMCs and prototype fabrication, have been undertaken. Further testing of nanofibres and coating of interface layer and copper matrix, including the development processes suitable for fibre coating, processing of MMCs, prototype fabrication and testing have software developed for modelling of metal matrix composites.

In relation to this project, two Masters were completed at the University of Malta and one PhD is in progress. Furthermore, five scientific papers have been accepted for publication.

IMA have participated in three events, the Nanochallenge 2009 at the University of Padua for the region of Trento, the PCIM Power Electronics Fair in Neuremberg in May 2010 and the PRONANO FP7 project.



parts for a laparoscopic surgery tool (Idelap)

Coordinator: Prof. Ing. Jonathan C. Borg Coordinating Organisation: University of Malta (Faculty of Engineering) Consortium: The Malta Chamber of Commerce. Enterprise and Industry, Malta Enterprise, Trelleborg Sealing Solutions, Jamesco Trading Company Ltd., Engineria Grant Value: €107.761

Micro manufacturing has expanded in a number of industries across the globe, with particular significance in the medical and surgical markets. To enable Malta to shift towards high-value added manufacturing, this Research & Innovation project adopts an interdisciplinary approach by the integration of the medical discipline with the engineering discipline.

As stated by the European Commission in the report on the Future and Vision of Manufacturing for 2020 (Manufuture 2004) manufacturing industries need to concentrate their efforts on shifting from resourcebased to knowledge-based manufacturing by investing in software and ICT-based tools to be able to design and produce high-value added products that meet users' new emerging needs.

This project thus focused on two main objectives: i) the development of a novel laparoscopic surgical prototype tool (nicknamed UMMISEF for University of Malta Minimally Invasive Surgical End-Effector) and ii) the development of an intelligent ICT prototype tool (nicknamed ICADMIC for Intelligent Computer Aided Design for Devices with Micro Scaled features) incorporating the knowledge generated from i) above.

All objectives and deliverables of the seven work packages of each of the three stages of the R&I project were delivered. These included the results of the problem analysis, detailed design solutions of the laparoscopic surgery tool, a set of structured design guidelines, an ICT-based design support tool, a long-term exploitation plan and the project webpage and flyer for dissemination purposes.

Five publications also emerged from this project as well as two local patents and one WIPO patent. A masters and a doctorate degree were also obtained by two postgraduate students via the project funding.



Smart Stent - Manufacture, Architecture, Research, Treatment

Coordinator: Prof. Joseph N. Grima

Coordinating Organisation: Unit, University of Malta Consortium: Tek-Moulds Precision Manufacturing Ltd.

HM RD Ltd

Grant Value: € 160.555

Cardiovascular disease is one of the leading causes of death in the Western world. An increasingly common form of treatment for this disease involves implanting a stent in the artery or vein where a blockage is present.

Current stents are inflexible, they shrink and they generally do not behave in the same way that a blood vessel inside the body would. This can result in new blockages forming and unnecessary stress on the problematic vessels which will eventually require additional surgical interventions.

The Metamaterials Unit of the University of Malta, in collaboration with HM RD Ltd., part of the HalMann Vella Group of Companies, and Tek-Moulds Precision Engineering Limited is attempting to solve these issues through innovative stent designs.

The University team of researchers is proposing and attempting to patent new geometries which can help to minimise the negative effects of current stent designs. Stent insertion is, therefore, made easier for the doctor, giving a better result to the patient. Such interventions would be more efficient, reducing operating times and costs while sparing the patients from undue stress.



Fabrication of Advanced Hybrid Composite Sandwich Panels - Testing & Simulation (FACTS)

Coordinator: Dr Claire De Marco

Coordinating Organisation: Dept of Mechanical Engineering.

University of Malta

Consortium: Buccaneer Boats Ltd

Grant Value: € 95.660

Composite materials has gained rapid popularity in many industrial applications, especially so in the boat building and marine industry, the focus of this research project. The composite, a specific combination of fibre reinforced resins, produces a combination and intimate relationship between the constituent materials, producing a material which is efficient and fit for purpose. Single skin laminate panels may lack stiffness due to their reduced thickness. In small craft design and manufacture, local boat builders traditionally introduce stiffeners of wood, encapsulated in additional fibre and resin. The additional frames provide strength, however add to the weight and increase the construction complexity.

Combining two high strength composite laminate skins separated by a core material produces a sandwich construction. The core is light weight, with favourable properties of shear strength and stiffness.

The panel increases in thickness, without suffering a weight penalty whilst providing additional strength support. The global sandwich panel bends and flexes during the in-service loading, typically from hydrostatic, bottom slamming and side shell impact loads.

The use of sandwich construction in boat building requires the utilization of advance construction techniques in order to gain the maximum performance from the build materials. Vacuum baqqinq is one such technique. This fabrication process is an effective and cost-efficient technique utilising pressure difference to produce a high-strength hybrid sandwich material of superior properties and characteristics. Properties such as light weight, corrosion resistance, low maintenance costs, enhanced mechanical properties and low magnetic characteristics have been successfully applied to marine vessels of all kinds.



Investigation of Advanced Metal - Diamond Composites for Thermal Management Applications (DiaCom)

Coordinator: Ing. Michael Attard Coordinating Organisation: IMA Engineering Services Limited Consortium: University of Malta (Department of Metallurgy & Materials Engineering) Austrian Technology Institute (ATI) (Supporting Entity) Grant Value: €88.313

Work carried in the past two years on the research and development of diamond composites has lead to outstanding results which can be used in beyond state of materials which find their applications in thermally loaded components (Cooling of LED, laser diodes, power electronics or microelectronics). Diamond composites represent the next generation of cooling solutions. Critical areas which limit the thermal conductivity and the reliability of the material, namely related to the interface between the metal and diamond, will be investigated. Also, to place metal-diamond composite materials into the market it is necessary to reduce the costs for the production through use of innovative materials and processes. This development will yield a beyond state of the art material with a high added value.

Carbide forming elements shall be used to create an interface between the diamonds and the metal matrix which shall consist of nano particles to provide a high surface area contact to the diamonds.

A process for the formation of silver nanoparticles has been set up and sufficient silver nanoparticles have been produced for next stage processing. The nanoparticles are classified in their size range using a zeta sizer. Graphite tools have been manufactured to consolidate the metal matrices in an induction vacuum oven.

Carbide forming elements like chromium is being applied by microwave assisted autocatalytic deposition to form an interface on the diamond fractions.

Simulation of the thermal behaviour of the metal matrix is being simulated using a dedicated program plug-in for Matlab software.

In relation to this project, an undergraduate is carrying out his final vear thesis related to this project. This will lead him to a Master's degree and later to a PhD. Publications are planned for at least two popular journals.





ERDF083: Manufacturing Research Platform

The Manufacturing Research Platform Project managed by the Malta Council for Science and Technology (The Malta Council for Science and Technology) is an EU-funded project aiming at catalysing the local manufacturing industry in its transformation to higher value-added activities through awareness-raising and participation in research

The project establishes a Manufacturing Research Platform bringing together all stakeholders in the manufacturing sector from government, academia and industry. Managed by a Steering Committee, the Manufacturing Research Platform aims at discussing issues faced by the manufacturing industry and how research can contribute towards mitigating these issues and strengthening the competitiveness of local industry.

The project includes the development of a Manufacturing Research Strategy for Malta focusing on the analysis of the local manufacturing scenario, identifying existing and potential R&I activities for increased industry-academia collaboration.

Finally the project undertakes three Collaborative Research Projects in the areas of Energy Efficiency in Manufacturing, ICT in Manufacturing and Innovation in Manufacturing, demonstrating the benefits of research and innovation and industry-academia collaboration, thus encouraging increased industry involvement in such activities.

Manufacturing Research Strategy

Malta's National Strategic Plan for Research and Innovation recommended the development of a specific research strategy for each of the four identified priority areas, one of which is manufacturing.

The manufacturing research strategy will include the following:

- An analysis of the local manufacturing scenario;
- A roadmap to guide the undertaking of manufacturing research. including the identification of possible focus areas:
- Recommendations to enable the strategic objectives to be achieved.

The need for a Manufacturing Research Strategy was identified as one of the key objectives in the National Strategic Plan for Research and Innovation (R&I). It will act as a guide in the allocation of available resources to ensure that they are used wisely and effectively, and with the best chances of success and return on investment.

This strategy identifies how R&I can be leveraged for economic growth and the steps to be taken to promote and facilitate R&I in the manufacturing sector.

The Strategy aims at analysing and achieving:

- Research Potential: identifying ways in which scientific and technological Research and Innovation can contribute to the competitiveness and growth of the manufacturing Industry in
- Research Strategy: considering alternative strategies and proposing how to best apply Limited resources to maximum effect, as well as how to increase availability of resources;

- Action Plan: identifying possible actions and measures which could facilitate and enable the development and growth of research within the manufacturing industry in Malta. Evaluating these for feasibility and cost-effectiveness, and submitting both a short-term and long-term action plan comprising a prioritized list of recommendations, enabling research to contribute to the competitiveness and growth of the manufacturing industry in

The Strategy undertook a thorough public consultation process in 2011 and will be published in 2012.

Collaborative Research Projects in Manufacturing

At the heart of the Manufacturing Research Platform is the creation of industry-academia collaboration through a number of research projects which do not only address the research needs of a particular organisation, but which focus on a horizontal theme relevant to a broad spectrum of industry. Projects of this nature are rarely proposed by industry or academia, since organisations tend to focus on their individual needs rather than on collaborative projects of this nature. Additionally, the results of these projects will be shared with the manufacturing industry and the research community at large.

The Collaborative Research Projects in Manufacturing tackle three distinct areas in manufacturing, namely: Energy Efficiency, ICT and

Projects promoting Energy Efficiency in Manufacturing

The main aim of these projects is to improve the efficiency of energy utilisation and thus reducing energy consumption in industry. Indeed, one project deals with increasing energy efficiency during reliability testing of electrical/ electronic equipment through grid connected load units while the other attempts to improve energy efficiency in electric motors for the manufacturing industry.

hese projects are being undertaken by researchers from the University of Malta together with the following industry partners: Abertax Quality Ltd. Andrews Feeds (Malta) Ltd. Delta Malta Ltd. Playmobil Malta Ltd and Toly Products Ltd.

The following is a summary of the projects and the achievements so far.



Increasing Energy Efficiency during Reliability Testing of Electrical / Electronic Equipment through Gridconnected Load units.

Manufacturing of electrical products must be followed by testing to ensure functionality when these reach the final consumer. The testing phase of certain products such as Electrical or Electronic DC supply equipment like DC Power Supplies can consume a considerable amount of electrical energy.

Testing of DC power supplies as well as batteries is carried out by cycling, which means that they are repetitively charged and discharged for a number of times by loading them with resistors, converting all the electrical energy into heat, thus losing all the energy.

Due to these losses, the ambient temperature in the testing area will increase, leading to further electrical consumption to control the ambient temperature within an air-conditioned environment.

The aim of this project is to conserve the electrical energy used while testing DC power supplies and batteries by redirecting as much energy possible back to the grid. This will be done by developing a regenerative active load unit.

Methodology

The regenerative active load unit involves a flexible design and implementation of a DC-DC converter stage with variable input voltage and current. The converter must maintain a constant output voltage so that it can be interfaced to a grid-connected inverter which will supply electrical energy back to the grid.

Results and Wav Forward

A number of tests have been carried out in collaboration with the industry partners. Initial testing carried out at Delta Malta Ltd showed impressive results of savings on the electrical consumption ranging between 63% up to 77%. The electrical losses were the inefficiencies of the DC-DC converter, the grid-connected inverter and the device

A second prototype, made up of two modular DC-DC converters is now being built and is expected to be able to test more DC power supply models and battery types with different capacities. Further studies will be carried out at Abertax Malta Ltd. where a number of battery banks will be discharged by the regenerative load following a current profile to model the load profiles that will be experienced by the batteries within a target application. Major energy savings are being envisaged through the utilisation of this prototype.

More energy efficient electric Motors for the Manufacturing industry

Motor driven systems account for approximately 65% of the electricity consumed by the EU industry. Switching to energy efficient motor driven systems can save Europe 202tWh in annual electricity consumption. This excess energy consumption represents an annual €10 billion operating cost and an unnecessary 79 million t/yr of CO2eq emissions. In the large majority of the cases, energy efficient motor systems have a lower life cycle cost – a reduction that can rise to 35%. Since the induction motor is widely used in the Maltese manufacturing industry, it is believed that replacement of the motor and/or drive system with a Motor Energy Controller (MEC) will have a wider application in the local industry with a potential significant efficiency improvement.

Methodology

In order to establish the use and rating of motors in the different industries on the island, a detailed study of the motor population in the manufacturing scenario was carried out. This included a state of the art literature review of motor energy controllers and energy efficient motors on the market. In particular, plastic injection moulding plants (Playmobil Malta Ltd and Toly Products Ltd) and a food processing plant (Andrews Feeds) were considered.

Research shows that the induction motor in an Injection Moulding Machine (IMM) always consumes a minimum constant amount of power which is being defined as the base load and the load on the motor never falls down below this value. This base load exists even when the IMM is idle (i.e. not producing any products); and when it experiences a production fault which requires manual resetting of the process. Although it appears that the motor is overrated, there are certain instances where the motor is loaded up to twice of its rating. The inefficiencies in these motor driven systems can be eliminated by introducing an MEC. A lab test rig has been developed to be able to emulate the industrial load through testing of intelligent energy controllers. Results show that, due to high percentages of time at low load, energy savings can be achieved.

Results and Way Forward

Following an analysis carried out on the percentage time that the machine operates at different power levels, research shows that most of the time the motor is operating at the base load thus operating inefficiently. Case studies at the industrial organizations have been commenced in order to confirm the energy savings obtained from simulations and the test rig results.

Projects promoting ICT in Manufacturing

The main aim of these projects is to exploit ICT to improve performance metrics such as cost, time, quality and sustainability. Indeed, one project deals with the automated optimization of production lines while the other attempts to automate Quality Assurance (QA) for print output using neural networks.

