Project No: **043820**

Project acronym: **RRCSD INNCODE**

Project title: **Reinforcement of Research Capacity in Software Development and Innovative Collaborative Design and Engineering in Serbia and Montenegro**

Instrument: **Specific Support Action**

Thematic priority: **Specific measure in support of international cooperation – Western Balkan Countries**

D2-1. Final activity report

Period covered: **from January 1. 2007 to December 31. 2009.**
Date of preparation: **February 15. 2010.**

Start date of project: **January 1. 2007**
Duration: **36 months**

Project coordinator name: **Prof dr Radovan Slavkovic**
Project coordinator organization name: **Mechanical Engineering Faculty Kragujevac**

Revision: [**FINAL**]

Table of Contents

PUBLISHABLE EXECUTIVE SUMMARY

Contract number
043820

Project acronym
RRCSD INNCODE

Project name
Reinforcement of Research Capacity in Software Development and Innovative Collaborative Design and Engineering in Serbia and Montenegro

Project duration
January 2007-Jun 2009

Instrument
Specific Support Action

Thematic priority
Specific measure in support of international cooperation – WBC

Project logo

Strategic objective
Strategic objective of RRCSD INNCODE project is reinforcement of S&T potential at Mechanical Engineering Faculty Kragujevac (MFK) in area of software and services, innovative collaborative engineering environ-ment development, and to establish a competitive research infrastructure for efficient application at national, regional and EU level towards integrative and enhanced ERA. That would make necessary preconditions for MFK to become a leading Centre of Excellence in area of information technologies and of product and process virtual development within the region of Western Balkan.

Specific objectives
1. To realize modernization of research infrastructure and working environment, through upgrade and renewal of S&T equipment and organizational harmo-nization of three research workgroups – RWGs: Software development, Infor-mation technology and Virtual engineering;

2. To realize researchers training programme at laboratories and institutes of EU networking partners and to increase their mobility in scope of European Research Area (ERA);
3. To strengthen the networking and research integration of MFK with existing EU and regional partners and also with new ones;
4. To disseminate research results and achievements and to create efficient mechanisms for its exploitation at national, regional and European level, through organization of three thematic workshops, specialized e-courses, participation at international conferences, connection with EU networks of knowledge and technology, etc;
5. To increase attractiveness of R&D occupations and local job opportunities for young researchers, resulting in diminishing of brain drain phenomena, by providing modern working environment and their training and mobility within EU centres.

Participant(s)

Mechanical Engineering Faculty Kragujevac
EU Networking partners
- The Institute of Scientific Computing at the Technical University Braunschweig, Germany
- Department for Innovation Technology and Management – DIMEG, University of Padova, Italy
- The Institute of Structural Analysis and Seismic Research (ISASR) at the National Technical University of Athens (NTUA), Greece
- Faculty of Natural Sciences and Engineering, Department of Materials and Metallurgy, University of Ljubljana, Slovenia,

Total cost of the project

300 200 €

Commission funding

300 000 €

Key issues

The RRCSD INNCODE project will improve communication between EC and MFK. It will also enhance cooperation of MFK with industry sector in a WBC region and with governmental decision-making bodies. This is clearly going to contribute to achievement of objectives. Reinforcement of MFK to its full potential will require the close collaboration of numerous regional and state organisations, local governments and R&D centres. MFK with EU partners will be able to cover all important topics of the project and help stabilisation and reinforcement of the research potential of Serbia & Montenegro.

Technical approach

The general structure of the work plan timely distributed within the whole duration of the project provides the means for a logical sequence of activities that can result in the achievement of the project objectives. The work plan is organized in 7 Work Packages:
WP1 - Coordination and project management
WP2 – Reinforcement of S&T equipment
WP3 – Development of modern organizational /management system for harmonization of RWGs
WP4 – Training and retraining of researchers
WP5 – Strengthening the networking and research integration

WP6 – Increasing local job and career opportunities for young researchers
WP7 – Dissemination and exploitation of the research and project results.

