

European research and development in the Pilsen region

Introduction

This publication was prepared within the project „Regional Contact Organisation for West Bohemia”, coordinated by the University of West Bohemia with BIC Plzeň and ŠKODA RESEARCH as project partners.

The publication presents selected projects of international cooperation in research and technological development with participants from the Pilsen region. We included projects with different types of participants – university teams, researchers from companies, partners applying research results to enhance their competitiveness. Projects were supported by different EU programmes. However, the majority of projects were co-funded by the EU Framework Programmes, which are the EU's main instrument for funding research in Europe. The budget of the current 7-th Framework Programme, covering period 2007 – 2013, is higher than €50 bln.

Brief information about the problems solved and about the experience gained in international project teams can inspire those who would like to use the opportunity and participate in interesting, high-prestigious research and development projects with international partners, use and create new knowledge and know-how, establish new contacts, present their results at international conferences and in professional publications – all of that (and many others) with support of the EU programmes.

Authors of this publication would like to thank to all project participants, who provided necessary information and helped in the creation of this publication. We hope that the number of successful international research and development projects in future will be increasing and their results will support the further development of not only the participating people, teams and organizations, but also of the whole region.

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RKO ZČ – Regional Contact Organisation for West Bohemia

The network of regional and professional contact organisations was created in 2000 with support of the Ministry of Education, Youth and Sports programme EUPRO. The Regional Contact Organisation for West Bohemia (RKO ZČ) has been the network member since its very origin. It was created as the joint project of the University of West Bohemia (UWB) with BIC Plzeň (Business and Innovation Centre) and ŠKODA RESEARCH as project partners.

The main tasks of the RKO have been:

- to support participation of teams of researchers, institutes and companies operating in the West Bohemia in programmes of international cooperation in research and development, specifically in the EU Framework Programmes for research and technological development (FP);
- to contribute to the development of international cooperation of research laboratories and organisations with industry and small and medium size enterprises.

At the very beginning the general knowledge of the EU programmes and the experience with them was rather limited; therefore we focused mainly on the dissemination of information about possible participation. In the course of time we acquired the experience with projects preparation and management and the number of participants of Framework Programmes, but also of other EU programmes, was increasing. This increasing participation was supported by information campaigns, specific seminars and individual consultations.

After 11 years the programme EUPRO ends and new programme EUPRO-II should start in 2011.

Web pages <http://rko.zcu.cz> contain basic information about programmes, links to useful web pages, news about prepared activities and calls for proposals and other information that can help in the project preparation and its realization. The activities of the RKO ZČ, including preparation of this publication, are supported by the Ministry of Education, Youth and Sports project EUPRO OK 474.

Partners of the RKO ZČ



ZÁPADOČESKÁ
UNIVERZITA
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<http://www.zcu.cz/>



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ŠKODA VÝZKUM s.r.o.

<http://skodavyzkum.cz/>



European research and development in the Pilsen region

Sustainable eco-efficient life cycle of new compressor oil, its production and use

Czech partner

ATMOS CHRÁST s.r.o.

Brief introduction of the Czech partner

The company ATMOS Chrast has been engaged in manufacture and repair of compressors for more than 50 years. Nowadays, it produces screw compressors, pistons compressors and special screw compressors based on customers' demands. In 2002 the company extended its range of generator set production. With its own R&D activities the company comes to the market with unique technological solutions with quality that guarantees a leading position among the other producers of screw compressors. The company ATMOS Chrast has subsidiaries in Slovakia, Russia and the Netherlands.

Programme

FP6 – Integrated project

Project acronym

SOILCY

Project content

The aim of the project was the optimisation of new compressor oil for screw compressors, including economic, ecological and sociological impact of its production. This approach includes the optimisation of initial phase using glycerine from biofuels as renewable resources and developing a clean production technology to transform it to a polyglycerol esters derivate oil to be used in compressor applications. The next phase deals with the development of oil filter which replaces harmful antioxidant compressor oil additives, thus extending the life of newly developed oil. The output of the project is an innovative range of compressor oil with less environmental impact.

Project duration

1 September 2005 – 28 February 2009

Consortium

21 partners (Spain, Germany, Austria, Romania, France, United Kingdom, Czech Republic, Italy, Netherlands, Denmark)

Role of the Czech partner

Participant – leader of the work package 5 “Innovative compressor design”

Project total budget

8 740 000 EUR

Public grant

4 940 000 EUR

Reason of the Czech partner participation in the consortium

The main reasons for joining the consortium were supporting of the company R&D department and keeping the technology ahead of competitors. The emphasis was put on extension of the service interval of ATMOS Chrast machines and on mastering new technologies enabling the compressor production with minimum environmental impact. The project also included an effort to create a technology of ecological disposal, or recycling of used compressor oil, which would lead to further expansion of company's services.

Project results

The production technology of compressor organic oil from derivatives of glycerol was developed during the project. Currently, this oil doesn't reach the lifetime required for full substitution of existing used mineral and synthetic lubricants. Even so, many positive partial results have been achieved. Several studies of degradation of many oil types (from mineral and synthetic to special ones) were carried out and mathematical model describing this process has been developed. Further, the new type of oil filter containing nanoparticles as molecular sieve has been developed and successfully tested. Studies aimed at optimisation of the use of nanoparticles for specific applications have been published and led to further research in this area.

Benefit for the Czech partner

One project outcome is the oil filter. This filter is currently intensively tested and the results show that significant lifetime extension of standard compressor oil was achieved. This fact represents substantial cost saving in the compressor operation and has positive environmental aspects. Long-term monitoring of the screw compressors behaviour in many types of plants and analysis of obtained data allow a better understanding of the processes occurring in the gradual oil degradation in the compressor. It brought several innovations in existing product ranges and significantly influenced emerging models and had impact on the business model of selling certain types. Finally, in the framework of the project the R&D department of the company was equipped by measuring devices, new staff was hired and skills of existing workers were increased.

Comment

David Krivanka, research & development manager, comments the project as follows: “Communication between the specialists of chemical and engineering areas and coherence and consistency of the whole project, when the follow-up stage required immediate outputs of previous stage proved to be the biggest challenge of the project. This concept along with long-lasting problems in the initial production of polyglycerol led to an extension of the project for about one year. Even so, the project brought many positive results experience, which more than overweight administrative burden and organisational difficulties. As the most significant results I would mention mathematical model of oil degradation, new type of oil filter with nanoparticles and also new contacts and closer cooperation with research institutes abroad and producers of oil filters.”



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European research and development in the Pilsen region



Reduction, modification and valorisation of sludge

Czech partner

K&H KINETIC a.s.

Brief introduction of the Czech partner

The company K&H Kinetic deals with development, design and application of technologies for wastewater and potable water treatment. Their activities are focused on expert preparation and realization of complex supplies of communal and industrial wastewater treatment plants and water purification plants, including computer control systems. The company is also active in the utilisation of sewage, industrial and agricultural waste as a source for production of electrical and heat energy.