These projects are being undertaken by researchers from the University of Malta together with the following industry partners: Abertax Quality Ltd. Andrews Feeds (Malta) Ltd. Delta Malta Ltd. Playmobil Malta Ltd and Toly Products Ltd.

The following is a summary of the projects and the achievements so far



The challenge of manufacturing today is the optimal allocation of resources to deliver 'added value' to customers. The 'added value' component helps compete in competitive markets by lowering cost and increasing output. Manufacturing companies struggle hard to plan their production such that it minimises costs, reduce unnecessary inventory and as far as possible produce a combination of products to maximise profits. Good planning is vital for the success of a manufacturing plant.

However scheduling problems are computationally complex. It is very difficult to generate a feasible, optimal schedule in an acceptable amount of time. Operators use basic rule-of-thumb techniques to generate a good schedule, unaware that these problems are exceptionally complex. The tool designed by the University of Malta through this project, allows operators to model and measure the complexity of the problems in their production lines and to generate 'near-optimal' schedules.

Methodology

The process has three stages, namely: Step 1: Modeling the production line using a graph, Step 2: Decomposing the graph to identify the different flow lines in the production line and finally Step 3: Using appropriate solvers to generate a near-optimal schedule.

The intermediate step between step 1 and step 2 involves generating a problem signature and using a classification engine to determine the computational complexity of the problem.

Results and Way Forward

The system allows modeling of a number of scheduling problems, including classic Single Machine and Parallel Machine scheduling problems and Shop Scheduling problems (Job Shop, Flow Shop and Open Shop scheduling problems). It is able to classify the scheduling problems. A plug-in system allows the implementation of different

Automated Quality Assurance (QA) for print output using Neural Networks

With today's competition in the manufacturing industry, the demand to produce large batches of high quality products in the least possible time is ever on the increase. Quality inspection is traditionally carried out by human beings making the process slow and often inaccurate. This project deals with the development of a system that detects defects in the printing of manufactured goods. Defects include scratches, extra ink, smudges, etc. The system proposed is one that is flexible enough to tolerances requested by the user which can be configured to tolerate some kinds of defects while refusing others. It makes use of Artificial Intelligence (AI) techniques such as artificial neural networks which mimic the way our brain functions.

Rather than having a user assign a set of parameters to the system and the system makes sure that a product fits under those parameters. the project aims to let the system learn by itself what is defective or not and be able to judge the quality of the product based on its learned parameters. The instant advantage of such a system is the applicability of the system from one domain to the other without a lot of tweaking to the system itself.

Methodology

The process of automated optical inspection of a product is generally split into multiple stages including image acquisition, image enhancement, feature extraction, image classification and results/ output. Some preferences such as breaking up the image into parts and treating each part separately can be adjusted by the user.

Once the image is captured it is enhanced through image preprocessing techniques and the meaningful features are extracted from the images to be used by the classifier.

In addition to the initial set up parameters and values, the automated optical inspection system requires data to learn from. Data inputted to the system is given in the form of images. Based on which methods will be used, the nature of the product and defects possible, the user can either provide a set of defective and defect free data or else the user can provide a set of defect free data and set a threshold of

Results and Way Forward

After the image captured is processed by the software, the image (i.e. product) is classified as either containing a defect or free from defects. The way the results are shown varies depending on the method selected for inspection during the configuration stages. Future work will include a larger set of features from the system to choose from together with Optical Character Recognition (OCR).



The main aim of these projects is support research related to increasing innovation and creativity in manufacturing firms to help their products and/or processes become more high-added value. Indeed, one project deals with the development of "An industrial collaboration framework" for amplifying innovation in Manufacturing (IC-FAIM) while the other project deals with the development of a "Life – oriented Product Development simulation framework" for amplifying innovation in Manufacturing (LS- FAIM).

These projects are being undertaken by researchers from the University of Malta together with the following industry partners: FxB Group of Companies Playmobil Malta Ltd. Techniplast Group of Companies, Toly Products Ltd and Rayair Automation Ltd.

The following is a summary of the projects and the achievements so far.



Development of "An Industrial Collaboration Framework" for Amplifying Innovation in Manufacturing (IC-FAIM) A "Life-Oriented Product Development Simulation Framework" for Amplifying Innovation in Manufacturing (LS-FAIM)

As stated in Europe's strategic vision for manufacturing for 2020 European industry needs to "increasingly concentrate its capabilities on high-added value products and technologies offering a broadened service range that fulfils worldwide customer requirements." {Manufuture high Level group, 2004 #733}. One factor contributing in this direction concerns the innovation in the way a product is designed and manufactured.

Both projects in this initiative look towards amplifying innovation in the Maltese manufacturing Industry. Due to increasing product complexity, different product stakeholders have to regularly collaborate and communicate during product development. The nature of collaboration taking place between these different stakeholders will influence how innovative and thus how competitive the resulting products and/or manufacturing processes are.

In view of this scenario, the overall goal of this research initiative is to develop a tool that helps amplify innovation in manufacturing through improved stakeholder collaboration.

Considering that the main stumbling blocks when it comes to the implementation of innovative ideas is the justification of possibly new capital expenses in the short term and prediction of long term profits/returns and other performance metrics such as environmental

impacts, product quality etc. Thus, the objective of this project is to develop a tool that can support decision making in the product development stages with the use of simulation with the aim of amplifying innovation.

The research team realised during the course of the research project that the two processes of Collaboration (IC-FAIM) and Simulation (LS-FAIM) are largely interdependent while providing the following

The AIM Portal, including innovation, simulation and collaboration toolboxes providing access to different users located in different areas making use of different devices.

This portal in turn grants access to the solutions developed, namely:

- Innovation Management Tools supporting innovation in manufacturing depending on what type of product development activity they are carrying out.
- Simulation Tools supporting stakeholders in Product and Manufacturing system visualization and simulation of their developing solutions by using technologies such as Augmented Reality. These tools help support innovation at several stages of the product development cycle.
- Collaboration Tools supporting innovation through communication, cooperation and coordination. These tools help support innovation in product development by allowing product development stakeholders to collaborate more easily without the need to meet face-to-face.
- The Product Design tool assisting the product design activities from problem analysis, through to solution generation and

- solution analysis by providing a central storage and common representation of product information (e.g. requirements, specifications, solution)
- 3. The Manufacturing System Design tool assisting manufacturing system designers to analyse the product requirements and develop innovative manufacturing system solutions, with the use of simulation, visualization and knowledge based support tools.

The above mentioned solutions are briefly explained below:

The Aim Portal

Although company representatives consider innovation as being important for their companies, few are aware of innovation management tools that are available to assist the innovative product development process from problem analysis through to solution generation. These tools include Synectics, Brainstorming, QFD and SCAMPER amongst others.

Through the implementation of the web portal, different users who are located in different locations, may be away from their office, and possibly make use of different devices (e.g. laptop, tablet, smartphone etc.) can gain access to the toolboxes and the templates present in

The technologies have been classified according to their uses and other criteria, such as conditions for use (e.g. can be used individually/ should be used in groups). Therefore, rather than being presented with all the tools available in the toolbox, the user would be guided to use those that fit his/her requirements. Hence, the time to identify the best tool to use in a particular situation is reduced and users of the portal would be more motivated to use the tools available.



The Product Design Tool

This tool has been developed to assist the product design activities from problem analysis, through to solution generation and solution analysis and is mainly needed so that different product development stakeholders, even if located in different locations and are making use of different devices (e.g. tablet, smartphone etc.) can have a central storage and common representation of product information.

The Product Design Tool allows product stakeholders to collaborate more easily and thus to focus their efforts on how they can be more innovative as a team. Additionally, the information stored can then be used by the Manufacturing System Design Tool, also developed by the research team, for the development of manufacturing system solutions for the product.

The Manufacturing System Design Tool

The Manufacturing System Design Tool was developed to support decision making in the product development stages with the use of simulation with the aim of amplifying innovation. It is based on a number of digital manufacturing technologies (such as Artificial Intelligence, Manufacturing Simulation) and was also developed to for feedback and quidance. operate on several operating systems and environments including personal computers running on Windows. Mac and Linux, and also on portable devices running iOS and Android. This allows for users to interact with their innovative designs in different locations, both in their offices, on the shop floor and also during travelling. It also provides an easy way to share the designs with other people who can contribute with innovative ideas to the evolving solution.

This tool supports automation and manufacturing process designers to develop innovative solutions to be implemented on the shop floor by allowing the manufacturing system designer to compare different and innovative solutions to each other. The tool also provides information on the consequences of the decisions made through the simulation of manufacturing system performance measures.

Helping the designer to visualize an idea is the first step in supporting him/her to develop an innovative manufacturing system solution. Hence it was deemed very important for the designer to have a tool that can provide support in planning the solution. The tool does this by allowing the designer to take decisions about which machines to use, choose them from a drop down menu and then explore how their layout is going to be configured onto a 2D map of the factory. The solution can then also be viewed in a 3D environment using the same tool. This allows the user to navigate a 3D environment of the solution which is being generated.

This gives the opportunity to the user the gain a better understanding of the problems in the manufacturing system development and hence helps him/her come up with better and innovative decisions. Once a number of decisions are made, the designer can also ask the system

The tool communicates via the internet to a remote Knowledge Based Simulation system that generates the feedback and guidance. This information is then passed back to the user via onscreen menus. This means that device running the user interface does not need to have advanced computational capabilities, since all the simulation is carried out remotely.

Finally the tool allows the user to view what product is to be manufactured and to design processes by assigning machines, human resources and defining process requirements. The user then receives information about the total processing time, expected quality levels, approximate cost and environmental impacts of the solution being developed.

This information can then be used to compare innovative solutions that use different processes to identify any problems, and target these processes for innovative brain storming sessions.



Conference on Amplifying the Competitiveness for Manufacturing in Malta

The 23rd of November 2011, marked an important milestone in the Manufacturing Research Platform Project with a national conference held at Le Meridien, St Julians on Amplifying the Competitiveness for Manufacturing in Malta.

The Conference had a total of 76 attendees, including leading representatives from local industries, academia, and the public sector. The programme consisted of top foreign speakers together with local key experts and prominent speakers from industry and academia.

The main focus of the conference was on the importance and benefits of Industry-Academia collaboration and how such benefits contribute to the competitive Manufacturing industry.

Foreign speakers, from the European Commission and Fraunhofer were invited to deliver a 30 minute presentation on the Future of Europe in Manufacturing and the Best practices of Research in Manufacturing, entailing the broader aspect of Manufacturing research.

Presentations by the Key Experts at the University of Malta. highlighting the importance of Energy Efficiency, ICT in Manufacturing and Amplifying Innovation in Manufacturing were also delivered.

Governmental entities such as The Malta Chamber of Commerce, Malta Enterprise focused on the views of industry's view for industry competitiveness and Research and Innovation support locally respectively. BEAT Consulting delivered a presentation on the Manufacturing Research Strategy highlighting the potential aspects and strategic benefits summarising through a SWOT analysis a strategic direction for growth and a clear vision of Malta's goals in the Manufacturing sector.

Finally, participants were encouraged to participate in the workshops to actively discuss and share their views on topics related to the Manufacturing industry.

Conclusion

The Manufacturing Research Platform Project will run until August 2012. A conference will be held in Q2 2012 where the final deliverables of the projects will be presented. Further information about the project and the upcoming Conference may be accessible on www.manufacturingresearch.eu







complement The Malta Council for Science and Technology's strategy, half of 2010 as part of the restructuring process of The Malta Council potential. for Science and Technology.

Popularisation, the Unit consists of nine Executive Science and grown by five new team members since last year to support the tasks opportunities to engage people of all ages in the wonders of science. at hand.

To carry on with the science popularisation endeavours and Each member has a unique background, education and set of experiences forming a multidisciplinary team, enabling the process of the Science Popularisation Unit was formally set up during the second developing the National Interactive Science Centre to reach its fullest

The Unit's primary responsibility is to set-up the NISC. Additional The Science Popularisation Unit has been tirelessly dedicating its science popularisation activities include: developing new project efforts to bringing the concept of an interactive science centre to proposals, implementing current and future EU funded projects, as Malta. Under the leadership of Ms. Melanie Giorgi, Director of Science well as carrying out science popularisation activities in the community.

Technology Officers, five full-time and four part-time. The Unit has Above all the remit of the Science Popularisation Unit is to provide

What is a Science Centre?

Science centres connect people with science and give it a presence in the community whilst offering people of all ages and backgrounds the opportunity to explore science in a fun and an interactive manner. Hands on exhibits are specially designed to lead to social interaction between visitors and engage families and children.

Science centres provide an opportunity to build an understanding and appreciation that science is an exciting, dynamic and ongoing process for discovering how the world works. Abroad, schools often rely on science centres for memorable field trips and workshops, hands-on curriculum, science kits, and even training for teachers since they provide an immersive science experience. Science centres are not only for students; families can spend time together whilst exploring how fun science can be.

Science centres inspire curiosity. Exhibits that are fun or surprising can encourage visitors to approach intimidating scientific phenomena and ideas. For some visitors, the interests awakened by science centre experiences have developed into a passion for science, and the beginning of a lifetime devoted to research or teaching.

Malta's very own National Interactive Science Centre (NISC) aims at cultivating a community of life-long science learners and fostering a culture of curiosity and wonder about science and technology.

The Science Popularisation Unit has been tirelessly dedicating their efforts to bringing the concept of a science centre to Malta.





Not Just a Building

A science centre is more than just a structure: it has character and a personality. Developing such a project is a complex process that takes accurate planning, foresight and combination of many resources. Prior to starting any sort of works, there is much research to be done and countless factors to consider, such as building operations and functionality, as well as consultations with various experts and investigating the impact on the local and national community.

The historic site where the National Interactive Science Centre will be developed and built has been a long awaited opportunity to restore and revive part of the Villa Bighi Complex. The complex was originally used as a fully equipped naval hospital until 1970. It was often referred to as "The Nurse of the Mediterranean" as it contributed to the medical care of casualties during times of hostility. The site overlooks Malta's splendid Grand Harbour and provides a picturesque setting for taking advantage of all the activities that the Centre has to offer.