As a result it is expected that MFK will be a recognized member of the European Network Institutions working in the field of Information Society Technology and Sustainable Development. At the end of the project MFK will be a Center of Excellence with well established connections to the high-edge Research centres in the EU with a significant impact at economic and social environment in Serbia and Montenegro and surrounding region, as an efficient support to growing demands. An enhanced participation of MFK and industrial partners, including SMEs in other EC FP areas, is expected, with a long-term sustainability effect on the development of MFK.

Expected achievements/impact

According with consultation with EU partners and after identified needs of MFK for advanced and modern S&T equipment and software that should enable state-of-the-art and unique research facilities in fields of RP/RT/RE, VM and VR technologies and IT for water management, detailed techno-economic analysis of equipment and software has been done, in order to make proper selections. The management Board has accepted list of selected equipment, which is presented in this deliverable, with techno-economic characteristics. Deliverable provides information about equipment and software for **Virtual Manufacturing, Virtual Reality, Rapid Prototyping, Reverse Engineering and Water quality monitoring,** as anticipated within project.

Application field	Item
Virtual Manufacturing	Simufact.forming (industrial paid-up license)
	Simufact project single (additional module, industrial paid-up license)
Virtual Reality	Wintracker, magnetic 6DOF tracking system
	Trackd (educational paid-up license)
	Additional devices and drivers for VR visualization
Rapid Prototyping	MCP Vacuum casting machine 5/01 with PLC control, accessories and material starter kit
Reverse Engineering	Platinium Arm 2,4m (8 inch), 6 axis
	CAM2 Measure X1, without SCT DEV
	Magnetic base that allows the FARO Laser Tracker
	TRITOP CMM adapter kit
	3D - image processing system: DELL Precision M4300: IntelCore2Duo 2.4 GHz CPU, 160GB SATA HD, 4G RAM, nVidia Quadro, 15.4", MS WINDOWS XP Profesional, LINUX 10
	Additional Stands: ALFAE+ and arms
	Airbrush system to apply a fine spray
	„TOUCH PROBE" + GD&T upgrade for ATOS II system
	White dot Reference Markers, uncoded, 2 sets
Water quality monitoring	Universa mobile system for hydro-meteorolgical, hydro-geological, and water quality measurement

Altogether the expected achievements and impact of RRCSD INNCODE activities will be:

- A large mobilization of facilities and human resources and reinforcement of equipment making MFK an attractive partner for European Centres and participation in EC FP.
- Introduction of new modern IT technology that will increase the research potential at the regional level.
- Extended networking will: i) increase the research capacity of the country, ii) improve the dissemination of the results and iii) strengthen connections between scientists for applications to EC FP calls.
- Job opportunities and specialization in European laboratories will encourage the young scientists to consider the possibility to have a scientific carrier in Serbia and Montenegro, leading to a decrease in the "brain drain".
- Increased attraction for science of young people and raising public awareness on the societal role of science in the improvement of the life quality. Expanded visibility, collaboration with SMEs, and regional R&D centres should contribute to better use of the research results for the benefit of the social and economical environment.
- The increased participation to EU programmes.
- Establishing new contacts and collabo-rations that will continue after the end of RRCSD INNCODE with major multi-side beneficial effects beyond the frame of the current project.

Coordinator contact details

Radovan Slavkovic
Mechanical Engineering Faculty
Sestre Janjic 6
34000 Kragujevac
Serbia
e-mail: radovan@kg.ac.yu
tel. +381 34 300 785
fax. +381 34 300 786

Website

http://www.rrcsd.kg.ac.yu

SECTION 1 – PROJECT OBJECTIVES AND MAJOR ACHIEVEMENTS DURING THE REPORTING PERIOD

1.1 Overview of general project objectives and state of the art

Strategic objective of RRCSD INNCODE project is to reinforce S&T potential at Mechanical Engineering Faculty Kragujevac (MFK) in thematic WBC top-priority areas of:

Collaborative working environment,

Software and services (IST) and

Water management (SUSDEV),

and also, to create a competitive research infrastructure for efficient knowledge and technology transfer at national, regional and EU level towards integrative and enhanced ERA. This provides necessary preconditions for MFK to become a leading Centre of Excellence in the Western Balkan region.

