

EUREKA PROJECT E!3765- EULASNET II

1. General description

Project	E! 3765- EULASNET II	Status	Announced- 26-Jun-2006
Title	European Laser Technology And Applications Network (Phase Ii)		
Class	Umbrella	Technological area	Lasers
Start date	01-Jun-2006	End date	01-Jun-2010
Duration	48months	Total cost	0Meuro
Partner sought	Yes		
Summary	Generate E!&Other European Rtdi Proj In Specific Fields Of Laser Applications By Bringing Together Eu Competencies In The Field Of Laser Techn&Assisting Eu Enterprises&Res. Org. In Finding Partners For Innovative,Internat Collaboration.		

Budget and duration

Phase	Budget(Meuro)	Duration (Months)
Total	0	48

Member contribution

Member	Contribution	Position	Since
Spain	%	Contact Member	28-May-2007
Romania	%	Participating Member	26-Jun-2006
Poland	%	Participating Member	26-Jun-2006
Lithuania	%	Participating Member	26-Jun-2006
Italy	%	Participating Member	26-Jun-2006
Hungary	%	Participating Member	26-Jun-2006
United Kingdom	%	Participating Member	26-Jun-2006
Denmark	.00%	Participating Member	14-Jun-2007
Czech Republic	%	Participating Member	26-Jun-2006
Serbia	%	Participating Member	26-Jun-2006
Belgium	%	Participating Member	26-Jun-2006
Austria	%	Notified Finished	31-Mar-2007
Slovenia	%	Interested	24-Mar-2006
Portugal	%	Interested	28-Mar-2006
Croatia	%	Interested	24-Mar-2006
France	%	Interested	05-Dec-2006

Participants

Company	Country	Type	Role
Centro Laser Upm Universidad Politecnica De Madrid	Spain	University	Main
Laser Centrum Vlaanderen (Lcv)	Belgium	Research Institute	Partner
Force Technology	Denmark	Research Institute	Partner

Participants

Company	Country	Type	Role
Tu Wien/Institut For Forming And High Laser Technology / Argelas Technische Universitaet Wien	Austria	University	Partner
Rudjer Boskovic Institute	Croatia	Research Institute	Interested
Enea - C. R. Frascati Ente Per Le Nuove Tecnologie, L'Energia, L'Ambiente	Italy	Governm./Nat. Admin.	Partner
Club Laser Et Procedes	France	Governm./Nat. Admin.	Interested
University Of Ljubljana / Faculty Of Mechanical Engineering Ladisk	Slovenia	University	Interested
National Institute For Laser, Plasma And Radiation Physics Laser Department	Romania	Research Institute	Partner
Inst. Of Optoelectronics, Military University Of Technology	Poland	University	Partner
Institute Of Physics/Non-Linear Optics & Spectroscopy Lab.	Lithuania	Research Institute	Partner
Institute Of Physics	Serbia	Research Institute	Partner
Association Of Industrial Laser Users - Ailu	United Kingdom	Governm./Nat. Admin.	Partner
Pannonlaser Co-Operation Research Centre University Of Pecs	Hungary	Research Institute	Partner
Matex Pm, S.R.O.	Czech Republic	SME	Partner

2. Project outline

Project description

During recent decades, laser technology has proven to be a highly versatile manufacturing tool for modern, environmentally friendly processes and a key technology for future advanced materials processing. Indeed, despite the relative maturity of industrial lasers, the technology and applications continue to undergo major developments and to move into new areas; for example, the emergence of new concepts of high power/high intensity lasers for applications ranging from low noise drilling of concrete in sensitive urban areas (e.g. hospitals) to nano-engineering and ultra high speed cutting of metals for high volume JIT (Just-in-Time) manufacture. It is therefore important that the EULASNET platform be allowed to continue, in order that European manufacturing can take full advantage of the opportunities that these new developments present. In its final state, the EULASNET Umbrella has brought together representatives from 21 European countries, for some of whom the network provides an important international link for transforming their manufacturing base to make it more competitive. By linking this activity to existing initiatives in the production field, EULASNET II will accelerate and optimise the incorporation of promising manufacturing technologies for the development of new processes through the exchange of expertise and know-how and will boost the ability for SMEs (Small and Medium-sized Enterprises) to adapt the new technologies.

EULASNET has been particularly successful in stimulating the development of national laser networks, but to date not so successful in creating new projects. For this reason EULASNET II is introducing a more structured approach to the networking and dissemination within the Umbrella, setting goals and delegating activities to a number of working groups, each responsible for specific topics within the scope of the Umbrella.