In October, the architect's tender was awarded to Design and Technical Resources (DTR) architects and its associated partners. DTR, along with key experts in restoration, interior design, exhibition design and science centre management, will be assisting in the process of developing Malta's first science centre. The Unit presented a detailed brief to the architects and a dialogue thus commenced regarding the initial design appraisal. After collecting the necessary information, consultation with the relative authorities began, the surveying team was mobilized on site: building, topographic and

photogrammatic surveys and mapping of deterioration patterns of the existing buildings took place. An in depth historical study was carried out in order to compile the Restoration Method Statement. All the necessary steps were completed, the drawings and plans were developed and submitted to the Malta Environmental and Planning Authority in December to apply for a Full Development Permit.

In addition to the architect's tender and as part of the administrative process, the Unit awarded the following tenders following public procurement procedures:

- a. A Cost-Benefit Analysis in order to assess the feasibility of the
- A Business Plan to investigate the financial viability of operating the NISC, and
- c. A Traffic Impact Statement to analyse the traffic impact on the local community.

Due to the historical significance of Villa Bighi, the configuration and complexity of the site posed a challenge to the architectural and design team. Their task was to create an exciting futuristic and technological design concept and seamlessly link the existing buildings in one complex whilst preserving the site's historical value.

The buildings to be restored include the West Wing, the Zymotic Block, the Mental Ward, the Cot Lift, Chaplain's House, Vad Quarters and the Auxiliary Hospital which will host a planetarium. The buildings must be designed to serve their designated purposes and the architects, key experts and project team must take into consideration the variety of activities that will take place inside and outside the buildings.

The footprint of the centre will cover over 20,000 square meters, of which approximately 4.000 square meters will be indoor exhibition space, and 1,500 square meters of outdoor exhibition area which will allow for additional scientific discovery. This will create authentic opportunities for exploration, workshops, meaningful play and extend the visitor experience beyond the interior of the buildings. The landscaping which will be integrated with outdoor exhibits will add an interesting dimension and depth to the already dynamic terrain.

With sustainability as a priority for the project, initiatives are being taken to reduce the NISC's carbon footprint. The NISC will be taking advantage of the underground reservoirs, using natural sunlight when possible, and landscaping with indigenous plants. Efficient lighting, opportunities for recycling and composting and building with ecofriendly material whenever possible will allow the NISC to partake in green practices and reduce energy consumption. Additionally, the NISC will promote sustainable practices to visitors through exhibits and workshops.



Creating a Hands-On and Minds-On Experience

Just as the NISC will encourage visitor exploration of science topics. the Science Popularisation Unit developed their own process to investigate and evaluate numerous types of exhibits. The Unit was very thorough in their research by collecting photos, collaborating with other science centre professionals and researching educational and informal learning theories. Much emphasis was placed on consulting local experts from the fields of education, environment and Villa Bighi history to advise on the content to be included in the various themed topics in NISC.

Other activities included organising internal workshops for the Unit and meeting with visiting experts from other science centres in Europe. Throughout this process, the Unit visited over 25 European science centres - hoping to bring the best practices back to Malta. Research papers were examined and exhibition evaluations analyzed As a result, a prioritized list of over 200 exhibits was identified. This was also a significant milestone for the Unit as it laid the foundation for future plans of further content development.

The selected exhibits underwent an in-depth examination to determine their learning outcomes, size, and how visitors would interact with them. A database was created to track the various exhibits and to provide a tool to ensure that the NISC would install an exciting, yet balanced set of exhibits. The Unit made it a top priority that the exhibit content was aligned conceptually with the Vision of Science Education in Malta and the new National Curriculum Framework.

The Centre will feature themed exhibit and multimedia areas about human biology, the universe, general physics, maths, naturally occurring phenomena, energy, environmental sustainability and the medical history of Villa Bighi. The Unit is pleased to offer exhibits specifically designed for children under the age of 7.

As these young scientists are developing their processing skills, the Centre will provide age-appropriate opportunities and experiences for young children to explore their world.





Building Capacity

Since the Science Centre is The Council's largest undertaking to date, human capacity investment is essential to safeguard the successful fulfilment of NISC's remit. In this regard, in December 2011, the 'ESF 4.152: Capacity Building for The Malta Council for Science and Technology' project submitted under Priority Axis 4 of Operational Programme II - Empowering People for More Jobs and a Better Quality of Life was selected for co-financing.

This project is a lifelong learning investment in The Council's staff which will strengthen the entity's institutional and administrative capacity. The project is made up of two activities: Project Management Training and NISC Management Development Training which will help foster greater efficiency and effectiveness in daily duties by improving skills, developing new competencies and increasing knowledge.

The Project Management Training will improve a large component of The Council's work in the implementation of different sized projects and programmes on international, European and national scales. Upon successful completion of this training, The Council staff will acquire an industry-recognised qualification in Project Management. Such training will include, amongst other topics: the principles and processes involved in project management; the management of project risk; how to maintain effective communication channels as well as managing a budget.

The NISC Management Development Training will be organised exclusively for the Science Popularisation Unit. The bespoke training package, comprised of four modules, will consist of coursework on science communication, exhibition development, writing texts and practical management.

The first two modules will be delivered abroad at a leading European Science Centre where observation, behind-the-scenes experience and practice in real-life settings will be organised. The remaining two modules will be delivered at Villa Bighi. Elements of the training will be taken from accredited courses and delivered by key experts of high standing in the science centre community.

The Next Steps

- 2012 will be a challenging but exciting year, as the project will move into the next phase.
- The Unit will be concentrating on the procurement process of issuing and awarding the various tenders for civil works, mechanical and engineering works, restoration, furniture, fixtures and equipment, finishes, multimedia and exhibit fabrication.
- Working closely with the designated key experts, The Unit will finalize the Master Plan: the management of operations establishing the design principles of the exhibits and the interior.
- The Budgets of 2011 and 2012 have awarded the Malta Council for Science and Technology with 1.5 and 1.275 million euro respectively, in order to begin the development.
- The Council's staff will undergo Project Management and NISC management training as a result of receiving funding. ESF 4.152 'Capacity Building for The Malta Council for Science and Technology'.
- The Unit will be continuing the process of developing content for exhibits, workshops and signage and holding any additional consultations that are necessary.
- The design of a special exhibition dedicated to the medical history of Villa Bighi will be researched and developed. This themed exhibition will include artefacts, photographs and interactive exhibits to engage visitors with the story of Villa Bighi.





Quotes from Budget Speech 2012

"Ultimately it is hoped that the National Interactive Science Centre, which will open its doors in December 2014, will be a unique special place that bridges the gap between the community and science, where people come together and share the wonders of science.

"This national project is critical to building our capacity in R & I, ultimately, the Centre aims at cultivating a community of life-long science learners and fostering a culture of curiosity and wonder about science and technology."

"A visit to the Science Centre will offer opportunities for discovering science first-hand, observing different phenomena and engaging visitors in discussions and workshops. This exciting approach will render science and technology understandable to everyone."

"The entire Science Centre experience is aimed at enthusing and engaging students and the public, by sparking creativity and imagination through science. The aim of the Science Centre is to make science accessible to all."

The Science Centre Complex must be...

Cost Effective

The science centre must be designed to be able to withstand many

The building must provide the physical conditions that are conducive reduce costs of operating and maintaining the building whilst science centre setting. The lighting, indoor air quality, temperature lengthening the life of the spaces and furnishings.

Sustainable

The science centre must take into consideration its impact on the friendly to all. environment regarding its energy consumption, waste and use of building materials. It is also planned to be financially self sufficient to reduce the financial burden on Government.

Aesthetically Pleasing

The exterior and interior design features give the first impression of what visitors will experience. The aesthetic surroundings of the site which can include an iconic structure, beautiful landscaping, art pieces, sculptures, enhance the visitor's overall experience.

Secure and Safe

Safety and security measures have to be identified and implemented for both staff and visitors regarding the space as well as the safety of the exhibits.

Functional & Flexible

The building needs to take into account the visitor flow through the buildings. Where will visitors enter? Where will the amenities be located? What path will allow visitors to travel from one building to another? What type of learning spaces will the centre have? The building must be designed in a way that allows for future exhibitions and activity changes and technological advances.

Comfortable & Accessible

years of active and constant use. Investing in quality products can to the variety of experiences and learning that takes place in a and cleanliness are all very important to the visitors and staff and to the longevity and functionality of the exhibits. Accessibility is a major factor when planning a science centre. Furnishings, amenities and exhibits must adhere to regulations to ensure that they are user-







COST, European Cooperation in Science and Technology, is a bottom up approach to research and networking. It involves minimal administration is fully funded by the EU and makes it possible for researchers from various national research, academic entities and SMEs to network together on research COST actions for four years.

COST thus allows researchers to meet and work together in the preparation of research grant proposals such as the EU Framework Programmes. Through its schemes of training schools and short term scientific missions. COST also assists in the mobility of researchers across Europe.

COST is also unique since the areas its funds are across all disciplines in ten key domains specifically Biomedicine and Molecular Biosciences (BMBS); Chemistry and Molecular Sciences and Technologies (CMST); Earth System Science and Environmental Management (ESSEM): Food and Agriculture (FA); Forests, their Products and Services (FPS): Individuals, Societies, Cultures and Health (ISCH): Information and Communication Technologies (ICT): Materials, Physical and Nanosciences (MPNS); Transport and Urban Development (TUD); Transdomain Proposals Standing Assessment Body (TDP-SAB).

COST in Malta is promoted by Dr Janet Mifsud, as the National Contact Point and colleagues who represent Malta on the various domains (see table 1)

In 2011, Malta's participation in COST continued to increase several times fold, compared to other EU countries, especially since the procedure for the nomination of researchers to participate in the various actions and the process for the signing of the memorandum of understanding by Malta, was greatly simplified by The Malta Council for Science and Technology (see table 2).

The full list of COST actions Malta was participating in 2011, together with the representatives from Malta on these actions and a short description of the action are outlined in pages 108-116.

COST was also highly visible in Malta in 2011 through the organization of various COST related international meetings in Malta.

Malta had the opportunity to host the Chemistry and Molecular Sciences and Technologies (CMST) Domain Committee members in March 2011, with the co-ordination of the CMST domain member Prof Joseph Grima. An Information Day was also organized which provided the information about how one can participate in COST and benefit from the COST programme.

It included presentations about the COST programme, its scope and funding mechanisms, on how COST can help and support academics, scientists working in industry and early-stage researchers. Local researchers also had the opportunity to meet representatives from the COST Office CMST Domain, the Chair of the CMST Domain Committee, the local representatives and current Maltese participants in CMST COST Actions.

Two international COST conferences were also organized in Malta. One conference held in October 2011 was associated with COST action was CM0805. The Chemical Cosmos: Understanding Chemistry in Astronomical Environments. This action aims to explore the mysteries of the chemistry of life.

Europe is at the forefront of such research supporting a range of collaborative projects that both explore the fundamental chemistry necessary to understand how the elements and molecules necessary for life are made and explore the planets of our solar system and beyond for evidence of life.

Malta hosted a conference which brought together 70 of Europe's leading researchers to discuss the exciting new results from telescopes, laboratory experiments and models that are revealing the rich chemistry in the universe that may give a fascinating insight into both how life began on Earth and whether life may exist elsewhere across the Universe.

In November 2011 another meeting was related to COST Action IS0804 Language Impairment in a Multilingual Society: Linguistic Patterns and the Road to Assessment. A current challenge in the field of language development is the differentiation between language difference in bilingual children and language impairment since characteristics of bilingual and impaired language seem to overlap. This COST Action aims to disentangle these features in child language cross-linguistically. The meeting in Malta was organized by Dr Daniela Gatt and Dr Helen Grech, Department of Communication Therapy (CT), Faculty of Health Sciences within the University of Malta. During the conference a one day seminar was organised for the local speech language pathologists as part of their continuing professional development programme (CPD). The seminar was also addressed by several international experts in the field of bilingual specific language impairment, some of whom are Action members. This area of language pathology is of considerable relevance to the local scene since the greater part of the paediatric caseload includes bilingual children with language difficulties.

COST is becoming more known and visible among researchers based in Malta, and the participation of SMEs, representatives from government entities and other non-academic entities is expected to increase in 2012.

Malta Representative on Committee of Senior Officials (CSO and COST National Co-ordinator (CNC): Dr Janet Mifsud COST CNC CSO Malta - cost.mcst@gov.mt

Domain Committee Representatives

Biomedicine and Molecular Biosciences (BMBS) Prof Giuseppe deGiovanni - giuseppe.digiovanni@um.edu.mt

Chemistry and Molecular Sciences and Technologies (CMST) Prof Joe Grima - joseph.grima@um.edu.mt

Earth System Science & Environmental Management (ESSEM) Prof Ray Ellul - ray.ellul@um.edu.mt

Food and Agriculture (FA)

Dr Anna McElhatton - anna.mcelhatton@um.edu.mt

Forests, their Products and Services (FPS) Mr Larry ShoeMake - larryshoemake@hotmail.com

Individuals, Societies, Cultures and Health (ISCH) Dr Helen Grech - helen.grech@um.edu.mt

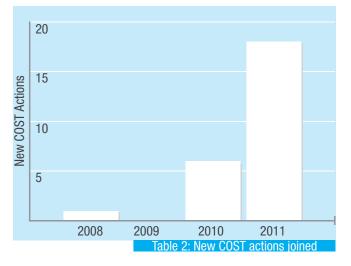
Information and Communication Technologies (ICT) Ing Saviour Zammit - saviour.zammit@um.edu.mt

Materials, Physical and Nanosciences (MPNS) Prof Luciano Mule Stagno - luciano.mule-stagno@um.edu.mt

Transport and Urban Development (TUD) Dr Maria Attard - maria.attard@um.edu.mt

Transdomain Proposals Standing Assessment Body (TDP-SAB) Dr Vincent Buhagiar - vincent.buhagiar@um.edu.mt

Table 1: Domain Committee Representative



In 2011 Malta began participating in 19 new COST Actions, bringing the total of 40 Actions since 2008.