Programme

FP6 – Specific Targeted Research Project

Project acronym

REMOVALS

Project content

The first task of the project was deeper understanding of current sludge treatment technologies and sewage sludge utilization techniques leading to problem solution in a European dimension. Secondly, alternative processes for treatment and utilisation of sewage sludge were developed. These processes lead up to reducing both amount and toxicity of sludge and simultaneously transforming sludge into green energy vectors such as the source of methane or hydrogen, or producing valuable materials such as active coal.

Project duration

1 July 2006 – 30 June 2009

Consortium

18 partners (Czech Republic, Norway, France, Spain, Poland, United Kingdom, Portugal, Germany)

Role of the Czech partner

Partner

Project total budget

3 950 000 EUR

Public grant

2 940 000 EUR

Reason of the Czech partner to be in the consortium

K&H Kinetic has extensive know-how in the field of sewage sludge treatment and is the leader in supplies of the sludge technologies in the Czech Republic. The company is also a provider of the communal wastewater treatment plant with capacity of 100.000 equivalent inhabitants in the city of Klatovy. Therefore it has broad possibilities to test and verify new technologies in a real operation. For a long time the company has been cooperating with leading research organisations, mainly with the Department of Water Technology and Environmental Engineering of the Institute of Chemical Technology in Prague. These facts create conditions for successful participation of K&H Kinetic in the research consortium.

Project results

Within the Urban Waste Treatment Directive 91/271/EEC and the Sewage Sludge Directive 86/278/EEC technologies which offer new ways of sew-

age sludge treatment and utilization were developed. The valuable information on the production of active coal from the sludge and its utilization in conventional adsorption and advanced oxidation processes during the sewage sludge treatment were developed by the consortium.

Benefit for the Czech partner

The benefit of the project for the company K&H Kinetic is mainly strengthening the cooperation with the Institute of Chemical Technology in Prague, who invited K&H Kinetic to the project, and receiving new information in the field of reducing and utilization of sewage sludge. Usually there is a long way from the research to the real application of its results in specific commercial supplies and not all results will be brought to use in practical application at sewage treatment plants.



Comment

"Paperwork related to the project was very demanding. Price of the project audits, which were performed each year, was 15% of our project costs. If we received the same funding for research of our choice, we probably could use it better" says Ing. Pavel Fialka, CSc. technical director of the company. On the other hand he adds: "Despite these negatives we probably would participate in the European project again, because we see a big benefit in earning new knowledge, contacts and opportunities to enter new markets".

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European research and development in the Pilsen region

Intensive and sustainable breeding of the freshwater tench species

Czech partner

Klatovské rybnářství a.s.

Brief introduction of the Czech partner

Klatovské rybnářství operates 411 ponds with a total area of approximately 2.300 hectares. Its main activity is breeding and sale of freshwater fish (carp, trout, grass carp, bighead carp, pike, catfish, tench and whitefish). By its acreage and production capacity the company belongs among the most important fisheries in the Czech Republic. The business success is also achieved thanks to its breeding work in fish farming, which is focused on spawning of their own generation fish, juveniles rearing to the subsequent rearing of fish to their market size.

Programme

FP6 – CRAFT

Project acronym

PROTENCH

Project content

Tench is a very valuable fish in Europe as an ornamental fish, an object of angling and mainly for its excellent taste has a big potential at the European fish market. Therefore tench has been kept in the European ponds for more than 500 years. Natural reproductive cycle of tench makes this fish unavailable in the market for a substantial part of the whole year because of its limited spawning period. Moreover, the farmers must cope with high mortality during the first year of life, with slow growth and with the fact that they spawn for the first time not before their fourth year of age. The main goal of the project was to develop and verify methods suitable for the intensification of tench farming.

Project duration

1 January 2005 – 28 February 2007

Consortium

14 partners (Spain, Czech Republic, Rumania, Ukraine, Germany, Norway, United Kingdom)

Role of the Czech partner

Partner

Project total budget

1 900 000 EUR

Public grant

941 823 EUR

Reason of the Czech partner to be in the consortium

The company was supposed to be involved in the project in its later phases, especially in phases of testing and application of developed methods. This was very attractive for Klatovské rybnářství because it promised the acquisition of new knowledge in the field of feeding by artificial feed and fodder of early stages of tench, which were the areas where the company identified its own weak points. An important reason was to acquire knowledge of tench farming in other countries from foreign participants of the project.

Project results

The goal of the project (application and verification of scientific knowl-

edge for an intensive and cost effective tench culture) has been met. New conditions and methods of artificial reproduction and fry hatching were defined, optimal food composition and size for each growth stage of tench were determined and effective way of transport of live fish was developed. This eliminated the main obstacles and limiting factors that had affected the profitability the farming of this more and more demanded freshwater fish. Based on data from individual members of the project consortium, the economic model of profit-oriented fish farm focused on the market production of tench has been created.

Benefit for the Czech partner

The benefit of the project is clear. Klatovské rybnářství has managed to tune the methodology and its application in the company has increased production of tench to today's 15 tons only due to lower mortality in the early stages of tench. Incremental benefits for the company are new links to foreign partners, which offer business opportunities and improvement of foreign language skills of employees engaged in the solution of the project.



Comment

Petr Votipka, production director of Klatovské rybnářství, says: "Originally, we were involved in the project to acquire know-how in the field of tench farming from foreign project partners. We didn't expect that applications of developed methods would achieve such results in the area of spawning and fodder of early stages of tench. Thanks to the methodological leading of other project participant (Research Institute of Fish Culture and Hydrobiology in Vodňany) the project didn't burden us with administration. Therefore, we would not hesitate to participate in other international collaborative project, which should be headed to the areas we are interested in".

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European research and development in the Pilsen region



Optimisation of FeNi Type Alloy Production

Czech partner

KOVHUTĚ ROKYCANY a.s.

Brief introduction of the Czech partner

The company Kovohute Rokycany a.s. has been for a long time a leading Czech producer and supplier of metallurgical semi-products and products with defined physical characteristics for further processing in electrical engineering, electronics, energy, military, aeronautics and chemistry. In addition to Europe, the company has customers in Asia (Taiwan, South Korea, India) and Russia. In cooperation with a number of research organisations in the Czech Republic, Slovakia, Ukraine and thanks to the unique equipment - small vacuum furnaces (capacity 500 kilograms) - the company offers to its customers solutions tailored to their needs, which are guaranteed by company's research and development programme, focused on new types of non-ferrous alloys for materially sophisticated manufacturing sectors.

Programme

EUREKA

Project acronym

FENI

Project content

The goal of the project is to optimise the technology for manufacturing flat products from iron (Fe) and nickel (Ni) based alloys with defined physical characteristics for electrical engineering and electronics industry. The aim is to develop a process that will eliminate surface defects in cast ingots and minimise side edge cracking during forming of the currently produced FeNi-based materials. The implementation of such process should increase utilisation of input material and consequently the efficiency of the production will be enhanced. Further project activities will optimise the welding of strips and subsequently heat treatment which should lead to better mechanical properties of materials based on FeNi.