From a European strategic point of view, the overall goals defined for EULASNET II are:

- To achieve truly networked European expertise in laser technology.
- To maintain the leading role Europe plays in the fields of laser technology research and applications.
- To transfer and exploit RTDI results, particularly for the benefit of SMEs.

Technological development envisaged

From a thematic point of view, by reflecting the dynamic character of laser technology and applications, the EULASNET II thematic scope is broad and evolutionary. Nevertheless, to provide an initial reference and illustrate the practical relevance of the topics involved, a (non-exhaustive) list of the EULASNET II initial priorities and associate topics for project generation are summarised in Table I.

Table I: Summary of initial thematic priorities for EULASNET II

TYPE OF PRIORITY: Market-oriented developments

ASSOCIATE TOPICS:

Laser Associated Optical Technologies

- Diffractive, refractive, non-linear and adaptive optics for beam shaping, modulation and improving beam quality, extending to higher modulation frequencies, higher spatial resolution and generated wavelength conversion.

- X-ray and EUV technology: mirrors, coatings, interferometry with nm-resolution (nanometre-resolution).

- Coupling of diode-lasers: new schemes for higher transfer efficiency and lower costs.

TYPE OF PRIORITY: Applied RTD priorities

ASSOCIATE TOPICS:

* Laser Sources

- New, advanced laser media and generating schemes.

- Laser-plasma X-ray and EUV (extreme Ultra-Violet) sources: higher brilliance, higher efficiency, higher average power.

* Laser Interaction and Processing

- Hybrid processes based on classical and laser processes.

- Laser bending and high intensity laser forming processes.

- Advanced high intensity laser processing applications.

- Laser micro-processing and structuring with sub-wavelength resolution.

- Laser-assisted nanolithography, micro-reactions and structuring of polymers.

- Advanced laser surface modification and cleaning processes.

* Process Modelling, Monitoring and Control

- Model development for high intensity laser material interaction in industrial applications.

- Development of advanced monitoring and on-line control strategies for laser processing.

- Development of laser measurement applications.

TYPE OF PRIORITY: Standardisation, education and training priorities

ASSOCIATE TOPICS:

* General

- Compilation and elaboration of educational material in the field of laser technology.
- Development of a European academic network in the field of laser technology.
- Academic and technical support for the organisation of academic schools in the field of laser technology.
- Promotion of local/national events and training sessions in the field of laser technology.

* Standardisation

- Promotion of the standardisation of laser characteristics according to ISO (International Standards Organisation) related documents.
- Promotion of the standardisation of laser safety around Europe.

Markets application and exploitation

The manufacturing activity in Europe represents today approximately 22% of the EU GNP (Gross National Product). It is estimated that in total, 75% of the EU GDP (Gross Domestic Product) and 70% of employment in Europe is related to manufacturing. This means that each job in manufacturing is linked to two jobs in manufacturing related services. European manufacturing has great potential as part of a sustainable EU economy, but its success will depend upon continuous innovation in products and processes.

The laser sector, where European industry holds the majority share, has enjoyed an annual growth rate of more than 18% over the past 10 years and has now reached a volume of 2.5 billion.

Examples of markets relevant to laser technology include:

- The automotive sector, where laser technology has been massively introduced in the past 10 years, is now beginning to take full advantage of the maturity of laser technology.
- The aerospace sector, where lasers are used for machining difficult materials (e.g. titanium alloys, carbon fibre composites), where welding is beginning to be qualified for use in fabricating lightweight airframes, and where the potential of laser-assisted deposition and laser shock processing are now being considered.
- The laser job shop sector continues to play an integral part in European manufacture. The SMEs (Small and Medium-sized Enterprises) are increasingly expanding their range of process capabilities from flatbed cutting and welding to laser surface treatment, laser cleaning, prototyping and micro processing.
- The IT (Information Technology) sector, which remains a massive application area for lasers and is characterised by a trend towards smaller feature sizes, is utilising short pulse lasers as photolithographic (e UV) sources.

- The medical equipment sector, where the need for enduring micro marking is increasing the use of laser matrix coding and where key-hole surgical techniques require smaller and more functional components, is driving a burgeoning medical product manufacturing industry that is heavily reliant on laser technology.

It follows that the development of laser technology, from high power, industrial laser systems to low power, diagnostic and metrological laser systems, is important for European manufacturing success.

Additionally, even assuming a reasonably high level of laser R & D across Europe, the lack of penetration of laser technology into the key industrial sectors in many European countries needs an active and wide promotion and dissemination of this technology. The industries of many European countries need to undergo significant transformation; the development and implementation of laser technology can be a key to achieving this.