During project implementation MFK reinforced its position within S&T area in the WBC region, as cooperative partner for local and WBC companies, especially for SMEs working in area of product and process development and optimization through application of modern ICT and virtual engineering techniques (CAD/CAM/CAE, RP/RT/RE, VR/AR). By application of new equipment and software, as well as with reinforced human potential MFK offers broad spectrum of developmental and applied research, for analysis of processes, constructions and systems for a large list of users in area of mechanical engineering, civil engineering, biomechanics, simulation of productive technologies and rapid production of product and tool prototypes, parts of medical apparatus or other equipment, geographical information system models in hydroinformatics, etc.

With reinforced research and human potential, MFK is able to develop innovative collaborative engineering environment that will itself enable necessary preconditions for Virtual Team Effectiveness, distance learning establishment and effectiveness in knowledge and technology transfer, thereby significantly contributing to creativity, innovation and productivity boosting.

1.2 Objectives and work performed during the reporting period

In order to achieve this strategic objective, **five operative (measurable) objectives, according to Anex I,** are established, as follows:

1. To realize modernization of research infrastructure and working environment, through upgrade and renewal of S&T equipment and organizational harmonization of three research workgroups – RWGs: Software Development, Information technology and Virtual engineering;
2. To realize researchers training programme at laboratories and institutes of EU networking partners and to increase their mobility in scope of European Research Area (ERA);
3. To strengthen the networking and research integration of MFK with existing EU and regional partners and also with new ones;
4. To disseminate research results and achievements and to create efficient mechanisms for its exploitation at national, regional and European level, through

organization of three thematic workshops, specialized e-courses, participation at international conferences, connection with EU networks of knowledge and technology, etc;

5. To increase attractively of R&D occupations and local job opportunities for young researchers, resulting in diminishing of brain drain phenomena, by providing modern working environment and their training and mobility within EU centres.

Project activities are grouped in seven work pakegeies and here we are giving short description of work performed during the first reporting period. The project outputs for reporting period are described in details in deliverables **D.3 to D.10** .

Reinforcement of research equipment and mobilization of human resources had positive impact that MFK becomes attractive partner in the region and for EU R&D centres, through extended networking.

According to the work plan main group of activities and work performed, in this period connected to work-packages are:

- Effective project management (institutional, financial, day-to-day),
- Organization of regular management meetings;
- Training for using of new equipment and software;
- Implementation and maintenance of new organizational system of RWGs
- Intensive mobility to EU research centres, for advanced trainings of researchers and preparation of proposals for FP7 and other EU RTD calls
- Increased job opportunities and chances for specializations in EU laboratories and centres for young researchers at MFK
- Dissemination of RRCSD INNCODE project results and RWGs current activities
- Joining to knowledge and technology networks in EU
- Established consortium and organized kick-off meeting,
- Organized Management Board Committee meetings;
- Purchased and installed equipment and software;
- Developed new modern management system;
- Initiated training and retraining of researches;
- Improved cooperation with WBC research centres;
- Work on dissemination of the project results.