Project duration

1 January 2006 – 31 December 2010

Consortium

6 partners (Czech Republic, Slovakia, Slovenia)

Role of the Czech partner

Principal investigator

Project total budget

1 100 000 EUR

Public grant

4 249 000 CZK

Reason of the Czech partner to be in the consortium

Kovohutě Rokycany a.s. specialises in products made from non-ferrous metals and often supplies products made of alloys tailored to specific customers. Considering the growing number of customers from electrical engineering and electronics industry together with strengthening demands on meeting their needs, the company has decided to develop the production technology of materials based on nickel and iron alloys, in order to expand its product portfolio.

Project results

Currently, the project is in its final stage when the results of particular activities are evaluated and the final reports are prepared. Until now, new production technologies of various non-ferrous alloys based on FeNi suitable for use in materially sophisticated industrial sectors have been developed. Although not all phases have been evaluated yet, it is obvious that consortium was able to increase the utilisation of input materials and thanks to the specification of the new production process to reduce scrap and thus strengthen their competitiveness.

Benefit for the Czech partner

Newly developed production technologies of alloys based on FeNi are characterised i.a. by high magnetic softness (which are not intended for use only in the electric engineering and electronics industry, but can be used in very advanced and materially sophisticated sectors such as energy and aeronautics) significantly expanded the area of company's business opportunities and increased its competitiveness. Thanks to the proposed production process it could be already said that after its application the reduction of scrap by about 10% and the increasing of material utilisation by about 20% are expected, because the problem of side edge cracking during further processing of ingots has been solved.

Comment

"Research and development in our industry is characterised by the lack of experience with the behaviour of materials in various stages of production. Therefore we always welcome the opportunity to invite top research organisations from the Czech Republic and abroad for a cooperative research projects. Our further research and development activities will be focused on materials for aeronautics, energy and chemical industry, so we are planning to participate in international projects in this direction", says Josef Machacek, Ph.D., MBA, managing director of the company Kovohute Rokycany a.s.



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European research and development in the Pilsen region



Intercepting harmful substances of PCDD/F type contained in smoke gas from hazardous waste combustion

Czech partner

SMS CZ s.r.o.

Brief introduction of the Czech partner

SMS CZ, s.r.o. is an engineering, manufacturing and supply company working in the field of environmental and agricultural machinery and equipment. Its manufacturing programme consists of production of agricultural machinery, which includes a comprehensive selection of soil processing, sowing and handling equipment. The second part of the manufacturing programme is a production of the waste incinerators, specialising in all types of hazardous waste incineration, which has been a part of company's development for more than 30 years.

Programme

EUREKA

Project acronym

HARMFUL SUBSTANCES

Project content

The goal of the project was to develop a technology to intercept harmful substances of PCDD/F type contained in smoke gas, which are formed during hazardous waste combustion. Technology should meet the newly introduced European emission standards for waste incineration. In addition to this, new technology should have low operational and purchase costs, which will make it readily available to small and medium-sized combustion plants (up to 1.000 tons of incinerated waste per year).

Project duration

1 February 2003 – 1 January 2005

Consortium

SMS CZ s.r.o. – coordinator
Partner from Germany

Role of the Czech partner

Coordinator

Project total budget

380 000 EUR

Public grant

155 000 EUR

Reason of the Czech partner to be in the consortium

Solving the problem was relevant for SMS CZ because of the new directive on waste incineration issued by the European Commission 2000/76/EC. In the EU, the emission limit for substances of PCDD/F type is 0.1ng/Nm³, which wasn't met by existing SMS CZ products. Therefore SMS CZ needed to develop both a prescription for PCDD/F capture and the prototype of the technology. Due to the cooperation with the German company SOLVAY the Czech company decided to submit the EUREKA project.

Project results

The goal of the project has been achieved. The company SMS CZ has developed so-called "complete set" that can capture toxic, carcinogenic and teratogenic substances of PCDD/F. The outcome of the project can be characterised by its maximum versatility and application options for various types of small and medium-sized hospital and industrial-chemical

waste incinerators. In case of installation, a particular incineration plant can reduce the concentration of hazardous gas from 9ng/Nm³ to required 0.1ng/Nm³.

Benefit for the Czech partner

SMS CZ sees the benefits of the project in two dimensions. First, the company has successfully developed specific technology which has been introduced to the market as new product with exceptional properties whose quality has been pointed out by award prize "Gold Medal in EUREKA". Secondly, the company created connections with experts, which are kept till today. They form a regular roundtable discussion of sector development and future directions of development of the company's activities.



Comment

"Thanks to the subsidy from the programme EUREKA we could afford to pay the expensive services of analytical laboratories necessary for a project, but also a group of experts who proposed the solution we brought to completion by design of the final product.. Meeting the target of the project and its benefits lead us to considerations that for further development of the product we will try to apply for financial support from the EUREKA again. Especially the mere fact that the product we offer is the result of research and development supported by EUREKA makes our prestige abroad higher and opens us doors to new customers," says Ing. Petr Jirsa, Ph.D., technical manager at SMS CZ s.r.o.

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European research and development in the Pilsen region

Development of ferritic-martensite steels for the temperatures of 650 °C and microstructural research of welded joints of progressive creep resistant materials for thermal power plants

Czech partner

ŠKODA VÝZKUM s.r.o.

Brief introduction of the Czech partner

ŠKODA VÝZKUM s.r.o. is engaged in research, development and accredited testing. The most important activities of the company include:

- Research and tests focused on increasing reliability in operation and lifetime of power equipments – vibration diagnostics, noise reduction, material tests, assessing residual lifetime, etc.
- Complex solution of problems related to service load, reliability and lifetime of road and rail vehicles – computer simulations, tests at a testing laboratory, measuring in operation.
- Accredited tests and measurements for a wide range of customers.
- Calculations in the field of strength, dynamics, fatigue damage, resistance against deformation, aerodynamics, and thermomechanics.
- Research and development of hot spraying for primary production as well as renovation including their industrial applications.

Programme

COST 536 - Alloy Development for Critical Components of Environmentally Friendly Power Plant

Project acronym

ACCEPT

Project content

Development of high-performance steam power plants with low emissions in three steps on the level of nano-scale, meso-scale and macro-scale from the development of innovated materials up to the verification of action of components.

The project is mainly focused on development, verification and implementation of the improved materials of the type 9 – 12 % Cr with improved creep resistant properties crucial for production of cast as well as forged parts of steam turbines. Specific requirements are following: creep strength at the temperature of 650 °C 100 000 hours at the pressure of 100 MPa, resistance against oxidation ensuring the minimum operation for the period of 100 000 hours.

Project duration

2005 – 2009

Consortium

60 institutions from 14 European countries

Role of the Czech partner

A study of creep resistant properties and development of microstructure in weldments of forged and cast low- and high-alloyed chrome steels during creep exposure.

Public grant

The total subsidy of the Ministry of Education, Youth and Sports in the amount of 2 080 000 CZK.

Reason of the Czech partner to be in the consortium

An effort to participate in development and verification of new materials for power engineering and immediate use in production practice.