With the expected participation of laser and optics equipment suppliers, industrial companies acting as leaders in the industrial development sought and research centres providing the effort for the assessment and development of applications, such industrial penetration of laser technology can be envisaged.

Project codes

BSI

NACE

3. Main participant

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Organisation type	University
Participant role	Main

Contribution to project

- Coordination (Chair + Secretariat). - Spanish National Coordinating Expert (NCE).

Expertise

CENTRO LASER UPM is a research institute with vast experience in participating in and carrying out R+D projects in the field of industrial laser processing applications. The experience has been gained in the fields of laser beam manipulation, laser matter interaction characterisation, laser cutting, laser welding, laser heat treatments, laser cladding and other advanced processes. CENTRO LASER UPM houses important specific laser and robotic facilities (CO₂, Nd:YAG (Nd:Yttrium-Aluminium-Garnet) and diode lasers with beams either mirror or fibre transmitted and multi-axis robotised workstations) providing a convenient environment for the synergic development of R&D&I projects. The technology transfer character of the centre adds ideal demonstration possibilities for these developments. On the basis of the large international experience of its management board, CENTRO LASER UPM is especially well qualified for coordinating Spanish participation in European-wide endeavours.

4. Partner

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Organisation type Research Institute
Participant role Partner

Contribution to project

- Coordination (Member of Steering Committee). - Belgian National Coordinating Expert (NCE).

Expertise

The Institute (LCV) is embedded in VITO's Materials Department is the best-equipped laser centre in Benelux. For the purpose of laser treatments (cutting, welding, cladding across a broad range of materials such as plastics, ferro and non-ferro metals) the centre can rely on industrial laser systems ranging from 100 Watts up to 20 KW (kilowatt), whether CO2 or YAG lasers. The centre's mission is focussed on industrial processes, whereby practically all parts along the innovation chain are covered. These activities range from simple advice, extended application research through to the production of small series in the initial production phase. VITO-LCV has taken part in several international laser development programmes and has, within the framework of VITO, expertise in FP6, COST and EUREKA programmes. VITO-LCV is also coordinating BELASNET, the Belgian National Laser Applications Network. Dr. De Schutter is President of BELASNET, a member of the Steering Committee of ELI, the EUROPEAN LASER INSTITUTE and also EU manager of the recently set up ENIWEPE EUREKA Umbrella. He has 20 years of experience in managing research and coordination projects on national and European scales.

4. Partner

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Organisation type Research Institute
Participant role Partner

Contribution to project

NUS - Umbrella Sectoral Representative The Institute is a non-profit distributing industrial research organisation with a main emphasis on development and applied research as well as education and consultation services. Force is a leading technological consultancy and service provider organisation on the international market. It operates in several areas including: 1) welding and production technologies, 2) optimisation and automation of production, 3) material properties and testing, 4) product testing as well as NDE, 5) quality management, 6) maritime technology, 7) sensor technology and 8) energy and environment.

Expertise

The competence of the Division of Welding and Production Innovation builds on the solid foundation of in-depth knowledge of processes and automation relevant to manufacturing methods such as welding, cutting and surface treatment. Recent significant developments have been carried out within laser based production as well as sensor- and model-based open and closed loop control. The Institute is among the largest welding institutes within the EU.

4. Partner

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Organisation type University
Participant role Partner

Contribution to project

ARGELAS - the Austrian Laser Association - is a registered association of companies, organisations and research and development facilities. At the moment, about 50 members are part of ARGELAS. ARGELAS is devoted to research and development of new laser processes, to helping members implement new laser processes within their production and to dissemination of laser technology in AUSTRIA. Several national as well as international activities are carried out by ARGELAS: - At least once per year, a general meeting of all ARGELAS members is organised to exchange experience and to present the latest achievements on laser and optics technology. - Periodically, news and laser specific events are published by ARGELAS journals which are sent to all members. Additionally, a well organised website (<http://www.argelas.org>) publishes the latest news on laser technology. An international conference on laser development and laser applications (GCL-HPL, see <http://info.tuwien.ac.at/gcl-hpl06/Welcome/home.htm>) is also being organised by ARGELAS

this year. This conference has been held at different locations over the past 18 years. ARGELAS looks forward to organising the conference at Gmunden, AUSTRIA from September 4th till September 8th, 2006. This conference offers a great opportunity for meeting leading experts on laser technology and for promoting EULASNET. All these opportunities serve as a communication basis for EULASNET.

Expertise

- Laser Technology. - Forming Technology.

4. Partner

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Organisation type Research Institute
Participant role Interested

Contribution to project

National science centre.