SECTION 2 – WORKPACKAGE PROGRESS OF THE PERIOD

2.1 Overview

WP1- Coordination and project management

Objectives

- To co-ordinate the project; meet all contractual obligations to the EC.
- To provide advice and assistance to partners involved
- To facilitate the timely realization of all deliverables
- To edit, set and prepare all reports for publication and distribute the final reports

RWG Information technologies representatives participated in kick-off meeting. Also, representatives of RWG Information technologies attended advisory board meetings.
RWG Information technologies participated in creation of periodic report for 1st year.
RWG Virtual Engineering representatives participated in kick-off meeting, all regular meetings, financial management and many activities regarding to day-to-day management. Also, representatives of RWG Virtual Engineering attended advisory board meetings. RWG Virtual Engineering participated in production of nine deliverables during reporting period, and in creation of Periodic activity and management reports.
RWG Software development representatives participated in kick-off meeting and in common meetings with other RWGs representatives and management of the project. Also, representatives of RWG Software development attended advisory board meetings. RWG Software development participated in production of deliverables and in creation of periodic management reports for 1st year and preparation of deliverables.
Management Board was established on kick-off meeting has been responsible for the project realization. An independent **Advisory Board** was also established in cooperation with partner institution from Germany, Italy, Greace and Slovenia and have been advised the Management Board. For communication with members of **Advisory Board** telephone, mail and teleconferencing have been used. The **Day-to-Day Project Management** have been responsible for project continuity and is central contact point for all project partners. The **Coordinators of Research Workgroups** (RWGs) have been responsible for proper execution of all activities belonging to a respective Research Workgroup as well as appropriate Workpackages.
Management Board had two meetings (February and October), whereat EU networking partners from Italy, Germany, Slovenia and Greece participated by means of teleconferencing equipment. Members of Advisory Board provided advice for MFK project members, especially in the area of research development and their involvement in FP7 projects. Coordinators of RWGs were responsible for realization of planned activities within WPs. They provided monthly reports to Project Coordinators and Project Executive Manager, as activity progress, problems in implementation, and flow of financial and other resources. Executive Project Manager and Assistant Project Manager carried out day-to-day management and provided all needed information about project to Project Coordinator. All RWGs also participated in preparation of Periodic Report. Project Coordinator organized and chaired regular meeting with Management project team and Coordinators of RWGs, coordinated communication with EU networking partners and EC.

WP1 Expected results

Kick-off meeting report (month 2)
EC fund available (month 3)

Established efficient management structure
Realized regular meetings
Planned deliverables are available

WP2 – Reinforcement of S&T equipment
Objectives

- to identify needs at MFK for renewal and upgrade of S&T equipment and software,
- to collect techno-economic data on planned equipment and software
- to realize equipment purchase, according to the tender procedure
- to install the equipment and software
- to train researchers-members of RWGs for using the equipment and software

According with consultation with EU partners from Slovenia and Italy, and after identified needs of RWG Virtual Engineering for advanced and modern VR equipment and software that should enable state-of-the-art and unique research facilities in the are of virtual manufacturing technologies and virtual reality systems, detailed techno-economic analysis of equipment and software has been done, in order to make proper selections. All procurement activities, performed within RWG Virtual Engineering, are described in detail within D5. It should emphasize that basis rules are applied, defined by the European Commission, Serbian Law and General Acts of Mechanical Engineering Faculty Kragujevac. As it is planned in Annex I of RRCSD INNCODE project, specialized software for Virtual Manufacturing and equipment for Virtual Reality are procured, during M8-M11 of 1st year. Before delivery and payment software, VAT exemption is performed in National Tax Department in Belgrade D5. Training for the use of equipment and software started on M11 and M12.

RWG Virtual Engineering

Reinforcement of equipment for RWG Information technologies started with collecting of information on techno/economic characteristics of equipment and software. This was done through consultations with EU partners and correspondence with equipment manufacturers. Vacuum casting equipment as a turnkey solution proved to have best price/performance ratio. For water quality monitoring equipment with hydrometeorological and hydrogeological measurements various sensors and appropriate datalogger were selected.

According to selection, request for offers were made and were sent to suppliers. The purchase was made through selection from three valid offers. A selection committee reviewed the offers, and selected the best offer. The procedure of VAT exemption was performed and the equipment was ordered.

Due to problems with administration there was considerable delay in payment procedures. The equipment has been delivered to MFK in February 2008. Installation followed immediately, while the training for use of equipment and software had to be postponed for 2nd year.