These covered all the domains as follows: 3 in Biomedicine and Molecular Biosciences (BMBS); 5 in Chemistry and Molecular Sciences and Technologies (CMST); 7 in Earth System Science and Environmental Management (ESSEM): 3 in Food and Agriculture (FA): 1 in Forests, their Products and Services (FPS); 6 in Individuals, Societies, Cultures and Health (ISCH); 6 in Information and Communication Technologies (ICT); 5 in Materials, Physical and Nanosciences (MPNS) and 4 in Transport and Urban Development (TUD) Researchers in Malta have also contributed to COST publications and organization of training schools and short term scientific missions.



IC1103: Manufacturable and Dependable Multicore Architectures at Nanoscale Ing. Trevor Spiteri Faculty of Engineering, University of

Constant advances in manufacturing yield and field reliability are important enabling factors for electronic devices pervading our lives, from medical to consumer electronics, from railways to the automotive and avionics scenarios.

At the same time, both technology and architectures are today at a turning point: many ideas are being proposed to postpone the end of Moore's law such as extending CMOS technology as well as finding alternatives to it like CNTFET, QCA, memristors, etc. while at the architectural level, the spin towards higher frequencies and aggressive dynamic instruction scheduling has been replaced by the trend of including many simpler cores on a single die. These paradigm shifts imply new dependability issues and thus require a rethinking of design, manufacturing, testing, and validation of reliable nextgeneration systems.

This Action aims at creating a European network of competence and experts on all dependability aspects of future digital systems development, promoting collaboration between industry and research.

ICO901 Rich-Model Toolkit - An Infrastructure for Reliable **Computer Systems:** Dr Adrian Francalanza, Prof. Gordon Pace, Department of Computer Science, University of Malta

The main objective is making automated reasoning techniques and tools applicable to a wider range of problems, as well as making them easier to use by researchers, software developers, hardware designers, and information system users and developers.

The Action coordinates activities on developing infrastructures for automated reasoning about the new notion of Rich Models of computer systems. Rich Models have the expressive power of a large fragment of formalizable mathematics, enabling specification of software, hardware, embedded, and distributed systems. Rich Models support modeling at a wide range of abstraction levels, from

knowledge bases and system architecture, to software source code and detailed hardware design.

The Action contributes to the construction of Rich-Model Toolkit, a new unified infrastructure that precisely defines the meaning of Rich Models, introduces standardized representation formats, and incorporates a number of automated reasoning tools. The resulting tools will have a wide range of applicability and improved efficiency, helping system developers construct reliable systems through automated reasoning, analysis, and synthesis.

ICO903: Knowledge Discovery from Moving Objects (MOVE) Dr Alexei Dingli, Faculty of ICT, University of Malta

The goal of this Action is to establish a strong network on Quality of Experience (QoE) with participation from both academia and industry. Its main objective will be to develop and to promote methodologies to subjectively and objectively measure the impact in terms of quality of future multimedia products and services.

This network will leverage on QoMEX, an already established international conference on Quality of Multimedia Experience, for researchers and professionals to interact and to report their findings on QoE issues.

Observing that there are currently no European networks focusing on the concept of QoE, this Action also aims at bringing a substantial scientific impact on fragmented efforts carried out in this field, by coordinating the research under the catalytic COST umbrella, and at setting up a European network of experts facilitating transfer of technology and know-how to industry, coordination in standardization. and certification of products and services.

IC0801: Agreement Technologies: Dr Matthew Montebello, Faculty of ICT. University of Malta

Agreement Technologies refer to computer systems in which autonomous software agents negotiate with one another, typically on behalf of humans, in order to come to mutually acceptable

This Action aims at coordinating national efforts on a new paradigm for next generation distributed systems, based on the concept of agreement between computational agents. An entity may choose whether to fulfil an agreement or not, and it should fulfil it when there is an obligation to do so derived from the standing agreements

Autonomy, interaction, mobility and openness are the characteristics that the paradigm will cover from a theoretical and practical perspective.

Semantic alignment, negotiation, argumentation, virtual organisations, learning, real time, and several other technologies will be in the sandbox to define, specify and verify such systems. Both functional and non-functional properties are to be studied. Security on execution will be based on trust and reputation measures.

These measures will help agents to determine with whom to interact and what terms and conditions to accept.

IC1105: 3D-ConTourNet - 3D Content Creation, Coding and Transmission over Future Media Networks: Dr Ing. Carl Debono. Faculty of ICT, University of Malta

This COST Action undertakes coordinated research collaboration, at European level, in 3D multimedia creation, encoding, delivery and reception of services and applications over future networking technologies. A scientific framework is devised to integrate the main elements of the delivery chain, such as 3D content creation and encoding evolution, transmission across heterogeneous networks and user consumption, taking perceived quality as an overall key performance factor. Several individual R&D efforts are currently running across Europe, targeted at 3D technologies.

This Action aims at beyond this trend by tightening closer together scattered efforts and integrating all technological elements with user 3D quality perception. To reach this goal, this Action fuels cooperation between researchers and industry experts, envisaging production of technical and scientific deliverables for researchers, scientists, engineers and managers, new business model recommendations for content and service providers through joint meetings across academia and industry, plus documentation and multimedia presentations to promote 3D technology in the society.

IC1003 European Network on Quality of Experience in Multimedia systems: Dr Reuben Farrugia, Communications and Computer Engineering, Faculty of Information and Communication Technology. University of Malta

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Its main objective will be to develop and to promote methodologies to subjectively and objectively measure the impact in terms of quality of future multimedia products and services. This network will leverage on QoMEX, an already established international conference on Quality of Multimedia Experience, for researchers and professionals to interact and to report their findings on QoE issues.

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ES1004: European framework for online integrated air quality and meteorology modelling: Dr Noel Aguilina Faculty of Science University of Malta

The COST Action - European framework for online integrated air quality and meteorology modelling (EuMetChem) - will focus on a new generation of online integrated Atmospheric Chemical Transport (ACT) and Meteorology (Numerical Weather Prediction and Climate) modelling with two-way interactions between different atmospheric processes including chemistry (both gases and aerosols), clouds, radiation, boundary layer, emissions, meteorology and climate.

At least, two application areas of the integrated modelling are planned to be considered: (i) improved numerical weather prediction (NWP) and chemical weather forecasting (CWF) with short-term feedbacks of aerosols and chemistry on meteorological variables, and (ii) twoway interactions between atmospheric pollution/ composition and climate variability/change.

ES1003 Development and implementation of a pan-European Marine Biodiversity Observatory System: Dr Adriana Vella. Department of Biology, University of Malta

Marine biodiversity varies over large scales of time and space, and requires a research strategy beyond the tradition/capabilities of classic research. Research that covers these scales requires a permanent

international pan-European network of observation stations with an optimized and standardized methodology.

In EMBOS the needed large-scale network of research locations in Europe will be installed to assess long-term changes in marine biodiversity and their possible causes taking into account natural and anthropogenic gradients, and EMBOS will extend and optimize this observatory system, including novel interdisciplinary approaches for

The cooperation leads to a focused and cost effective long term research agenda for EU marine observatories, and contributes to ERA, LIFEWATCH and GEOSS/GEOBON actions, and supports legal obligations of the EU regarding the CBD, OSPAR and Barcelona conventions as well as EU directives (Bird and Habitat Directive, WFD. MSFD. ICZM).

ES1001 Mission Oceanographic Data Exploitation: Prof. Aldo Drago. Mr. Joel Azzopardi, 101-Malta Operational Centre, University of Malta

This COST Action aims at coordinating the European studies concerning the oceanographic data exploitation of the European Space Agency Soil Moisture and Ocean Salinity (SMOS) satellite mission.

Recently launched in November 2009, SMOS will provide for the first time Sea Surface Salinity (SSS) maps over the oceans. The SMOS mission uses innovative passive microwave radiometry techniques to provide long-awaited remotely-sensed Sea Surface Salinity (SSS) maps over the oceans with a 3-day revisiting time.

As ocean salinity variability is related to the net ocean water budget, the river run-off and the processes of seawater freezing and melting. its monitoring will provide a tracer of the intensity, but also a constraint, of the Water Cycle. Moreover, through its impact on density, salinity variations foster the formation of deep water, a key process of the so-called thermohaline circulation. The "conveyor belt"-like resulting circulation is a major component of the Earth's heat redistribution engine that regulates weather and climate.

ES0906 Seagrass Productivity: From Genes to Ecosystem Management: Dr Joseph Borg, Department of Biology, University of

The main objective of this Action is to provide the scientific basis for estimating and preserving the goods and services arising from the productivity of European seagrass ecosystems under anthropogenic

The Action aim is to form a European-wide research coordination network that integrates expertise in physiological ecology, ecological genomics and conservation-resource management. Uniquely, scientists and managers will work together to close the pure/ applied research gap and to develop comprehensive best practices for integrated seagrass habitat management. This is a much talkedabout approach that has not been implemented.

The European capacities for seagrass research will be integrated to carry out six tasks: establish continuous, in-situ measurement devices for seagrass productivity, establish a modelling and monitoring tool based on seagrass light requirements, understand seagrass responses to global changes, assess seagrass genetic adaptative variation at photosynthetic related loci, evaluate the effectiveness of existing and new seagrass-health ecological indicators and provide guidelines to improve the conservation and management of seagrass dominated ecosystems.

ES1102 VALUE - Validating and Integrating Downscaling Methods for Climate Change Research: Dr Noel Aguilina, Prof. Lino Sant, Faculty of Science, University of Malta

Our understanding of global climate change is mainly based on General Circulation Models (GCMs) with a relatively coarse resolution. Since climate change impacts are mainly experienced on regional scales, high-resolution climate change scenarios need to be derived from GCM simulations by downscaling.

Validation of downscaling methods is crucial, but several aspects have not been systematically assessed: variability on sub-daily, decadal and longer time-scales, extreme events, spatial variability and inter-variable relationships.

Different downscaling approaches such as dynamical downscaling, perfect prog statistical downscaling and model output statistics have not been systematically compared. Furthermore, collaboration between different communities, in particular regional climate modellers, statistical downscalers and statisticians has been limited.

VALUE will provide a European network to validate and develop downscaling methods and improve the collaboration between the dispersed research communities and with stakeholders.

ES 1103 Microbial ecology & the earth system: collaborating for insight and success with the new generation of sequencing tools Dr Gabriella Zammit, Department of Physiology and Biochemistry, University of Malta

The microbial world is a vast frontier of intrinsic scientific importance and profound practical importance. The exploration of this frontier has been revolutionised by the introduction of molecular techniques. However, recent advances have only served to emphasise the enormity of the task before us.

The improvements in sequencing technology have enormous implications for those at this frontier. Nevertheless description of this huge resource and the discovery of the rule governing its occurrence transcend the ability of not simply any one research group, but of any one nation.

The purpose of this Action is to coordinate research groups across Europe to meet this challenge in the belief that if we agree upon common protocols and procedures we will share and pool knowledge to create a whole which is far greater than the sum of the parts.

ES0902 Pergamon Permafrost and gas hydrate related methane release in the Arctic and impact on climate change - European cooperation for long-term monitoring: Dr Aaron Vella, Faculty of Science, University of Malta

The main objective is to quantify the methane input from marine and terrestrial sources into the atmosphere in the Arctic region, and ultimately to evaluate the impact of Arctic methane seepage on global

The Arctic is a key area in our anthropogenically-warming world as massive releases of methane currently locked up in permafrost and gas hydrates, both on land and in marine sediments, could increase atmospheric concentrations of this greenhouse gas much faster than predicted. The vast Arctic continental shelf, wetlands and Tundra

might become major emitters of methane in the future. At present, there are a handful of unconnected projects involving research on methane seepage in this area.

The exchange of information about these ongoing and also planned activities with respect to gas hydrate destabilization and permafrost thawing is minimal within the EU and almost non-existent at an international level.



TU 1102 Smart Energy Regions

Dr Vince Buhagiar, Faculty of Built Environment, University of Malta

Low carbon technology is advancing. Government policy throughout the world needs to achieve considerable reductions in CO2 emissions over a relatively short time scale to avoid catastrophic climate change.

The built environment needs to play a major role in CO2 reductions and needs to be addressed at a large scale. A broad set of issues have a significant impact on the successful adoption of new technologies and processes on a larger scale to create a low carbon built environment, including a lack of flexibility and shortage of skills in the supply chain, a misunderstanding of capital and operational costs, where technologies can be implemented, the impact on quality of life and policy and planning for the future.

These need to be understood to enable technologies to be widely applicable and transferable within and between regions. This Action will investigate the drivers and barriers that may impact on the long term creation of low carbon regions in Europe.

TU0901 Integrating and Harmonizing Sound Insulation Aspects in Sustainable Urban Housing Constructions

Dr Vince Buhagiar, Faculty of Built Environment, University of Malta

The main objective of the Action is to harmonise the descriptors for airborne and impact sound insulation between dwellings and for airborne sound insulation of facades as well as to prepare a European classification scheme with a number of quality classes.

In Europe, regulatory requirements concerning acoustic performance of buildings differ widely in performance descriptors and limit values. The diversity (indicators, steps between classes, grade of guietness achieved, etc.) found in the nine existing national schemes and proposals in three more countries is an obstacle for exchange of experience, development and trade.

The harmonization of such descriptors and performance levels of sound insulation classes is important to make progress and would be well received by the building industry, governments and research sectors.

The Action will stimulate innovation, support sustainability through simplified research and development objectives, reduce trade barriers between Member States and facilitate marketing. Coordination of research activity, knowledge transfer, psychoacoustic evaluation, collection of data of typical and high performance acoustic solutions is necessary to make progress.

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TU0701 Improving the Quality of Suburban Building Stocks Dr Vince Buhagiar, Dr Ruben Borg, Faculty of Built Environment University of Malta

The main objective of the Action is the development and dissemination of knowledge and tools to assess and promote the refurbishment of existing suburban building stocks.

Most of the buildings generally multi-family housing blocks consisting of small apartments were completed after 1950 using low-cost technologies and are often characterized by very poor quality, which contributes to the social decay of suburbs.

The aim of the Action is to investigate, compare, define and disseminate common knowledge concerning methods, procedures and technologies for:

- the renovation and revitalization of suburban housing settlements.
- increasing their value, and
- improving safety and the quality of life of inhabitants.