Expertise

- Design of coherent and non-coherent light sources. - Design of laser optical components. - Laser power and energy measurements. - Laser instruments, laser protection.

4. Partner

Company **Enea - C. R. Frascati Ente Per Le Nuove Tecnologie,**
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Organisation type
Participant role

Governm./Nat. Admin.
Partner

Contribution to project

Italian representative for EULASNET.

Expertise

- Excimer laser technology; - Laser beam handling system design and test; - Surface modifications by laser processing; - Optical parameter standardisation; - X-ray and EUV sources by laser-plasmas; - Excimer lamps; - X-ray diodes design and test; - Technology transfer to SMEs; - International Project Coordination.

4. Partner

Company

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Organisation type
Participant role

Governm./Nat. Admin.
Interested

Contribution to project

Interface between French industrial companies and European partners for research projects in the field of laser processes.

Expertise

- Research and Industrial applications of lasers. - Network of experts in this field in FRANCE. - Management/Organisation of events and participation in national and European networks.

4. Partner

Company	University Of Ljubljana / Faculty Of Mechanical Engineering Ladisk ??Askerceva, 6 1000 Ljubljana Slovenia
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Organisation type	University
Participant role	Interested

Contribution to project

- Set-up of the Slovenian Laser Network (SLAM) connecting Slovenian companies that produce and apply laser technology with academic organisations. - Organisation and administration of SLAM. - Stimulate Slovenian SMEs to participate in EUREKA projects. - Foster research partnerships from the national research programmes and motivate them to prepare EUREKA project proposals. - Dissemination of EULASNET initiatives to Slovenian partners. - Collaborate in establishment of Slovenian laser technology demonstration centre. - Organisation of workshops on laser based technology.

Expertise

?Teaching, research and development and knowledge dissemination in the field of laser material interaction, laser applications and fibre-optic sensors. Major research areas: - Opto-dynamics (laser-induced material motion). - Opto-acoustics and laser ultrasonics. - Pulsed laser manufacturing processes (marking and engraving, drilling, ablation, cleaning, welding, bending and forming, etc.). - Laser based 3D measurement systems. - Fibre-optic sensors.

4. Partner

Company	National Institute For Laser, Plasma And Radiation Physics Laser Department ??Atomistilor, 409 077 125 Bucharest
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Organisation type
Participant role

Research Institute
Partner

Contribution to project

* Set-up of the Romanian Laser Network (ROLASNET). * Organisation and administration. * Presentation of a SWOT analysis on laser based technology in Romanian organisations involving SMEs and Universities. * Romanian SME stimulation to participate in EUREKA type projects. * Extension of already existing partnerships from national research programmes to EUREKA project proposals. * Dissemination of EULASNET initiatives to Romanian partners. * Organisation of an annual workshop on laser based technology with demos for SME partners.

Expertise

- Solid state lasers and micro-lasers. - Surface pulsed laser processing (cleaning, ablation, PLD (Pulsed Laser Deposition)). - Laser cutting and marking. - Laser application in medicine and biology (surgery, diagnostics, therapy). - Measurement of trace gases using laser photo-acoustic spectroscopy. - Laser metrology and standardisation. - Laser nano-technologies. - Laser photochemistry.

4. Partner

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Organisation type	University
Participant role	Partner

Contribution to project

- Coordination of Polish Laser Network POLLASNET representing Polish scientific and industrial optoelectronic/laser institutions in EULSANET II. - Polish NCE.

Expertise

The Institute is an interdisciplinary academic institute of the MILITARY UNIVERSITY OF TECHNOLOGY in Warsaw set up for scientific and educational activities in optoelectronics. Research and development as well as implementation works are carried out here on optoelectronic systems used for technology, medicine and environmental protection. The main activities of IOE scientific works concern optics, nuclear physics, solid-state physics, material engineering, electronics and mechatronics. The subjects of research projects carried out at the Institute are as follows: materials, optical technologies and systems, lasers and their applications, nanotechnologies, thermo-vision and thermo-detection, optoelectronic protection systems and optoelectronic metrology. At present, the INSTITUTE OF OPTOELECTRONICS MUT participates in many international programmes and coordinates several international projects (COST, EUREKA, 5th and 6th FPs (Framework Programme)).

4. Partner

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Organisation type	Research Institute
Participant role	Partner

Contribution to project

- Member of Topical Committee. - Lithuanian National Coordinating Expert (NCE).