Reinforcement of equipment for RWG Software development started with collecting of information on techno-economic characteristics of equipment and software for reverse engineering . This was done through consultations with EU partners and correspondence with equipment manufacturers.
All procurement activities, performed within RWG Software development, are described in D5. According to selection, request for offers were made and were sent to suppliers. The purchase was made through selection from three valid offers. A selection committee

reviewed the offers, and selected the best offer. The procedure of VAT exemption was performed and the equipment was ordered.
Due to problems with administration there was considerable delay in payment procedures. The equipment has been delivered to MFK in February 2008. Installation followed immediately, while the training for use of equipment and software had to be postponed for 2nd year.

Additional stand ATOS IIe (tripod system ALFAE + 3D image processing system)

Touch Probe + GD&T

TRITOP CMM adapter kit

Airbrush system

Faro Arm Platinum 2.4m (8 inch)

Magnetic base

Since new S&T equipment and software were purchased in 2007, after installation of equipment and software, training of RWGs researchers are realized in cooperation with EU partners and equipment suppliers.

Software Simufact.forming and Simufact.project installed in computer room of CEVIP centre, where the other equipment of RWG VE are installed. Six researchers took part in installation of software and equipment and basic training, by using User manuals and Instructions, as well as through training performed by suppliers. Additional trainings were undertaken in EU centres and laboratories in Slovenia, Germany and Netherlands, as described in series of deliverables D9 and D10.

Equipment for vacuum casting is installed in the Centre for IT, where the other equipment of RWG IT is placed, tested and installed. Five researchers participated in installation process of equipment and corresponding software applications and training for it (use available documentation and instructions and training performed by suppliers). Additional trainings were undertaken in EU centres and labs in Germany and Czech Republic.

Installation of equipment for reverse engineering is performed in Laboratory for SD, where the other equipment of RWG SD is placed, after installation equipment was tested. Four researchers were present during installation process of equipment and corresponding software applications and were trained for its use (use available documentation and instructions and training performed by suppliers). Additional training where undertaken in EU centers and laboratories in Germany and Czech Republic.

WP2 Expected results

Selection of S&T equipment and software is completed (month 8)
Equipment is installed
RWGs researchers are trained for using purchased equipment and software

WP3 – Development of modern organizational/management system for harmonization of RWGs

Objectives

- to modernize organizational/management system at MFK in order for harmonization of RWGs functioning
- to successfully implement the new organizational system of RWGs
- to establish regulative and favourable environment for employment of young researchers and scientists

Analysis of functioning of similar research groups at EU centres of excellence was carried out through consultations with EU networking partners' representatives, and experiences were used in development of new organizational and management systems. New organizational system has been introduced, and monitoring of its effectiveness is constantly performed by RWG Information technologies and RWG Software Development. Detail scientist-research plans of RWG Virtual Engineering are prepared, with clear defined activities which date from well sophistical strategic development plan. In preparation of strategic plan except Management Board, Coordinators of RWGs, the members of Advisory Board also were taking a part.
Development of new organizational and management systems is based on analysis of functioning of similar research groups at EU partners' centres was carried out through