Quality standards must be improved in order to satisfy user needs as regards comfort, safety and accessibility, as well as the new European regulations concerning sustainability and energy savings.

In order to achieve these objectives, new specific social, financial technical and procedural models must be developed to facilitate the decisions of local authorities, housing corporations, owners and

TU0905 STRUCTURAL GLASS - Novel Design Methods and Next Generation Products: Prof. Dione Buhagiar, Faculty of Built Environment, University of Malta

The main objective of this Action is to provide a strong contribution to the ongoing development of innovative high performance structural glass products mainly in architectural and solar applications, and to European standards in this field.

The Action will identify and share the outcomes of existing fragmented activities within the European research community. In addition, the Action will establish a diverse multi-disciplinary network that will encourage new research and collaborations. Finally, the Action will strengthen the current and future generations of European glass designers by developing a structural glass educational pack for university curricula across Europe.

This Action will directly contribute to safer products and risk analysisbased design methods. In doing so, it will reduce glass-related injuries, which generally constitute an unacceptably high proportion of casualties in extreme loading events. Finally, the research themes supported by this COST Action will directly lead to a reduction in embodied energy and will contribute to reducing energy demand in

TU0904 Integrated Fire Engineering and Response Dr Ruben Borg, Faculty of Built Environment, University of Malta

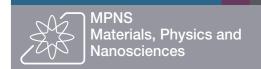
The main objective of this Action is to break down the barrier preventing the exchange of information and experience between researchers from different disciplines on the one hand and between academia and practitioners (including fire-fighters) on the other hand. Thanks to the exchange of international experience, ideas and stateof-the-art on fire risk concepts and assessment methods, the Action aims at providing concrete applications of the performance-based fire safety design methods to practitioners and at introducing the latest research into standards for fire design.

Fire engineering researchers are specialists working in specific areas. such as fire dynamics, structural fire engineering, active/passive fire protection, environmental protection and human response.

Through encouraging integration of different aspects of fire engineering and response, the Action will enable researchers with different fields of expertise and coming from different countries to understand better the recent advances in research in parallel fields, as well as their limitations, so that they see their own research in context, and identify opportunities in involvement of early-stage researchers and application of the results in national standards.

TU0803: Cities Regrowing Smaller – Fostering Knowledge on Regeneration Strategies in Shrinking Cities across Europe: Dr Maria Attard, Institute of Sustainable Development; Dr Vince Buhagiar, Faculty of Built Environment University of Malta

The main objective of the Action is to foster the interdisciplinary knowledge of Regeneration Strategies in Shrinking Cities across Europe. By promoting the exchange of scientific knowledge in Europe and stimulating new ideas in selected reference cities, the network will act as a catalyst for innovative solutions to deal with demographic change and urban decline.



MP1006 Fundamental Problems in Quantum Physics: Mr Jackson Said, Faculty of Science, University of Malta

Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us closer to the secret of the 'Old One.' I, at any rate, am convinced that He is not playing at dice." (Einstein, 1926).

This view on quantum mechanics is now shared by a large number of scientists spanning the entire spectrum of physics, from pure theoretical analysis to cutting edge experiments. Europe has the largest number of scientists working on the fundamental problems of quantum mechanics.

This COST Action will be the first network in the world, focussed on the foundations of quantum mechanics. The Action aims at strengthening the cooperation and boosting the research activity among European groups working in the foundations of quantum mechanics. By combining existing research strengths in mathematical, theoretical and experimental physics and quantum chemistry, major breakthroughs in foundational guestions will be achieved.

MP0905 Black Holes in a Violent Universe

Dr Kristian Zarb Adami, Dept of Physics, University of Malta

The main objectives of this Action are (i) to enhance the understanding of the BH-phenomenon and its impact on the evolution of our Universe,(ii) to study the fundamental laws of nature using an multidisciplinary and multi-dimensional approach of BH research, and (iii) to use BHs as laboratories to test new physical concepts.

Black Hole physics is both fundamental and broad ranging and hence multidisciplinary. The world's first open and flexible network on BH research will counteract the existing fragmentation of this research

To attack the elementary and far-reaching demands posed by BHrelated science, an overarching framework is required. It will connect astronomers from all wavelength regimes (from low energy radio bands up to ultra-high energies such as TeV), working on all mass scales of Black Holes, i.e. from the smallest structures up to the largest masses in the Universe (i.e. Quantum BHs to SMBHs), with physicists and particle physicists as well as theoreticians, observers and software and technology developers.

MP1104 Polarization as a tool to study the Solar System and

Dr Kirsten Zarb Adami, Faculty of Science, University of Malta

Polarization of light is a key observable to access essential information that lies encoded in the electromagnetic radiation reaching us from astronomical objects.

Polarimetry is a powerful observational tool that augments and complements the capabilities of imaging, photometry and spectroscopy in many fields of planetology and astrophysics. In most research fields, notwithstanding some outstanding results. polarimetry is still too often overlooked.

The Action will aim at promoting polarization as an invaluable tool to obtain a wealth of information about astrophysical bodies in our Solar System and beyond. With the benefit of the COST legitimacy, the Action will recommend to the European Space Agency, the European Southern Observatory, national space agencies, European industry and policy makers the development and addition of polarimeters in future ground-based observatories and space missions.

MP1005 From nano to macro biomaterials (design, processing, characterization, modeling) and applications to stem cells regenerative orthopedic and dental medicine: Dr Nicholas Busuttil Douglas, Department of Dentistry, Mater Dei Hospital; Dr Martin Muscat; Dr Zdenka Sant, Faculty of Engineering, University of Malta.

Regenerative medicine is a new discipline based on biomaterial development and increasing knowledge in cell science, NAMABIO will be focused only in the interdisciplinary research related to biomaterials and stem cells of interest for the regenerative medicine of bones and teeth.

The aim of NAMABIO is to coordinate research efforts (very often loosely correlated) of several actors belonging to different disciplines necessary in order to obtain a real breakthrough in these areas. In

particular the partners of the present project are scientists involved in the following activities:processing of innovative biomaterials; chemical, physical and mechanical characterization; modeling of physical and mechanical properties; stem cells loading on biomaterials, implantation on animals, and histological and molecular evaluation; 3D structural characterization of tissue engineered bones and teeth by X-ray synchrotron microtomography (or holotomography); Biomedical evaluation of the results.

MP1101 Biomedical Applications of Atmospheric Pressure Plasma Technology: Dr Vasileios Valdramidis, Faculty of Health Sciences, University of Malta

Providing health care at tolerable cost is one of the greatest challenges facing the world in this century. Technologies that may offer enhanced quality of care at reduced cost, such as plasma technology, will be of immense societal and commercial value.

This action will focus on medical and biomedical applications of low-temperature, non-thermal atmospheric pressure plasmas, in fields including surface treatment of biomedical devices, sterilisation. and therapeutic techniques, such as wound sterilisation and cancer

This is an interdisciplinary topic: The Action will involve clinicians, biologists, chemists and physicists, together with industrialists ready to exploit the results. The collective purpose of the participants in this Action is to develop synergistic links between their research programmes, and to take full advantage of the opportunities that follow to create a leadership position for Europe in this important emerging area.



CM0805 The Chemical Cosmos: Understanding Chemistry in Astronomical Environments: Prof. Emmanuel Sinagra, Dr Alexander Gatt. Department of Chemistry, University of Malta

The main objective of this Action is to study chemical processes relevant to the physical conditions encountered in the interstellar medium, and on the surface and in the atmospheres of planetary

The Action aims to provide new insights into the dynamics of the chemical reactions leading to molecular synthesis under such conditions and reveal how these are influenced by the ambient temperature and pressure. Special attention will also be given to the study of the novel surface chemistry prevalent on interstellar medium dust grains and planetary surfaces.

The Action also aims to combine such laboratory data with complementary chemical models to allow a fuller interpretation of observational data.

CM1101 Colloidal Aspects of Nanoscience for Innovative Processes and Materials: Prof. Emmanuel Sinagra, Department of Chemistry, University of Malta

Colloid chemistry is a steadily growing field of immense importance. The enormous diversity of the colloidal processes involved in novel materials and their applications in both advanced technologies and everyday life cannot be overstated. There is a compelling need for exchange, coordination and cooperation in the European colloid community.

This Action will combine coherently the outstanding European expertise in this field, including: theoretical modelling and experimental formation of functional and patterned interfaces; self-assembly of molecules and colloidal particles; synthesis and up-scaling of novel nano-colloidal and bio-colloidal materials; the kinetic and catalytic aspects of these novel materials; and their applications in chemical, pharmaceutical and food industries, as well as in nano-devices such as sensors, assays, photonics and bio-fuel cells.

The Action's main deliverables will be the increased networking in colloid chemistry through the organization of scientific events (conferences, workshops), training schools and STSMs. Through an extensive mobility program targeted to early stage researchers, it will encourage their involvement in the research at the international level.

CM1103 Structure-based drug design for diagnosis and treatment of neurological diseases: dissecting and modulating complex function in the monoaminergic systems of the brain: Dr Giuseppe de Giovanni, Department of Physiology and Biochemistry, University

The therapy of neuropsychiatric disorders is limited by the high variability of symptoms and behavioural disturbances. Few drugs are available to address specific subsets of neurological/mental symptoms, and none to aid in diagnosis or to stop the progress of neurodegenerative disorders.

Neurotransmitters such as dopamine and serotonin play a central role in the pathophysiology of major neuropsychiatric illnesses, such as anxiety and mood disorders, schizophrenia, autism-spectrum disorders, Parkinson's disease, epilepsy, and dementias. Structurebased drug design, synthetic chemistry and biological characterisation will inform the choice of lead compounds to treat select subsets of brain malfunction.

COST collaboration facilitates the cross-disciplinary interaction for discovery of promiscuous drugs for diagnosis and treatment of complex brain diseases.

CM1106 Chemical approaches to targeting drug resistance to cancer stem cells: Dr Pierre Schembri Wismaver, Department of Anatomy University of Malta

This COST Action aims to unite researchers with expertise in rational drug design and the medicinal chemistry of synthetic and natural compounds with biomedical investigators dedicated to the understanding the mechanisms governing drug resistance in cancer stem cells. Cancer stem cells (CSC) are a subpopulation of cells within tumors that exhibit enhanced tumor-initiating attributes and are a major contributing factor to current cancer therapy failure.

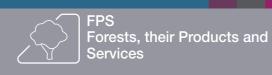
The CSC phenotypic state comprises distinct molecular and functional differences that underpin resistance to current treatments and the unique ability spread and to seed new tumors throughout the body.

This insight necessitates an entirely new approach to cancer drug development to effectively target tumor CSCs. Through exchange of information, experience and expertise, researcher mobility and fostering new collaboration between chemistry and biology groups, the Action endeavours to develop new, effective methods for identifying novel compounds and drug candidates that target drugresistant cancer stem cells.

CM1005 Supramolecular Chemistry: Dr David Magri, Department of Chemistry, University of Malta

The objective of this COST Action is to develop supramolecular systems that work in water. Such supramolecular systems should allow to (i) monitor environmentally or biologically relevant species in water (ii) control selectivity of reactions in water, and (iii) produce self-assembled organized structures in water which are stimuli responsive and which can be used for programming functions in materials and

The Action aims at improving our understanding of the multiple weak non-covalent, but collectively powerful interactions that allow efficient and selective recognition processes to occur in water.



FP 1002 Pathway Evaluation and pest Risk Management In Transport: Dr Antoine Vella, Institute of Environmental Sciences. University of Malta

Movements of Invasive Alien Species (IAS) globally by trade and human movement present severe and increasing risks of transfer of plant pests (principally invertebrates and plant pathogens) globally.

Climate change adds further opportunities for pest establishment and impact, both by providing increased survival and growth opportunities for pests and, through environmental stresses, making trees more vulnerable to those pests. In relation to ecosystem services and their longevity, forests are particularly vulnerable to IAS. In particular, multiple PATHWAYS for transfer of pests internationally are poorly characterised, leading to increasing transfer and establishment of new damaging organisms.

The COST Action PERMIT addresses this shortfall in knowledge and practice and will focus on reducing threats from exotic pests through promoting ENHANCED PATHWAY MANAGEMENT.



FA1004 Conservation Physiology Of Marine Fishes: Dr Noel Vella. Department of Biology, University of Malta

Marine fish are important resources in Europe but human pressures severely threaten their biodiversity and abundance. There is an urgent need to improve the knowledge-base underlying their sustainable management.

Physiological research reveals how marine fish are adapted to their environment, and causal mechanisms underlying their distribution and abundance. Thus, the emerging field of conservation physiology can provide improved predictions on the impacts of environmental challenges, and refine conservation strategies. There are over 50 institutions in Europe performing research in marine fish physiology. behaviour, ecology, and in modelling impacts of environmental chal-

This COST Action pioneers the coordination and integration of these multidisciplinary research activities across Europe. The COST action will coordinate marine fish conservation physiology research, to collate existing knowledge, reduce overlap, identify critical gaps in knowledge, and devise common approaches.

FA 1002 Farm Animal Proteomics: Mr Adrian Bugeja Douglas, Division of Rural Sciences and Food Systems, Institute of Earth Sciences, University of Malta

There is an increasing awareness of the potential of proteomic technologies to study production animals but the use of proteomic strategies to investigate animal health and disease has been limited by the lack of international coordination and collaboration.

The COST Action will form a network of the leading European scientists who are focused on farm animal proteomics; this network will benefit the European Research Area scientific community by providing a conduit for the rapid dissemination of knowledge on the techniques and applications of this rapidly advancing area. It will benefit the European economy by providing advanced analytical tools to enhance animal production, health and welfare, as well as in the assessment of food quality and safety related to the protein in food produced from animal origin.

FA 605 Signalling control of stress tolerance and production of stress protective compounds in plants: Dr Marion Zammit Mangion, Dept of Physiology and Biochemistry, University of Malta

Unravelling signalling steps and metabolic pathways controlling abiotic stress tolerance of plants, provides essential tools for coping with the accumulating negative effects of climate changes in breeding, agriculture and environmental protection. Improvement of efficacy of plant stress tolerance is essential for successful combating salinization, frost damage and desertification in European and also in other non-COST participating countries.