Project results

ŠKODA VÝZKUM s.r.o. participates in long-term tests of creep resistance

(at the present time the longest creep test exceeded 105 000 hours) and in the analyses of the microstructure and submicrostructure especially by the method of transmission electron microscopy of thin foils of newly developed materials. In addition to that, the study of creep resistance of heterogeneous as well as homogeneous welded joints of steel types P22, P91 and P92 used in the company ŠKODA POWER a.s. in the manufacture of new turbines and renovation of the existing turbines and their attachments, was carried out within the project.

Benefit for the Czech partner

Participation of our laboratories and joining the community of the specialists dealing with solutions of the above mentioned problems bring not only new knowledge about materials, their properties and behaviour in the long-term exploitation under stress at increased temperatures but also make possible to establish new contacts and gain new experience. The results are directly used by the company ŠKODA POWER s.r.o.

Comment

The project followed two previous projects (COST501 and COST 525). At present, project proposal for the next call is under preparation.

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European research and development in the Pilsen region

Simulation of flow with the help of network calculations

Czech partners

ŠKODA VÝZKUM s.r.o.
ŠKODA POWER a.s.

Brief introduction of the Czech partner

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- Accredited tests and measurements for a wide range of customers.
- Calculations in the field of strength, dynamics, fatigue damage, resistance against deformation, aerodynamics, and thermomechanics.
- Research and development of hot spraying for primary production as well as renovation including their industrial applications.

Programme

FP5 – IST

Project acronym

FLOWGRID

Project content

Creation and testing of the virtual computing environment for solving extensive flow tasks with the help of parallelization and sharing of computation aids. The FlowGrid system allows entering a computing task, division of the area being solved into parts, sending the individual parts of the task via the public network to the remote processors for calculation, data distribution, and synthesis of the partial results.

Project duration

2002 – 2004

Consortium

6 partners from 5 countries (coordinator: Universidad de Zaragoza, Spain)

Role of the Czech partner

Tests of functionality of the computing system environment.
The test of user properties.
Computer simulations of the flow in the transport engineering.

Project total budget

1 725 000 EUR

Public grant

1 090 000 EUR

Web pages

<http://www.unizar.es/flowgrid>

Reason of the Czech partner to be in the consortium

Participation in the project allows to extend CFD calculations. For the tests the Consortium needed testing tasks from practice as well as experience of computing experts for the functionality tests of the designed CFD system.

Project results

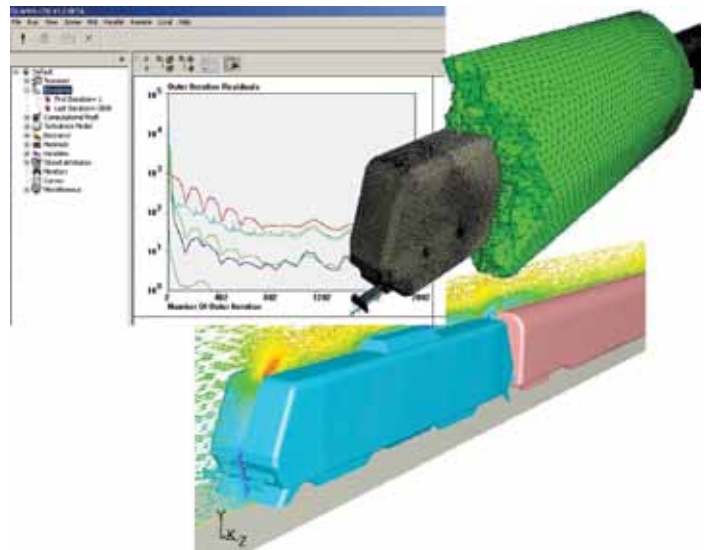
Solving problems of extensive flow calculations, faster calculations, control of network calculations and sharing computing means, resulting calculations of aerodynamics of rail vehicles.

Benefit for the Czech partner

The test of parallelization of the CFD computing tasks, verification of possibilities and control of distributed calculations, an opportunity of the system testing on various sample tasks from practice (on behalf of ŠKODA VÝZKUM: outside aerodynamics of rail vehicles). Cooperation with specialists in the systems and control computing software, as well as specialists in the research of flow and simulations.

Comment

Participation was beneficial, brought deeper familiarization with the problems of control of distributed calculations; an opportunity of solving extensive tasks. Knowledge and experience from the project have been used in other calculations. Large benefit and experience in controlling participation in the international project (administration, reporting); a style of controlling and evaluating work with the project (deadlines, milestones, ...). Small difficulties occurred due to participation of the single researcher of ŠKODA VÝZKUM (and the whole Czech party) and his limited capacity in consultations and expert discussions, substitutions in work organization and participation in project meetings, etc. During the project were solved also newly occurred situations such as internal accounting in CZK and an "annual" profit and loss statement in EUR according to proper exchange rates. In summary it can be stated that from the point of view of administration as well as an expert content the positives markedly exceed the negatives (e.g. a method of accounting, language barriers, project orientation more on software and IT activities than "flow research", etc.).



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European research and development in the Pilsen region

Verification of the system of connection of the primary panel to the inside shielding of the fusion reactor ITER

Czech partners

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FJFI ČVUT
ÚFP AVČR
Vítkovice Výzkum a vývoj s.r.o.

Brief introduction of the Czech partner

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- Accredited tests and measurements for a wide range of customers.
- Calculations in the field of strength, dynamics, fatigue damage, resistance against deformation, aerodynamics, and thermomechanics.
- Research and development of hot spraying for primary production as well as renovation including their industrial applications.

Programme

MSM – 1P + EURATOM

Project acronym

1P OK 462

Project content

Design and realization of laboratory stand tests to verify strength properties of the screwed connection of the primary panel to the shielding block. Both parts are connected by means of ten special high strength screws. Loading is performed by means of radial and poloidal moment and the poloidal force. In loading by the radial force the temperature cycling from 100 to 200°C is carried out by means of specially designed appliance combining induction heating and cooling by water spray. Panel movement is measured by special sensors. The design of the stand for combined loading is a part of the project.

Project duration

2005 – 2007

Consortium

Partners from 2 countries (coordinator EFDA Garching)

Role of the Czech partner

Calculations, manufacture of materials, realization and evaluation of the tests, validation of the computational model.

Project total budget

2 240 kCZK from MSMY and 105 kEUR from EUROATOM

Reason of the Czech partner to be in the consortium

ŠKODA VÝZKUM s.r.o. was addressed by the Czech project coordinator as one of the leading laboratories in the Czech Republic with competence to propose and realize the dynamic fatigue tests.

Project results

The performed dynamic tests and long-term temperature test of a screwed connection proved that the screw connection is compliant within the range of the specified parameters. The experimental results were used for validation of the FEM calculations. Another project output is the functional sample of the appliance for long-term temperature test of a screw joint by cycling by induction heating.