Expertise

The Institute (FI) is a state scientific research institute in LITHUANIA. It brings together scientists and laboratories for basic and applied research in modern laser physics and technology, non-linear optics and spectroscopy, and some other related areas of physics. A great deal of experience is gained in non-linear optics and the spectroscopy laboratory in experimental investigations, modelling and development of solid-state lasers with pulse compression during Brillouin and Raman scattering, SHG (Second Harmonic Generation) and OPA (Operational Amplifiers) processes. High power solid-state lasers with multistage pulse compressors with synchronised and duration-controllable nano, subnano and picosecond monopulses at different wavelengths were developed and used for different applications. Many Lithuanian Laser companies (EKSMA, EKSPLA, STANDA, OPTIDA) were founded in close collaboration with FI, and this was their major competitive advantage on the laser market. Their presence on the international laser market dates back to 1987. Nowadays there are research equipment niches where Lithuanian manufacturers play a leading role worldwide with a market share exceeding 50 percent. The FI neighbour - EKSPLA UAB, the largest of the companies - is a manufacturer of complex and often unique laser systems which are developed by experienced engineers and former laser scientists. Therefore FI is especially well equipped for coordinating Lithuanian participation in EULASNET II Umbrella.

4. Partner

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Organisation type Participant role	Research Institute Partner

Contribution to project

- Expert in optical metrology in SERBIA AND MONTENEGRO. - Coordination of efforts in laser measurements and standards for SERBIA AND MONTENEGRO.

Expertise

- Applications in novel techniques in laser stabilisation (Nd:YAG, laser diodes). - Using lasers in optical metrology and standardisation. - Research in holography. - New holographic materials, diffractive optics and digital holography (CGH - Computer-Generated Hologram). - Applying non-linear phenomena (photon down-conversion, coherent population trapping) in modern optical measurements. - Special interest in biophysics and digital image analysis in medical physics.

4. Partner

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Organisation type Governm./Nat. Admin.
Participant role Partner

Contribution to project

UK industrial representative.

Expertise

Dissemination of laser information.

4. Partner

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Organisation type Research Institute
Participant role Partner

Contribution to project

?Leader of the Hungarian Laser Network (HULASNET). Coordination (member of Steering Committee), Hungarian representative, National Coordinating Expert (NCE). 1. Discharge excited X-ray laser development and EUV (Extreme UV) sources: higher brilliance, higher efficiency. 2. Laser micro-processing and structuring with sub-wavelength resolution. 3. Development of optoelectronics, 'on-line' diagnosis of processed level. 4. Development of laser-induced breakdown spectroscopy methods. 5. Dissemination of the results through workshops, exhibitions, seminars and publications.

Expertise

?Professor Santa has 30 years of experience in managing research and coordination projects on national and European scales. He is President of HULASNET, a Board Member of the ESF DYNA project, and President of the Society of Cooperative Research Centres. CRC PU is a consortium of 21 SMEs and research institutes in the field of laser technology: 2 and 3D laser cutting, welding, surface modification technologies, surface cleaning by laser beam, PLD, R&D of femtosecond and X-ray laser, fs OPO, Tera-Hertz source, analytical devices (LIBS (Laser Induced Breakdown Spectroscopy), LIF (Laser Induced Fluorescence), opto-chemical sensors), laser beam diagnostics, and medical applications (nano-biotechnology, dermatology, ophthalmology, surgery).

4. Partner

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Organisation type	SME
Participant role	Partner

Contribution to project

Coordination of Czech Laser Network CZELASNET representing Czech scientific, academic and industrial institutions dealing with laser technologies. Czech NCE in EULASNET II.

Expertise

The research company MATEX PM was originally oriented towards the analyses of material structure and

chemical composition using laser and other methods, the development of materials with specific properties, and optimisation of the technological processing of metallurgical wastes. Laser technologies are the main long-term research direction of MATEX PM. Close cooperation with the UNIVERSITY OF WEST BOHEMIA in Pilsen has been established. Therefore the research team can now also offer expertise on technologies using intensive heat sources, non-contact measurement of temperature fields, computer modelling, measurement of thermal properties of materials using laser methods, measurement of residual stresses, process control, etc. The goal is to set up a laser technologies research centre in the CZECH REPUBLIC similar to those set up in many other EU countries. MATEX PM also put forward a cluster initiative for laser technologies in the CZECH REPUBLIC at the end of 2005. Czech companies dealing with laser techniques, a number of small, medium and large industrial enterprises that are users of laser technologies and research/university workplaces all acknowledge their interest in such a laser technology cluster. Research activities of MATEX PM are focussed on intensification of laser laboratory cooperation in the CZECH REPUBLIC, education, and the transfer of laser technology research results in the Czech industry, to eventually converge with involvement in the EULANET II.