Drought, salt and cold tolerance traits of crops are controlled by biological regulatory mechanisms governing the production of highly effective stress-protecting metabolites, including polyamines and

The major goal of this COST proposal is to stimulate cutting-edge collaborative research towards understanding the regulatory mechanisms of abiotic stress signalling pathways leading to the production of major stress-protective plant compounds. By stimulating scientific exchange among molecular geneticists, biochemists, plant physiologists and breeders, the network program aims at the identification of key regulators of plant abiotic stress responses and their essential stress-protective end-targets.



IS1102 SOCIAL SERVICES, WELFARE STATE AND PLACES. The restructuring of social services in Europe and its impacts on social and territorial cohesion and governance. Ms Dorianna Bezzina, Ministry for Education; Dr Charles Pace, FEHMA, University of Malta

In the last 20 years social services have experienced significant restructuring throughout Europe, involving cuts in public funding, devolution (from central to local governments), externalisation (from public to private providers).

Among the reasons for such changes have been stressed the fiscal crisis of the State (on the supply side) and the need to ensure greater efficiency, wider consumer choice and more democratic governance (on the demand side). Although relevant research is available on such processes, the recent global financial crisis and the awareness that, among services of general interest, social services are a major vehicle of social and territorial cohesion, have brought social services back on the EU agenda.

IS0907 Childbirth Cultures, Concerns, and Consequences; Creating a dynamic EU framework for optimal maternity care: Dr Marika Podda Connor, Migrant Health Unit, Department of Primary Health Ministry of Health: Dr Rita Borg Xuereb Faculty of Health Sciences. University of Malta.

The main objective of the Action is to advance scientific knowledge about ways of improving maternity care provision and outcomes for mothers, babies and families across Europe by understanding what works, for who, in what circumstances, and by identifying and learning from the best.

Around 4.7 million European women experience childbirth annually. Optimal maternal and infant health is critical to societal well-being. Survival rates have improved, but there are now concerns about iatrogenic morbidity. There are significant cross-EU differences in maternity care cultures, philosophies, organisation, uptake, and outcomes.

This Action will advance scientific knowledge about ways of improving maternity care provision and outcomes by examining what works, for

who, in what circumstances, and by identifying and learning from the best. The work will include an examination of first trimester prenatal diagnosis, routine intrapartum interventions for low risk women, and care for migrant women.

IS1005 Medieval Europe: Dr Simon Mercieca, Mr Francis Cassar. Mediterranean Institute, University of Malta

Medieval Cultures & Technological Resources (Medioevo Europeo) groups experts from important European entities in 13 countries to create a Virtual Centre for Medieval Studies; a virtual, team work space in which to collaborate, communicate and share work and research tools. Medioevo Europeo fits into the COST framework as it coordinates existing research on the use of ICT for Medieval Studies. a field where ICT has potential to improve and substantiate research. and specifically on interoperability between databases used for storage and research in this area.

Through 4 years of cooperation, Medioevo Europeo links modern technology to medieval studies and combines technological development with intensive training of researchers. The European framework offers the means to connect the wealth of scientific material available, while ensuring interoperability, data security, and suitability for differing academic contexts.

Medioevo Europeo promotes social, technological and scientific advances. It promotes an understanding of Europe as a union of diverse but complimentary heritages.

IS0804 Language Impairment in a Multilingual Society: Linguistic patterns and the road to assessment, Dr Daniela Gatt. Dr Helen Grech, Department of Communication Therapy, Faculty of Health Sciences, University of Malta

The main objective of this Action is to profile bilingual Specific Language Impairment (SLI)by establishing a network to coordinate research on linguistic and cognitive abilities of bilingual children with SLI across different migrant communities.

This Action will coordinate research on the development of syntax and its interface with morphology and semantics in bilingual children with SLI by identifying structures which are less sensitive to crosslinguistic differences, and are vulnerable for monolingual and bilingual children with SLI, but not for typically developing bilingual children. In addition, the Action will evaluate current research to select off-line and online tasks which can reveal quantitative and qualitative differences between typically developing bilingual children and bilingual children with SLI (BISLI), and ultimately offer a window into representation and processing issues in BISLI. It will coordinate research and evaluate the use of different kinds of tasks to elicit narratives and tap into specifically bilingual properties and evaluate the parameters for developing tasks to test lexical and phonological processing in bilingual children with SLI.

IS1004 WEBDATANET: Dr Ernest Cachia, Faculty of ICT, University of Malta: Dr Patrick J Camilleri, Dept of Maths and Sciences, University of Malta

Web-based data collection (surveys, experimenting, testing, nonreactive data collection, and mobile Internet research) is/will become important for all social science fields. In avoiding both a simultaneous waste of effort and the use of web data without scientific validity. a multidisciplinary network is proposed to address web-based data collection, its methodologies, scientific validity, and use in the social sciences.

WEBDATANET will benefit from communication throughout the social sciences by establishing a network bringing together social scientists. survey and web-based data collection experts, and data users. It will tackle several web-based data collection problems and discuss scientific validity by using different data sources, such as existing websurveys, social networks, and other web 2.0 technologies.

WEBDATANET will promote web-based data usage in the EU by supplying web-based teaching and discussion platforms, disseminating findings, and organizing conferences, working groups, and research exchanges. It will contribute to the theoretical foundation of webbased data collection, stimulate its integration into the entire research process (e-science), and enhance its credibility in the name of public

IS1103 Adapting European health systems to diversity Dr Sandra Buttigieg, Faculty of Health Sciences, University of Malta

European societies are becoming ethnically and culturally more diverse, yet their health systems are failing to keep pace. This Action aims to promote the adoption and implementation of policies responding to this increased diversity. It builds on the achievements of COST Action ISO603 (Health and Social Care for Migrants and Ethnic Minorities – HOME), which reviewed health inequalities among migrants and ethnic minorities as well as the measures designed to remedy them. ADAPT will take this work forward, identifying obstacles to translating this knowledge into action as well as 'levers for change'. Despite a remarkable increase in research and innovation in this area.

as well as significant backing from international bodies, the pace of change in Europe remains slow. Few countries have adopted national policies on migrant and ethnic minority health and even where they have, implementation has encountered many obstacles.



BM1006 Next Generation Sequencing Data Analysis Dr Joseph Borg, Faculty of Health Sciences, University of Malta

Next generation sequencing (NGS) is a highly parallelised approach for quickly and economically sequencing new genomes, re-sequencing large numbers of known genomes, or for rapidly investigating transcriptomes under different conditions. Producing data on an unprecedented scale, these techniques are now driving the generation of knowledge (especially in biomedicine and molecular life sciences) to new dimensions.

The massive data volumes being generated by these new technologies require new data handling and storage methods. Hence, the life science community urgently needs new, and improved approaches to facilitate NGS data management and analysis.

This COST Action unites bioinformaticians, computer scientists and biomedical scientists, harnessing their expertise to bring NGS data management and analysis to new levels of efficiency and integration. Rigorous surveillance of NGS technology and NGS-related software developments will allow the partners to generate software solutions for future NGS opportunities in a timely manner.

BM0704 Emerging EMF Technologies and Health Risk Manage-

Dr Louis Zammit Mangion, Dr Charles Sammut, Faculty of Science. University of Malta

The main objective of the Action is to create a structure in which researchers in the field of EMF and health can share knowledge and information on:

- 1. How existing EMF technologies change either in their operating characteristics or in novel ways and applications in which they are
- 2. Identifying what entirely new EMF technologies are introduced and on what time-scale

- 3. What novel emission and operating characteristics might result and what impact these would have on the device-specific and overall EMF exposure of people
- 4. What possible health effects could consequently arise and the scientific evidence for health concerns if any
- 5. How such concerns should be addressed through the use of evidence-based information and
- 6. What tools are effective in communicating and managing such risks and perceived risks. And, effectively publish all such information in the public sector for the benefit of all stakeholders. Primary end users are national and local government agencies, advisory bodies. risk assessors and communicators.

BM0905 European Network for the Study of Gilles de la Tourette **Syndrome: Dr** Ruben Cauchi Dept of Physiology and Biochemistry University of Malta

The main objective of this Action is to create a pan-European interdisciplinary network of scientists with the goal to promote the study of Gilles de la Tourette Syndrome (GTS), improve the standard of care for GTS across Europe, and educate the public and professionals about the disorder.

Gilles de la Tourette Syndrome (GTS) is an inherited neuropsychiatric disorder with childhood onset. It is marked by multiple motor and vocal tics and high comorbidity rates with attention deficit hyperactivity disorder and obsessive compulsive disorder. Due to lack of education of medical professionals, educators, and the general public, GTS is underdiagnosed and patients are severely discriminated against. Efforts to elucidate the genetic etiology of GTS are fragmented across Europe and hampered by low statistical power.

This COST Action will foster the creation of a pan-European, interdisciplinary scientific network with a goal to promote the study of GTS, improve the standards of care, and educate the public and professionals, combating stigmatisation of affected individuals.



TD1006 European Network on Robotics for NeuroRehabilitation Dr Mark Sacco, Dept of Physiotherapy, Faculty of Health Sciences, University of Malta; Dr Zdenka Sant, Faculty of Engineering, University of Malta

The aging of the European population will inevitably accelerate the demand for effective rehabilitative therapies to ameliorate the motor deficits caused by major age-associated neurological syndromes such as stroke.

Robots for neurorehabilitation offer a significant advantage in addressing this need. They can extend substantially the capacities of therapists who work with patients suffering from motor impairments. Typical robotic devices can convey instructions to patients on how to perform specific movements, can assist and guide the execution of motor actions, and can objectively assess movement capabilities.

The growing variety of robotic devices used in primary research and clinical practice offers a rich framework for expanding their use in an expanding number of different patient groups. The main objectives of this Action are firstly to develop new, efficient and patient-tailored robot-assisted therapies by coordinating basic and applied research perspectives.

TD0902 Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf: Dr Timmy Gambin, Department of Archaeology and Classics, University of Malta

For most of human history on the European continent over the past one million years, sea levels have persisted at levels lower than present by as much as 130m, creating extensive coastal and lowland landscapes attractive to human settlement. Between 16,000 and 6000 years, most of this territory was drowned by rapid sea level rise from -130m, following the last Ice Age, transforming the geographical and environmental context of human development with consequences that persisted into the modern era.

This Action will improve knowledge on the location, preservation conditions, investigation methods, interpretation and management of underwater archaeological, geological and palaeoenvironmental evidence of prehistoric human activity, create a structure for the development of new interdisciplinary and international research collaboration, and provide guidance for archaeologists, heritage professionals, scientists, government agencies, commercial organisations, policy makers and a wider public.

TD 1103 European Network for Hyperpolarization Physics and Methodology in NMR and MRI Dr Louis Zammit Mangion, Faculty of Science, University of Malta

Nuclear Magnetic Resonance (NMR) spectroscopy, microscopy and imaging techniques (MRI) play a crucial role in numerous fields of science ranging from physics, chemistry, material sciences, biology to medicine.

However, despite all their versatility, the key issue is frequently sensitivity, which limits the applicability of NMR spectroscopy and imaging techniques in the case of fast dynamical processes and detection of low concentrated molecules in both in vitro and in vivo applications.

The Action aims to stimulate and accelerate collaborations and joint research efforts between European groups into hyperpolarization physics and methodology with the goal to develop robust strategies for sensitivity enhancement in NMR and MRI.





The Malta Council for Science and Technology and EurOcean

Embracing as their common goal the promotion of marine science and technology, strategic tools for the socio-economic development of nations. The Malta Council for Science and Technology and The European Centre for Information on Marine Science and Technology (EurOcean) joined their efforts since 2008, when The Council was accepted as a full member of Eurocean.

Through The Malta Council for Science and Technology representative, Ambassador Emeritus Salvino Busuttil, who is also Vice-President of this European network, the two organizations worked together to:

- facilitate the access to information on Marine Sciences:
- encourage cooperation between existing European Marine organisations:
- iii. contribute to the preparation of syntheses on Ocean issues:
- iv. enhance the public awareness and understanding of marine sciences.

The Malta Council for Science and Technology, has been heavily involved in promoting the EurOcean concept and network in Malta, connecting EurOcean with relevant networks and institutions based in Malta, particularly the International Ocean Institute (IOI), which since

2012 is also a Member of EurOcean, the International Maritime Law Institute (IMLI), The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), the University of Malta and the Fondation de Malte (which is an associate Eurocean member).

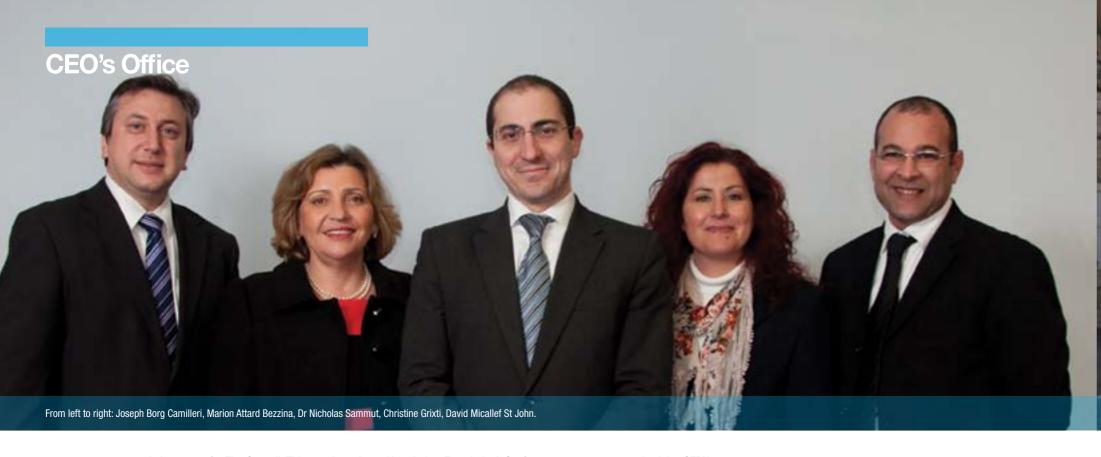
At the same time. The Malta Council for Science and Technology benefits from the relevant European network that supports EurOcean, thus strengthening the Maltese marine scientific community through specialised training. In fact in 2011 Eurocean developed two dedicated training activities for a Maltese researcher and for a PhD

One training activity was attended by Molly Sorensen from the University of Malta organised in collaboration with the Institute of Marine Research (IMR) in Norway, while the other was attended by Dr. Matthew Montebello for the University of Malta and was held in collaboration with the Department of Oceanography and Fisheries (DOP) at the University of Azores (UAc), Portugal.