Benefit for the Czech partner

The first fusion reactor ITER has been developed within the activities of EU EUROATOM with support of the EFDA program. The workplace of the EFDA program in Garching coordinates the work of the individual European research centres in the given area and arranges the financial support of partial projects. One of the partial projects is the research of the safe connection of the panels of the first protective layer of a reactor to the massive underlay shielding blocks carried out in the Czech Republic.

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European research and development in the Pilsen region

Piezoelectric Brake Actuator

Czech partner

ŠKODA VÝZKUM s.r.o.

Brief introduction of the Czech partner

ŠKODA VÝZKUM s.r.o. is engaged in research, development and accredited testing. The most important activities of the company include:

- Research and tests focused on increasing reliability in operation and lifetime of power equipments – vibration diagnostics, noise reduction, material tests, assessing residual lifetime, etc.
- Complex solution of problems related to service load, reliability and lifetime of road and rail vehicles – computer simulations, tests at a testing laboratory, measuring in operation.
- Accredited tests and measurements for a wide range of customers.
- Calculations in the field of strength, dynamics, fatigue damage, resistance against deformation, aerodynamics, and thermomechanics.
- Research and development of hot spraying for primary production as well as renovation including their industrial applications.

Programme

FP6 – AEROSPACE

Project acronym

PIBRAC

Project content

The project was focused on the development of a new braking system that should reduce an amount of the hydraulic components in the braking system and replace the electromechanical (EMA) braking systems used at the present time as a suitable alternative to the hydraulic ones. However, their disadvantage is quite high energy consumption in relation to efficiency. The piezoelectric system being developed in this project should improve the EMA brake actuators from the point of view of efficiency as well as from the point of view of weight, technology and similar factors influencing their possible industrial production. ŠKODA VÝZKUM s.r.o. ensures the development of the surface finishing of the components with special mechanical and tribological properties.

Project duration

1 February 2005 – 31 September 2009

Consortium

11 partners (coordinator SAGEM)

Role of the Czech partner

Preparation of hot sprayed coating on the parts of the motor prototype

Project total budget

5 190 000 EUR

Public grant

3 110 000 EUR

Reason of the Czech partner to be in the consortium

Raising funds for research, gaining experience and establishing contacts.

Project results

The prototype of the actuator on the basis of the piezoelectric conception.

Benefit for the Czech partner

The financial support to solution of the problems described above, gaining experience in the project of the top EU research, establishing contacts with foreign partners, gaining new information and knowledge in the field of hot-sprayed coating, especially in the field of spraying parts of very small dimensions in the order of several mm.

Comment

Friendly cooperation, multi-field orientation, gaining experience with project control. Good communication was a basis of success. It is recommended to be a host state of a project meeting at least once during the project duration (however, it assumes to have representative premises and background); very interesting subsidies; nevertheless, it is recommended to give less for Eastern Europe than western states, otherwise the problem is to clear the money (but not to spend), an overall assessment 10 of 10.

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European research and development in the Pilsen region



NEW TECHNOLOGIES
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Advanced Protective Systems

Czech partner

University of West Bohemia
New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

The University of West Bohemia (UWB) located in Pilsen, the Czech Republic, is the only higher education institution in West Bohemia that educates students in wide spectra of bachelor, master and doctoral programmes. Besides the pedagogical activities, UWB is also a dynamical centre of research and development. In the field of R&D, UWB cooperates with other universities as well as with business companies, public bodies and other institutions. UWB participates in around 300 R&D projects per year. Within the R&D activities, UWB produces many interesting technical and economical results. The investigator of the presented project is the higher education institute New Technologies – Research Centre (NTC) that is a part of the University of West Bohemia ensuring the direct link to industrial subjects. The link is enforced by both joint research and contract research. The joint research is realized in projects supported by the EU, Ministry of Education, Youth and Sports and Ministry of Industry and Trade. NTC is equipped by modern computational, machine and laboratory facilities.

Programme

FP6 – IP

Project acronym

APROSYS

Project content

The project aims to improve passive safety for all European road users for priority accident types and levels of crash severity. The field of passive safety concerns in particular human injury biomechanics, vehicle crashworthiness and protection systems. APROSYS is mobilizing and integrating the European scientific & technological expertise for the development of new technologies for the protection of road users in all relevant accident conditions. Furthermore, APROSYS aims to increase the level of competitiveness of the European industry by developing new safety technologies.

Project duration

2004 – 2009

Consortium

TNO (NL) – coordinator
49 further partners from EU member states

Project role of the Czech partner

Within the biomechanical working group, UWB participated in the development of improved human abdomen model for correct description of injury caused by the impact.

Total project budget

30.000.000 EUR (26.523 EUR for UWB)

Public resources contribution

18.000.000 EUR (26.523 EUR for UWB)

Project web pages

<http://www.aprosys.com>

Reason of Czech partner participation in the project

Extension of the cooperation in the investigated field with international partners, establishment of new contacts and gaining of new knowledge in the investigated field. UWB succeeded due to its previous activities that proved its competence in the proposed field.

Project results

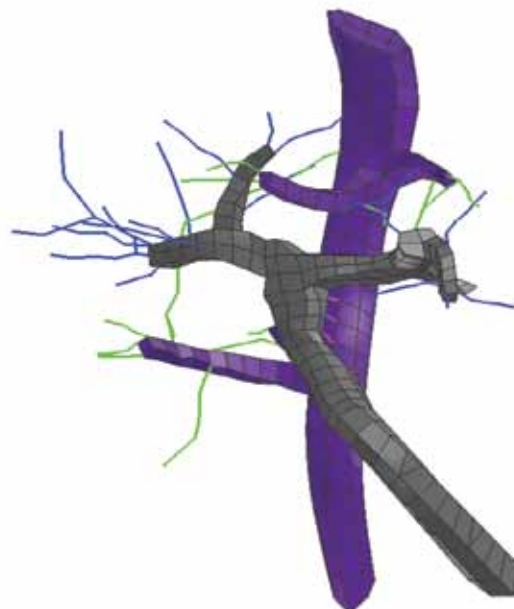
UWB created model of the liver system including the veins, accommodated it to the whole biomechanical human body model and validated the model. The whole improved biomechanical human body model was the result of the biomechanical working group. For further extensive results in the traffic safety refer to the web pages.

Benefits for the Czech partner

Besides strengthening the international prestige, UWB gained extensive knowledge in the field of numerical and experimental impact biomechanics.

Commentary

Based on proposed activities to improve the project results, UWB was accepted as a project partner after negotiation in the second year of the project.



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European research and development in the Pilsen region

Advanced Passive Safety Network

Czech partner

University of West Bohemia
New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

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Programme

FP6 – NoE

Project acronym

APSN

Project content

The project focused on the identification of needs and development of strategies and synergies in transport in order to decrease serious and fatal injuries in traffic accidents on European roads.

Project duration

2004 – 2008

Consortium

TNO (NL) – coordinator
52 further partners from European countries

Project role of the Czech partner

UWB as a partner was responsible for identification of passive safety issues of motorcycles and for identification of motorcyclists' needs and technological requirements concerning passive safety in chosen European countries (Czech Republic, Germany and Greece).