Both activities involved training on board of research vessels and/or land based laboratories, made possible through the kindness of the respective research organisations and through the financial support

The Malta Council for Science and Technology looks forward to strengthening this valuable and valued relationship through continued cooperation particularly through the opportunities Eurocean, through the enthusiasm of its Executive Director, Dr Telmo Carvalho, continues to offer to Maltese marine researchers.







2011 was an extremely busy year for The Council. This was brought about due to further recruiting, multiplying list of events and ongoing embellishment of Villa Bighi.

With a further 9 recruits, 2011 was hectic for Human Resources needs. This office handled approximately 100 parliamentary questions, 22 sponsorship deals and extensive coordination between the Council, OPM and MPO.

premises. This Council, saw an increase of around 20% in this respect with more than 60 events taking place at Villa Bighi. These included regular workshops by the R&I and FP7 Units as well as Mini European

For the second consecutive year Villa Bighi hosted yet another conference organised by CERN. The 2011 edition of 'Sharing 2011.

Knowledge Foundation' Conference; an event organised by CERN included approximately 70 delegates and 3 international television

Villa Bighi is one of The Council's best assets, which has also undergone major restructuring and restoration works during 2011. These works, included installation of parguet flooring, new lighting systems, new security alarm installation as well as a complete overhaul of the main hall, which required new flooring and paint 2011 also saw a higher number of events taking place within the work. These works, which included restoration of the old stonework and replication of the original features were closely monitored by the Council's architect.

> The Council also took on a visual overhaul during 2011. This started with re-branding followed by the creation of a brand new website. This department organised 17 press conferences and events during

These events included launches of new R&I research projects, conclusion of past projects and reportage of their achievements, as well as an innovative lunch for the local press. This gastronomic event, which was organised in cooperation with Bacchus Restaurant and Paolo Bonnici Wine Merchants, was intended as a scientific explanation of food and wine.

Villa Bighi requires constant maintenance and ever since the building was entrusted to The Malta Council for Science and Technology, it has undergone a massive restoration process. These works are never ending and with the increase in The Council's activity, more is planned.

In 2008, a number of employees from the Gerolamo Cassar School of Building and Restoration, were seconded to form a maintenance team. Their experience in masonry works proved indispensable and apart from the extensive stone maintenance works, they also took on an aesthetical renovation of both the Villa's elevation and interior. All these works were done with the supervision of The Council's architect Claude Busuttil who's task is to closely monitor the jobs in order to retain the Villa's historical values as well as the use of right materials. One has to appreciate that the renovation works done on the Villa, in order to turn it into an office to house over 40 employees, were done using appropriate materials and in non-permanent methods.

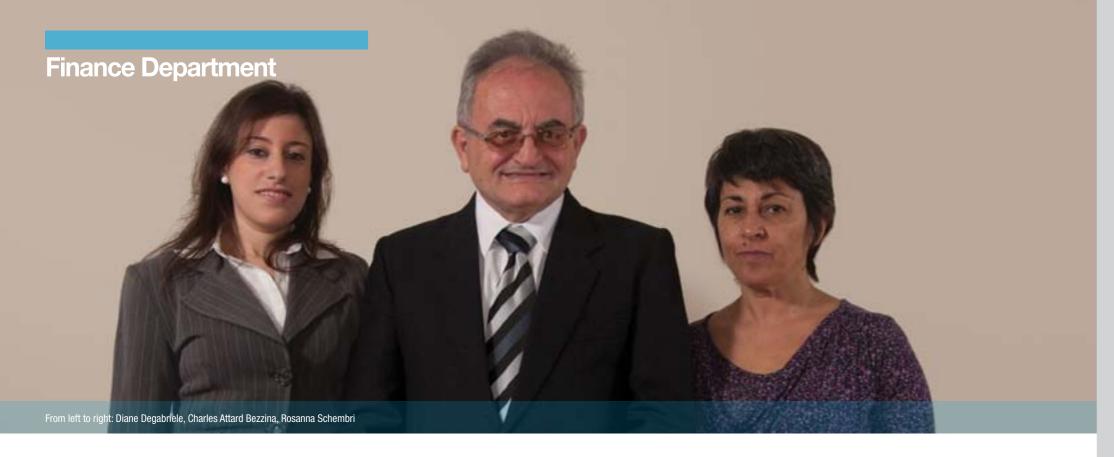
During 2011, the whole of the ground floor was re surfaced. This laborious task which took almost 3 months to complete, included new flag stones in the main hall as well as laminated parquet flooring in the adjacent offices. The flagstones were entirely reproduced by our Maintenance Team using the same kind of stone, thickness and patterns. The parguet flooring was intended to replace the fitted carpet which apart from the health issues and constant maintenance requirements, was also damaging the original flooring due to the retention of humidity. Before the parquet was installed, the original flooring was thoroughly cleaned and a layer of insulating foaming was

The Council also commissioned an all new computer network and internet cabling system, alarm system and illumination works. All the necessary wiring was passed through custom made wooden truncking which was placed alongside walls and not directly applied.

In 2011, The Malta Council for Science and Technology participated and organised a number of events which frequency increased to almost two events per month. These were all organised in the lower grounds which has now been transformed in a fully fledged conference room which can accommodate over 90 seats. This hall is equipped with PA system, projection and all possible requirements.

These facilities were tested in May 2011 when CERN organised their annual conference at Villa Bighi. This conference included over 70 delegates from many countries and international press and TV stations. The hall was transformed to include translation booths. A/V stations and satellite transmission facilities.

The Villa also needs constant maintenance due to its exposure to the sea and elements. All these works and the regular preparation of The Council's events are all handled by The Maintenance Team.



joined in July 2011.

Since then accounting records have been brought up to date cleaned Bank Accounts and others that had no useful purpose have been accounts are reconciled on a monthly basis.

The Finance Department at the Malta Council for Science and Internal Control has been tightened and observance of the Public Technology set up as an in house department in 2010 took over all Service Management Code and the various European Commission the finance functions by May 2011. The team is made up of Rosanna regulations (e.g. Framework 7, ERDF and ESF) has been given its due Schembri, Accounts Executive who had been holding the department importance and priority. With the co-operation of all sections of the flag since 2000, Charles Attard Bezzina, Financial Controller who Malta Council for Science and Technology the improvement of internal joined in June 2010 and Diane Degabriele, Accounts Executive who control and adherence to the various regulations is being regularly

Salaries records and computations have also been taken over by the up and kept updated consistently. This heralded the production of Finance Department at the Malta Council for Science and Technology monthly management accounts on a regular timely basis. Old project and among the policies newly adopted are the automatic payment of leave and bonus (pro Rata) to part - timers and the emailing of closed and Bank accounts are being limited to a minimum. Bank payslips. Better use of the facilities for details on payslips have been

The FP 7 projects accounts are now fully integrated into the accounts of Malta Council for Science and Technology.

R&I project funding is now also an integral part of the accounting records and funds are being drawn from government on a need basis

Accounts for the Interactive Science Centre project development have also been set up as a separate department.

Financial Statements for the year ended 31 December 2011

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Chairman's report

The Chairman presents his report and the audited financial statements for the year ended 31 December 2011.

Principal activities

The Malta Council for Science and Technology (hereafter referred to as the Foundation), is responsible for the development of science and technology in Malta.

Review of the business

The level of business and the Foundation's financial position is in line with expectations, and the Council expects that the present level of activity will improve in the foreseeable future.

Council

The members of the Council were:

Chairman: Hon, Dr. Jeffrev Pullicino Orlando

Vice Chairman & CEO: Dr Ing. Nicholas Sammut Secretary: Dr Alex Perici Calascione

Members:

Mr Anthony Tabone Prof. Maurice Grech

Dr Susanne Gatt

Prof. Alfred Vella

Dr Marisa Cassar

Dr Claire Bartolo

Dr Alec Lapira

Mr Charles Theuma

Mr Charles Saliba

Ing. Silvana Falzon

Ing. Joseph Sammut

(Resigned September 2011)

Dr. Sue Vella

(appointed 26 January 2012)

Statement of Council's responsibilities

prepare financial statements which give a true and fair view of the state of affairs of the Foundation as at the end of each financial period and of the surplus or deficit for that period.

In preparing the financial statements, the Council members are responsible for ensuring that:

- appropriate accounting policies have been consistently applied and supported by reasonable and prudent judgments and esti-
- the financial statements have been drawn up in accordance with the Accountancy Profession (General Accounting Principles for Smaller Entities) Regulations, 2009 and the Schedule accompanying and forming an integral part of those Regulations;
- the financial statements are prepared on the going concern basis Kalkara unless it is inappropriate to presume that the Foundation will continue in business as a going concern.

The Council is also responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the Foundation and to enable the council members to ensure that the financial statements comply with the Charter Document of the Foundation. They are also responsible for safeguarding the assets of the Foundation, and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Auditor

The Council is required by the Charter Document of the Foundation to A resolution to reappoint the firm Mercieca, Azzopardi & Co. as auditors of the Malta Council for Science and Technology will be proposed at the forthcoming meeting at which these financial statements are approved and authorised for issue.

By order of the Council

Hon. Dr. Jeffrey Pullicino Orlando, B.Ch.D.(Hons), M.P. Chairman

"Villa Bighi"

22 March 2012

Independent auditor's report

Report on the financial statements

and expenditure account, statement of changes in equity and cash flow statement for the year then ended, and a summary of significant Principles for Smaller Entities. accounting policies and other explanatory information.

Council's responsibilty for the financial statements

that give a true and fair view in accordance with the Accountancy Profession (General Accounting Principles for Smaller Entities) Regulations, 2009 and the Schedule accompanying and forming an qualifying entities as presented in these regulations. integral part of those Regulations and for such internal control as the council members determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibilty

Our responsibility is to express an opinion on these financial statements Ray Mercieca (Parther) for and based on our audit. We conducted our audit in accordance with International Standards on Auditing, Those standards require that we Mercieca, Azzopardi & Co. comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about 22 March 2012 the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made by the council members, as well as evaluating the overall presentation of financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

We have audited the accompanying financial statements of the Malta In our opinion, the financial statements give a true and fair view of the Council for Science and Technology set out on pages 132 to 141, which financial position of The Malta Council for Science and Technology as comprise the balance sheet as at 31 December 2011, the income at 31 December 2011, and of its financial performance and its cash flows for the year then ended in accordance with General Accounting

Report on Other Legal and Regulatory Requirements

In our opinion, the financial statements have been properly prepared The Council is responsible for the preparation of financial statements in accordance with the Accountancy Profession (General Accounting Principles for Smaller Entities) Regulations, 2009 and the Schedule accompanying and forming an integral part of these Regulations, for

Certified Public Accountants San Gwann Malta

Income and expenditure account for the year ended 31 December 2011

	Notes	2011	2010
		€	€
Project income		3,487,438	1,105,464
Project expenses	_	(3,657,100)	(771,382)
Gross (deficit)/surplus		(169,662)	334,082
Administrative expenses	_	(1,253,660)	(928,668)
Operating deficit	3	(1,423,322)	(594,586)
Other income	5	1,736,849	635,221
Investment income	6	1,676	2,713
Interest payable and similar charges	7	(1,058)	(482)
Surplus for the year	_	314,145	42,866

Balance sheet at 31 December 2011

	Notes	2011	2010
		€	€
Assets			
Non-current assets			
Property, plant and equipment	9	260,760	84,693
Investments in associated undertaking	10	7,761	7,761
	_	268,521	92,454
Current assets	_		
Trade and other receivables	11	62,499	63,505
Cash and bank		1,596,549	1,046,968
	_	1,659,048	1,110,473
Total assets		1,927,569	1,202,927
	_	1,927,509	1,202,921
Equity			
Reserves			
Accumulated fund	_	416,651	102,506
Liabilities			
Non-current liabilities			
Trade and other payables	12	-	38,657
Current liabilities	_		
Trade and other payables	12	1,510,918	1,061,764
Total liabilities		1,510,918	1,100,421
Total equity and liabilities	_	1,927,569	1,202,927

The financial statements on pages 132 to 141 were authorised for issue by the Council on 22 March 2012 and were signed on its behalf by

Hon. Dr. Jeffrey Pullicino Orland

Chairman

Dr Nicholas Sammut
Vice Chairman & CEO

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Statement of changes in equity for the year ended 31 December 2011

	Accumulated fund	Tota
	€	:
Balance at 1 January 2010	59,640	59,64
Surplus for the year	42,866	42,86
Balance at 31 December 2010	102,506	102,50
Balance at 1 January 2011	102,506	102,50
Surplus for the year	314,145	314,14
Balance at 31 December 2011	416,651	416,65

Cash flow statement for the year ended 31 December 2011

	Notes	2011	2010
		€	€
ash flow from operating activities:			
perating deficit		(1,423,322)	(594,586)
djustments for:			
epreciation of property, plant and equipment		81,195	55,143
eferred grants released to income for year	-	(38,657)	(38,657)
		(1,380,784)	(578,100)
hanges in working capital:			
rade and other receivables		1,006	80,220
rade and other payables	-	449,154	(633,669)
ash used in operations:		(930,624)	(1,131,549)
nterest received		1,676	2,713
nterest paid		(1,058)	(482)
ther income	-	1,736,849	635,221
let cash generated from/(used in) operating activities	-	806,843	(494,097)
ash flows from investing activities:			
urchase of plant, property and equipment	-	(257,262)	(37,302)
lovement in cash and cash equivalents		549,581	(531,399)
ash and cash equivalents at beginning of year	-	1,046,968	1,578,367
ash and cash equivalents at end of year	13	1,596,549	1,046,968
	-		

Notes to the financial statements

1. Basis of preparation

The financial statements of the Malta Council for Science and Technology have been prepared in accordance with the Accountancy Profession (General Accounting Principles for Smaller Entities) Regulations, 2009 and the Schedule accompanying and forming an integral part of those Regulations ("GAPSE").