Total project budget

3.800.000 EUR (25.815 EUR for UWB)

Public resources contribution

3.800.000 EUR (25.815 EUR for UWB)

Project web pages

<http://www.passivesafety.com>

Reason of Czech partner participation in the project

UWB applied for the project participation to strengthen its cooperation with international research team, establishing new contacts and gaining new knowledge.

Project results

The result was foundation of the virtual institute of excellence acting in the field of passive safety in order to decrease the number of serious and fatal injuries in traffic accidents on European roads.

Benefits for the Czech partner

Besides reinforcement or international prestige, UWB gained extensive knowledge in the field of passive safety. The project was the first FP project for NTC and thanks to the proven knowledge and ability it allowed to enter international cooperation in further projects.

Commentary

UWB was accepted to the consortium as a new member state. UWB activities proved competitiveness in the investigated field.

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European research and development in the Pilsen region

Bridging services, information and data for Europe

Czech partner

University of West Bohemia
Faculty of Applied Sciences
Department of Mathematics
Section of Geomatics

Brief introduction of the Czech partner

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Programme

FP7 – ICT

Project acronym

BRISEIDE

Project content

BRISEIDE will be applied, tested and validated within a Civil Protection application context, using the INSPIRE relevant themes, via a chain of stakeholders, data providers, technology partners, and downstream users. The Pilot operational phase will last 12 months and will consider and assess real life events, with extensions in additional domains.

Project duration

2010 – 2012

Consortium

Fondazione GraphiTech (Italy) – coordinator
15 partners from 8 European countries

Role of the Czech partner

UWB as a partner is responsible mainly for leading of WP1 - to identify BRISEIDE's user and system requirements based on the input from partners and to define, according to these, the architecture of the final pilot. This WP will involve all partners including, most importantly, the final users who will be actively involved at this stage.

Project total budget

3 810 891 EUR

Public grant

1 905 444 EUR

Project web pages

<http://www.briseide.eu>

Reason of the Czech partner to be in the consortium

The Section of Geomatics at the University of West Bohemia focuses, beside other specialisations, on spatial planning. Building of the European network of stakeholders, involvement in drafting European legislation for sharing and exchange of spatial information and getting experience from the field of spatial planning are the main reasons for participation in this project.

Project results

Project results: BRISEIDE aims at delivering:

- time-aware extension of data models developed in the context of previous/ongoing EU INSPIRE related projects (e.g. in the context of GMES, eContentPlus),
- application (e.g. Civil Protection) based on the integration of existing, user operational information and
- value added services for spatio-temporal data management, authoring, processing, analysis and interactive visualisation.

Benefit for the Czech partner

UWB has the chance to be involved in other related projects and gain expertise in the field of spatial planning. UWB will profit from the cooperation with the European partners including universities, private companies, European organisations and public authorities.

Comment

The project consortium makes a multidisciplinary and multicultural environment. There is great diversity in the project partners, yet finding consensus and achieving the project goals requires mutual understanding and learning. Therefore a crucial task is establishing common language, terminologies and working approaches..

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European research and development in the Pilsen region

Motorcycle and Motorcyclist Safety

Czech partner

University of West Bohemia
Faculty of Applied Sciences
Department of Mechanics

Brief introduction of the Czech partner

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Programme

FP6 – Marie Curie – RTN

Project acronym

MYMOSA

Project content

The prime objectives of the project are to educate Early Stage Researchers in the field of Powered Two Wheelers' and riders' safety, to develop R&D competencies and to form the European network of personal relationships among early stage researchers, to stimulate co-operation between researchers of universities, research centres and industries

Project duration

2006 – 2010

Consortium

Imperial College London (ICL, GB) – coordinator
13 further partners from the Czech Republic, France, Germany, Netherlands, Italy, Spain and Great Britain

Project role of the Czech partner

Education of an early stage researcher in the field of impact biomechanics in the field of improved motorcycle safety

Total project budget

2.668.502 EUR (161.158 EUR for UWB)

Public resources contribution

2.668.502 EUR (161.158 EUR for UWB)

Project web pages

<http://www.mymosa.eu>

Reason of Czech partner participation in the project

The motivation for participation of the Department of Mechanics (KME) of the Faculty of Applied Sciences (FAV) at UWB was to extend the educational activities to foreign students.

Project results

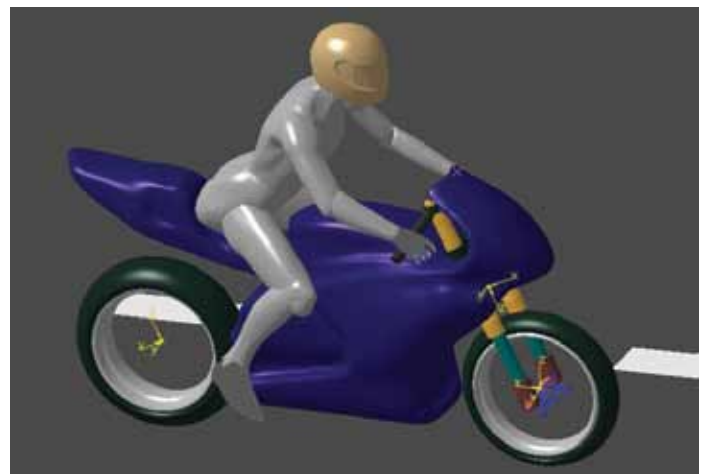
The result at the UWB is the educated researcher from Portugal who is currently finishing his Ph.D. thesis in the field of impact biomechanics. Other partners educate further young researchers or provide tutorials or internships within the network.

Benefits for the Czech partner

The project was the first experience with such kind of projects. UWB proved the ability to educate an expert from abroad and prepare and guide courses for group of international students.

Commentary

The project reinforced the communication and negotiation abilities of the UWB employees participating in the project because it was necessary to face the different European cultures and various approaches to education from the side of students.



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European research and development in the Pilsen region

European Network of Best Practices for Interoperability of Spatial Planning Information

Czech partner

University of West Bohemia
Faculty of Applied Sciences
Department of Mathematics
Section of Geomatics

Brief introduction of the Czech partner

The University of West Bohemia (UWB) located in Pilsen, the Czech Republic, is the only higher education institution in West Bohemia, that educates students in wide spectra of bachelor, master and doctoral programmes. Besides the pedagogical activities, UWB is also a dynamical centre of research and development. In the field of R&D, UWB cooperates with other universities as well as with business companies, public bodies and other institutions. UWB investigates around 300 R&D projects per year. Within the R&D activities, UWB produces many interesting technical and economical results. The Plan4all project is executed by the Section of Geomatics at the Faculty of Applied Sciences. International organization for normalization (ISO) defines geomatics as "scientific and technical interdisciplinary branch focused on collecting, distributing, storing, analyzing, processing and presenting of geographical data or geographical information".

Programme

eContentplus

Project acronym

Plan4all

Project content

The harmonisation of spatial planning data according to the INSPIRE Directive based on the existing best practices in EU regions and municipalities and the results of current research projects.