Basis of measurement

The financial statements are prepared in accordance with the historical cost convention.

Functional and presentation currency

The financial statements are presented in euro, which is the Foundation's functional currency.

2. Significant accounting policies

Property, plant and equipment

Recognition and measurement

The cost of an item of property, plant and equipment is recognised as an asset when it is probable that the future economic benefits that are associated with the asset will flow to the entity and the initially measured at cost comprising the purchase price, any costs directly attributable to bringing the assets to a working condition for their intended use, and the costs of dismantling and removing GAPSE. the item and restoring the site on which it is located. Subsequent expenditure is capitalised as part of the cost of property, plant and
The carrying amounts of the Foundation's assets are also reviewed equipment only if it enhances the economic benefits of an asset in excess of the previously assessed standard of performance, or it replaces or restores a component that has been separately depreciated over its useful life.

Property, plant and equipment is carried under the cost model, that is at cost less any accumulated depreciation and any accumulated impairment losses.

Depreciation

Depreciation is calculated to write down the carrying amount of the asset on a straight line basis over its expected useful life.

at the earlier of the date that the asset is classified as held for sale (or included in a disposal group that is classified as held for sale) in accordance with Section 24 of GAPSE or the date that the asset is Investment in associate undertakings derecognised. The depreciation charge for each period is recognised in profit or loss. The rates of depreciation used are based on the following useful lives:

	%
Improvements to building	10
Office equipment	10
Soft furnishings	10
Technical equipment	20
Furniture, fixtures and fittings	10
Motor vehicles	20
Computer hardware and software	33.33

Impairment

The carrying amounts of the Foundation's property, plant and equipment receive the dividend is established. are reviewed at each balance sheet date to determine whether there is any indication of impairment. If any such indication exists, the asset's Trade and other receivables recoverable amount is estimated.

Whenever the carrying amount of an asset exceeds its recoverable amount, an impairment loss is recognised and the carrying amount of the asset is reduced to its recoverable amount. Impairment losses are off during the year in which they are identified. cost can be measured reliably. Property, plant and equipment are recognised immediately in profit or loss, unless they relate to an asset which is carried at revalued amount, in which case they are treated as a revaluation decrease in accordance with the applicable Section in

> at each balance sheet date to determine whether there is any indication that an impairment loss recognised in prior periods may no longer exist or may have decreased. If any such indication exists, Bank overdrafts that are repayable on demand and form an integral the asset's recoverable amount is estimated. An impairment loss previously recognised is reversed only if there has been a change in nent of cash and cash equivalents for the purpose of the statement of the estimates used to determine the asset's recoverable amount since cash flows. the last impairment loss was recognised. When an impairment loss subsequently reverses, the carrying amount of the asset is increased to the revised estimate of its recoverable amount, to the extent that it does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior years. Impairment reversals are recognised immediately in profit or loss, unless they relate to an asset which is carried at revalued amount, in

> Depreciation of an asset begins when it is available for use and ceases which case they are treated as a revaluation increase in accordance with the applicable Section in GAPSE.

An associate is an entity over which the foundation has significant influence and that is neither a subsidiary nor an interest in a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of the associate but is not control or joint control over those policies.

Investments in associates are initially measured at cost. After initial recognition, the investment may be carried under the cost method, or under the equity method, that is at its initial recognition amount. subsequently adjusted to recognise the foundation's share of the profit or loss or changes in equity of the associate after the date of acquisition, and to recognise impairment losses.

After initial recognition, investments in associates are carried under the cost method. Under the cost method, the investment is measured at cost less any impairment losses. Distributions received are recognised as investment income in profit or loss when the foundation's right to

Trade and other receivables are carried forward at anticipated realisable value. An estimate is made for doubtful receivables based on a review of all outstanding amounts at year end. Bad debts are written

Trade and other payables

Trade and other payables are stated at their nominal value.

Cash and cash equivalents

Cash and cash equivalents comprise cash balances and call deposits. part of the Foundation's cash management are included as a compo-

Revenue is recognised upon performance of services and is reported in the financial statements as project income.

3 Operating deficit

The operating deficit is stated after charging the following:

	2011	2010
	€	€
Depreciation of property, plant and equipment (note 9)	81,195	55,143
Staff costs (note 4)	902,502	610,637
Auditor's remuneration	1,700	1,700
Movement in trade receivables impairment provision	<u> </u>	(9,500)
4 Staff costs		
	2011	2010
	€	€
Wages and salaries	771,482	485,194
Social security costs	50,174	29,850
Council members' emoluments	80,846	95,593
	902,502	610,637
Average number of full time equivalents employed during the year:		
	2011	2010
	€	€
Administration	39	24
5 Other income		
	2011	2010
	€	€
Government of Malta subvention	1,409,856	433,997
Refund of salaries and expenses	169,397	159,926
Refund of overheads	90,544	-
Government grants released to income for the year (note 12)	38,657	38,657
Sundry income	28,395	2,641
	1,736,849	635,221

6 Investment income

	2011 €	2010 €
Interest receivable on bank balances	1,676	2,713
7 Interest payable and similar charges		
	2011	2010
	€	€
Bank interest payable and similar charges	1,058	482

8 Income Tax

No provision for Malta income tax has been made in these financial statements as the Malta Council for Science and Technology is exempt from Malta income tax.

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9 Property, plant and equipment

	Improvements to building	Office Equipment	Soft Furnishings	Technical Equipment	Furniture, fixtures & fittings	Motor vehicles	Computer hardware & software	Total
	€	€	€	€	€	€	€	€
Cost								
At 1 January 2010	269,888	47,010	18,682	85,810	131,279	32,926	164,149	749,744
Additions	12,807		<u>-</u> _		8,864		15,631	37,302
At 31 December 2010	282,695	47,010	18,682	85,810	140,143	32,926	179,780	787,046
Additions	180,181	390	699	590	58,444	<u> </u>	16,958	257,262
At 31 December 2011	462,876	47,400	19,381	86,400	198,587	32,926	196,738	1,044,308
Depreciation charge								
At 1 January 2010	215,596	39,942	15,527	83,664	103,788	31,155	157,538	647,210
Charge for the year	28,270	2,664	1,551	538_	11,003	1,771	9,346	55,143
At 31 December 2010	243,866	42,606	17,078	84,202	114,791	32,926	166,884	702,353
Charge for the year	46,288	2,700	1,621	663	16,848		13,075	81,195
At 31 December 2011	290,154	45,306	18,699	84,865	131,639	32,926	179,959	783,548
Net book value								
At 31 December 2011	172,722	2,904	682	1,535	66,948	<u> </u>	16,779	260,760
Net Book Value								
At 31 December 2010	38,829	4,404	1,604	1,608	25,352		12,896	84,693

10 Investment in associated undertaking

to investment in associated u	muertaking		
		2011	2010
		€	€
Investment in associated underta	akings at cost	7,761	7,761
Name	Registered office	Principal activities	Percentage of shares held
			2011 2010
Euromediti Limited	Villa Bighi, Kalkara, Malta	Development of new technologies	33 % 33%
11 Trade and other receivables	s		
		2011	2010
		€	€
Trade receivables		6,768	3,512
Payments		9,245	-
Accrued income		46,486	59,993
		62,499	63,505
12 Trade and other payables			
		2011	2010
		€	€
Non-current			
Government grants At beginning of year		38,657	77,314
Released to income and expend	itura account (nota 5)	(38,657)	(38,657)
neleased to income and expend	iture account (note 5)	(30,037)	(30,037)
At end of year			38,657
Current			
Trade payables		19,027	21,205
Contingency		2,578	6,998
Accruals		80,525	78,177
Deferred income		1,392,514	948,718
Other payables		16,274	6,666
		1,510,918	1,061,764

In accordance with the Foundation's accounting policies relating to grants received for the purchase of tangible non-current assets, grants are included with non-current liabilities and are credited to the income and expenditure account on a straight line basis over the expected useful lives of the related assets.

The Malta Council for

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13 Cash and cash equivalents

For the purposes of the cash flow statement, the cash and cash equivalents at the end of the year comprise the following:

	2011	2010
	€	€
n at bank and in hand	1,596,549	1,046,968

Contingent liabilities

At 31 December 2011, guarantees amounting to €5,659 (2010: €5,659) were given by the Foundation during the normal course of operational activity in favour of third parties over which no loss is expected to arise.

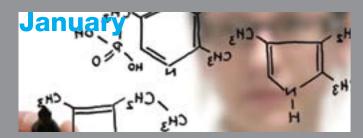
Design Solutions Limited have initiated legal proceedings against the Foundation, claiming for the Life Sciences Park Project contract be awarded to them. The Foundation's lawyers are unable to quantify any potential contingency arising from the said case due to the nature of the claims.

Related party transactions

Malta Council for Science and Technology is a public Foundation funded by the Government of Malta. Transactions with the Government of Malta during the year arose as shown hereunder:

	2011	2010	
	€	€	
Other funding	1,409,856	433,997	

Fees and salaries payable to the Council Members have been disclosed separately in note 4.



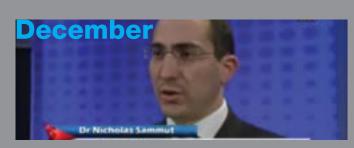
International Year of Chemistry 2011: Seminar organised at Villa Bighi to discuss Intellectual Property issues in the Local Pharmaceutical Manufacturing Industry



Geologist, Dr Peter Gatt, explains research findings about geological features of the Maltese Islands during a press conference at Villa Bighi energy; "Dexawave" is launched.



FP7 Project - Pri-Sci-Net was launched at Villa Bighi



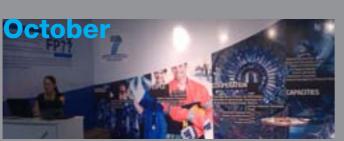
R&I 2012 launched



Science Magazine Publishes Profs. Joseph N. Grima's research study on Auxetic Foams.



R&I Research Project which consists of the conversion of waves into



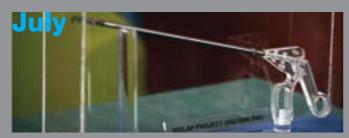
FP7 Unit took part in SME week



Malta's National Strategy for Research & Innovation launched for public consultation



Molecular Characterization and Authentication of Maltese Honey is



R&I Research Project IDLap is finalised and first prototype is donated to The Malta Council for Science & Technology during a press conference at Villa Bighi.



"Science in Food" event for the Media organised with kind cooperation of Paolo Bonnici and Bacchus Restaurant



The Council launches its new corporate identity followed by new



R&I Research Project Neptume is launched during a press conference at Villa Bighi.



R&I Research Project "Clean Flight" launched at Villa Bighi



Prime Minister Lawrence Gonzi visits Villa Bighi for Science Week organised by NSTF



Eraprism, a €1M FP7 Project coordinated by Dr Jennifer Casingena Harper came to an end via a press conference.



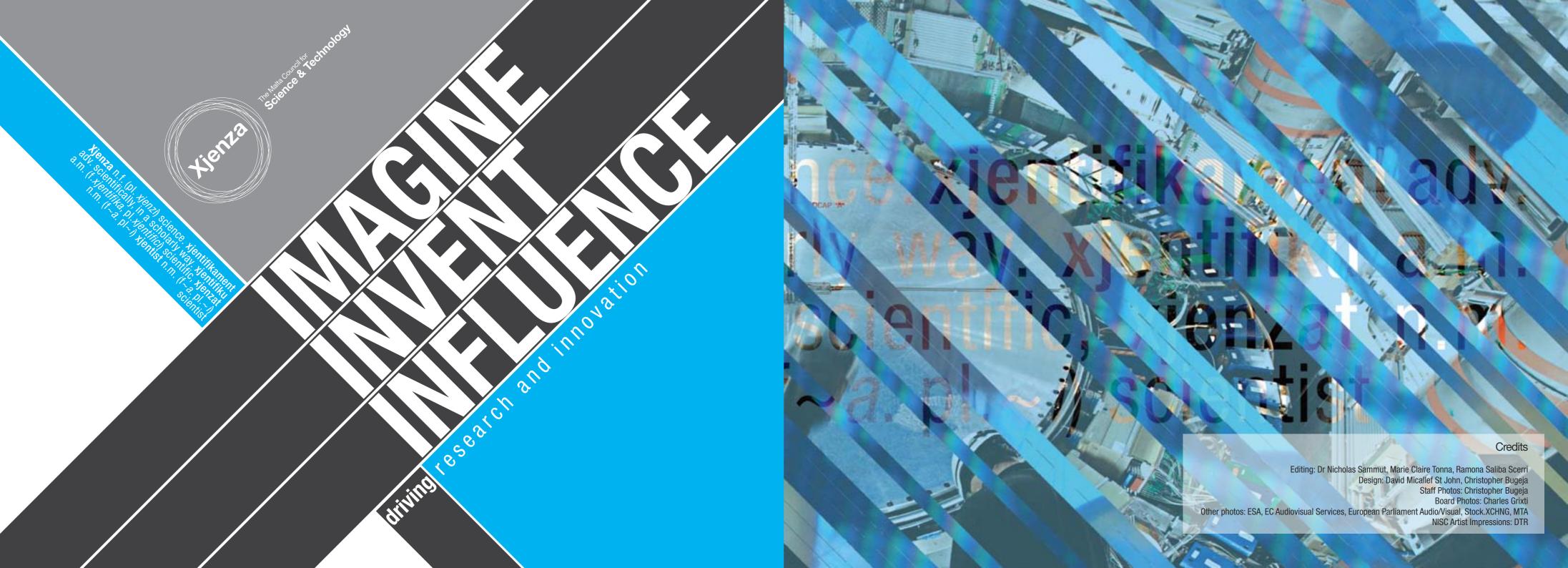
R&I Project "Diacom" came to an end and findings explained to the



Sharing Knowledge Across The Mediterranean Annual Conference held at Villa Bighi and organised in collaboration with CERN.

Manufacturing Platform launched







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