Project duration

05/2009 – 10/2011

Consortium

UWB – coordinator
24 partners from 15 European countries

Role of the Czech partner

UWB is responsible for the overall coordination of the project and for several tasks. These include design of spatial planning metadata profile and data models for spatial planning data, organisation of workshops and preparation of dissemination materials. Furthermore the university is involved in analysis of the INSPIRE Directive requirements, design of networking architecture, dissemination and building of European network of stakeholders in the field of best practices.

Project total budget

4 125 000 EUR

Public grant

80%

Project web pages

<http://www.plan4all.eu>

Reason of the Czech partner participation in the consortium

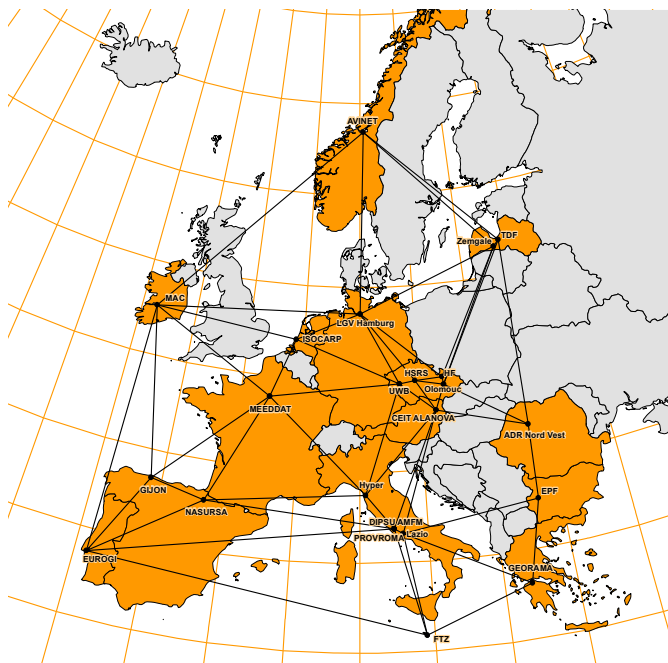
The Section of Geomatics at the University of West Bohemia focuses, beside other specialisations, on spatial planning. Building of the European network of stakeholders, involvement in drafting European legislation for sharing and exchange of spatial information and gaining experience from the field of spatial planning are the main reasons for participation in this project.

Project results

The main results of the Plan4all project will be European network of best practices, spatial planning metadata profile, data models for spatial planning, networking architecture for sharing and exchange of data and metadata and European geoportal.

Benefit for the Czech partner

UWB has the chance to be involved in other related projects and gain expertise in the field of spatial planning. UWB will profit from the cooperation with the European partners including universities, private companies, European organisations and public authorities.



Comment

The project consortium makes a multidisciplinary and multicultural environment. There is great diversity in the project partners, yet finding consensus and achieving the project goals requires mutual understanding and learning. Therefore a crucial task is establishing common language, terminologies and working approaches.

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European research and development in the Pilsen region



NEW TECHNOLOGIES
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Safety In Motion

Czech partner

University of West Bohemia
New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

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Programme

FP6 – STREP

Project acronym

SIM

Project content

The project focus on the development of a safe motorcycle with respect to both passive safety and passenger's comfort.

Project duration

1 September 2006 – 31 August 2009

Consortium

Piaggio (Italy) – coordinator
13 partners from the Czech Republic, Italy, Germany, Slovenia, Spain a Sweden

Role of the Czech partner

Numerical simulation of fluid flow around motorcycle

Project total budget

4 036 404 EUR (31 148 EUR for UWB)

Public grant

2 198 439 EUR (31 148 EUR for UWB)

Project web pages

<http://www.sim-eu.com>

Reason of the Czech partner to be in the consortium

UWB performed numerical simulations of fluid flow around motorcycle regarding the ride stability, and numerical simulations of internal helmet ventilation to optimize the rider's comfort.

Project results

The result is a prototype of the Piaggio MP3 motorcycle with new passive safety devices implemented.

Benefit for the Czech partner

UWB strengthened its international prestige.

Comment

Based on previous experience of NTC, UWB was directly contacted by the Piaggio coordinator to participate in the project.

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European research and development in the Pilsen region

Super Light Car

Czech partner

University of West Bohemia
New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

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Programme

FP6 – IP

Project acronym

SLC

Project content

SuperLIGHT-CAR project is based on a multi-material approach. It strives to use for each part the best material and manufacturing processes in terms of weight and cost minimization, while fulfilling a wide range of automotive requirements in areas such as stiffness, crash performance, fatigue and corrosion resistance.

Project duration

2005-2009

Consortium

Volkswagen AG (Germany) – coordinator
38 partners from 9 countries

Role of the Czech partner

UWB as a partner is responsible for investigation of grain structure on microcrystalline level using X-ray diffraction, metallography and electron microscopy; the research team has key capabilities for assessment of material microstructures as well as bonding areas (weld areas, adhesive bonding layers).

Project total budget

17 102 277 EUR (108 600 EUR for UWB)

Project web pages

<http://www.superlightcar.com>

Reason of the Czech partner to be in the consortium

UWB intended to extend the cooperation in the investigated field towards the international partners, to establish new contacts and to gain new knowledge in the investigated field. UWB team succeeded thanks to its previous activities that proved its competencies in the proposed field.

Project results

Project aims to develop technologies and design concepts that would allow up to the 30% weight reduction in the C-class car models of the future generations, while respecting very demanding cost restrictions of such popular models. The precompetitive achievements of SuperLIGHT-CAR, when applied in series production beyond 2010 would allow to save millions of tons of fuel (and therefore significantly decrease carbon dioxide emissions) due to significantly reduced vehicle weight.

Benefit for the Czech partner

Besides strengthening the international prestige, UWB gains extensive knowledge in the field of material science, automotive industry and technologies.

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European research and development in the Pilsen region

Development of a Finite Element Model of the Human Thorax and Upper Extremities

Czech partner

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New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

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Programme

FP7 – Cooperation

Project acronym

THOMO

Project content

The project focuses on the development of the virtual human thorax model including upper limbs for description of injuries caused by load (traffic accidents, sport). The model will be validated in order to describe the real human body behaviour under dynamic loads of various type and intensity.

Project duration

1 January 2009 – 30 June 2012

Consortium

Centre Européen d'Etudes de Sécurité et d'Analyse des Risques (France)
– coordinator
Université de Valenciennes et du Hainaut Cambrésis (France) – partner
University of West Bohemia – partner
Politechnika Warszawska (Poland) – partner

Role of the Czech partner

UWB as a partner is responsible for verification of the model developed on the base of finite elements, its modification and validation based on experiments provided by the partners' institutions. The goal is to tune the model behaviour so that it realistically describes the real human body behaviour exposed to the dynamical loading.

Project total budget

2 614 175 EUR (236 936 EUR for UWB)

Public grant

2 065 270 EUR (180 702 EUR for UWB)

Project web pages

<http://www.thomo.eu>

Reason of the Czech partner to be in the consortium

UWB intended to spread the cooperation in the investigated field towards the international partners, to establish new contacts and to gain new knowledge in the investigated field. UWB succeeded thanks to its previous activities that proved the UWB competence in the proposed field.

Project results

The result will be a validated human thorax and upper limbs model.

Benefit for the czech partner

Besides strengthening the international prestige, UWB gains extensive knowledge in the field of numerical and experimental impact biomechanics.

Comment

The consortium was founded to further build on previous activities of the coordinator and the partners in the investigated field. The advantage of the consortium is its size: thanks to only four partners, quick information and data flow is possible. Furthermore, the partners know each other from previous projects.

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European research and development in the Pilsen region

Toolkits for hazard identification, risk assessment and prevention of work-related musculoskeletal disorders based on a collaborative platform

Czech partner

University of West Bohemia
New Technologies – Research Centre in the West Bohemia Region

Brief introduction of the Czech partner

The University of West Bohemia (UWB) located in Pilsen, the Czech Republic, is the only higher education institution in West Bohemia, that educates students in wide spectra of bachelor, master and doctoral programmes. Besides the pedagogical activities, UWB is also a dynamical centre of research and development. In the field of R&D, UWB cooperates with other universities as well as with business companies, public bodies and other institutions. UWB investigates around 300 R&D projects per year. Within the R&D activities, UWB produces many interesting technical and economical results. The investigator, New Technologies – Research Centre (NTC), is the part of the University of West Bohemia ensuring the direct contact with industrial subjects through its research focus. This contact is accomplished in research cooperation with commercial subjects (supported by EU, Czech Ministry of Education and Ministry of Industry and Commerce) as well as in solutions of particular demands in the form of commissions. For these purposes, the Centre possesses with modern computational, laboratory and instrumentation background.

Programme

INTERREG IVC

Project acronym

TIAM

Project content

The TIAM project aims to develop a toolkit for prevention of work-related musculoskeletal disorders (WMSDs). The toolkit will contain guidelines, information on processes, checklists and templates for the purpose of hazard identification and risk assessment of WMSDs and injuries.

Project duration

2010 – 2011

Consortium

Technical University of Catalonia (Spain) – coordinator
Further 4 partners from Czech Republic, Italy, Austria and Estonia

Role of the Czech partner

Analysis of collected data and methods applied in Czech NUTS II region South-West.

Project total budget

314 500 EUR (65 000 EUR for UWB)

Public grant

261 875 EUR (55 250 EUR for UWB)

Project web pages

<http://www.innovation4welfare.eu/308/subprojects/tiam.html>

Reason of the Czech partner to be in the consortium

UWB has rich experience in ergonomic design and its application in practice.

Project results

The main goal of the project is to develop toolkits based on a collaborative platform for hazard identification and risk assessment for WMSDs and injury prevention, and to disseminate improved toolkits via a specified website in order to promote best practices in WMSDs and injuries prevention.

Benefit for the Czech partner

The main benefit for UWB was establishment of contacts with industrial partners abroad.

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European research and development in the Pilsen region

The Osteoporotic Virtual Physiological Human - Enlarged European Union

Czech partner

University of West Bohemia
Faculty of Applied Sciences
Department of Computer Science and Engineering
Centre of Computer Graphics and Visualization

Brief introduction of the Czech partner

The University of West Bohemia (UWB) located in Pilsen, the Czech Republic, is the only higher education institution in West Bohemia, that educates students in wide spectra of bachelor, master and doctoral programmes. Besides the pedagogical activities, UWB is also a dynamical centre of research and development. In the field of R&D, UWB cooperates with other universities as well as with business companies, public bodies and other institutions. UWB investigates around 300 R&D projects per year. Within the R&D activities, UWB produces many interesting technical and economical results. The team dedicated for solving VPHOP-EEU project is the Centre of Computer Graphics and Visualization (CGV) established at the Department of Computer Science and Engineering. CGV research focuses primarily on algorithms and mathematical foundations of computer graphics, data and information visualization, human computer interaction and applications of computational geometry.

Programme

FP7 – Cooperation

Project acronym

VPHOP-EEU

Project content

The project focuses on the development of the patient specific musculo-skeletal model, where muscles, represented by surface model, are deformed in response to the skeleton movement and afterwards they are decomposed into muscle fibres. The results are then used in the VPHOP project to predict the overloading of bones of osteoporotic patients and to evaluate fracture risks during common activities.

Project duration

2010 – 2012

Consortium

Istituto Ortopedico Rizzoli (Italy) – coordinator
SCS srl (Italy) – partner
University of Bedfordshire (United Kingdom) – partner
University of West Bohemia (Czech Republic) – partner

Role of the Czech partner

UWB is responsible for the development of software (and its integration into an existing system) that allows: a) muscle deformation (muscles represented by surface model) respecting volume preservation and impenetrability of muscles and bones and b) decomposition of deformed muscles into a chaff of parallel lines of actions based on muscle fibres orientation.

Project total budget

254 880 EUR (95 200 EUR pro ZČU)

Public grant

195 500 EUR (72 240 EUR pro ZČU)

Project web pages

<http://www.vphop.eu>

Reason of the Czech partner to be in the consortium

UWB was asked to participate in the project because of its previous experience in musculoskeletal modelling and because of the fact that the leading researcher had already cooperated with the other partners of VPHOP-EEU.

Project results

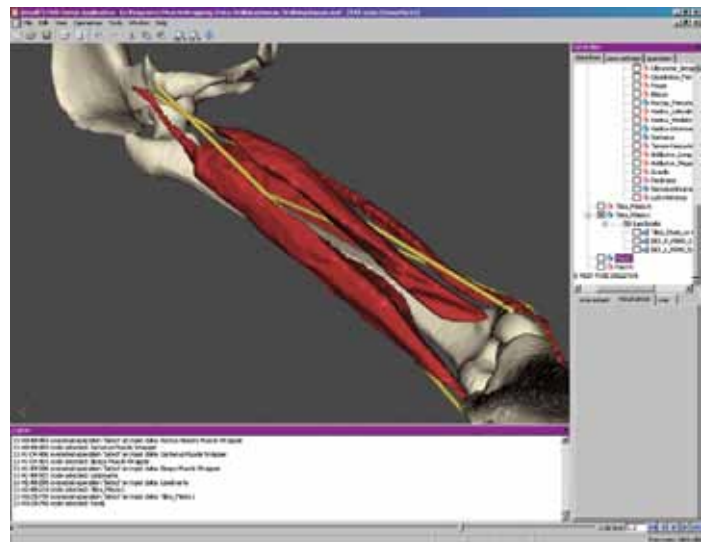
The result will be a virtual, patient specific musculoskeletal model.

Benefit for the Czech partner

Besides strengthening the research team at UWB and establishing new contacts, the team gains valuable knowledge in the field of interactive computational geometry.

Comment

The participation of the UWB in the VPHOP-EEU project was started by accession to the already running VPHOP project (19 partners) on the basis of call: "ICT-2009.9.5: Supplements to Strengthen Cooperation in ICT R&D in an Enlarged European Union". Both projects are mutually linked.



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