consultations with their representatives, and experiences were used. New organizational system has been introduced, and monitoring of its effectiveness is constantly performed. According to Statute of Faculty of Mechanical engineering centres of RWGs are parts of Institute of Faculty of Mechanical engineering.
Research activities at MFK in area of information technologies, software and services development, and innovative technologies are realized within three research workgroups – RWGs (Information technologies, Software development and Virtual engineering). Their functioning is not completely adjusted and harmonized, thus resulting in applied research and services that is realized for end user sometimes not being satisfactorily efficient and timely. This WP objective is to analyze organizational model of similar RWGs system at EU Research Centres and to develop and implement new organizational / management system at MFK, based on examples of the best EU practice. This is one precondition for efficient and qualitative integration of MFK into European Research Area. This will certainly also create favourable and clearly defined regulative and rules for employment of young researchers and for their qualitative professional development.
During the second project year analysis of functioning of similar research groups at EU centres of excellence was continued with aim to network with similar centres in EU.
Previously crated rules for employment of young researchers are upgraded to comply with new institutional statute and regulations regarding PhD students
During the third project year, analysis of similar research groups functioning at EU centres of excellence was continued with aim to improve already established organizational system. Implementation and monitoring of existing management systems was successfully managed and also it was discussed with many respectable partners in EU (e.g. Luis Portoles Grinan, head of Product engineering team at AIMME, Spain) about their experience in management system and new ideas. Several internal meetings were organized at MFK and with additional consultations about better cooperation between RWGs, development of modern organizational/management system for harmonization of RWGs was finished.

WP3 Expected result
Adopted new organizational/management system at MFK (month 6),
Adopted regulation on employment of young researchers within RWGs (month 12)
Existing 3 RWGs at MFK have harmonized functioning in scope of scientific- research activities and efficient transfer of results and knowledge to end users.
Created favourable conditions for employment of young researchers at MFK.

WP4 – Training and retraining of researchers
Objectives

- to evaluate current condition of human potentials at MFK, especially within RWGs, by competent representatives of EU partners
- to create a strategy for development of human resources at MFK, according to 6^{th}/7^{th} FP thematic priorities
- to make a detailed plan for researchers trainings at EU partners laboratories and centres, with consultations from representatives of Advisory Board
- to implement program of trainings in accordance with EU rules
- to adjust and expand scientific and research programs at MFK, within the scope of EC FP thematic priorities
- to exchange knowledge and experience

Research program of RWG Information technologies was adjusted with regard to thematic priorities of EC FP7. The adjusted research program was reviewed by EU partners as adequate for integration

International evaluation of current conditions at RWG Virtual Engineering was performed by EU networking partners, from Slovenia and Italy. Their representatives, Prof. Tomaz Rodic and Dean of NTF Prof. Radomir Turk stayed at MFK from 27th June till 30th June. They have been acquainted with R&D activities and available human potential at RWG Virtual Engineering and other RWGs at MFK. Based on their recommendations, Plan on scientific-research work (see D6) and Training plan for young researchers are produced (see D8). Apart from presentation of RWGs, their R&D results, RRCSD INNCODE project, press conference and TV appearances were carried out. According to Action plan of project, trainings for 2 researchers of RWG VE are performed in NTF laboratories, in period 25th to 30th September (D9.1).

Training plan for researchers was created, but the implementation was postponed, because of the delay in equipment purchase and installation. It was agreed at RWG Information technologies and RWG Software Development level that it would be more efficient to implement training of researchers after training for equipment and software use, therefore postponing it for 2nd year of project.

According to Action plan of project, and previously defined Plan for training, six researchers of RWG VE had 12 flows so far, from Serbia to EU, as follows (described in details in deliverables D9-2 to D9-6, and D10-2 to D10-6):

- specialized training for Simufact.forming and Simufact.project software in Germany (Simufact engineering GmbH, Hamburg), in period from 6th to 9th May 2008 (2 researchers).
- Travel to Slovenia, visits to NTF laboratories, C3M group and training for their software and VR equipment, training for QC10 ballbar Renishaw equipment in RLS Merilna tehnika, visit to UNIOR company, in period from 25th to 30th August 2009 (4 researchers)
- Practical training for Simufact software and exchange of experience with other Simufact users, within Round Table 2008 event, Bamberg, Germany, from 20th to 22nd October 2008 (2 researchers)
- training for preparation of FP7 proposals in Netherlands, visit to Research centre of Corus group, presentation of Autofoorm software and its application in deepdrawing process simulations (3 researchers).

Four researchers of RWG IT had 4 flows so far, from Serbia to EU, as follows (described in D10-9):

- specialized training for vacuum casting technology in Luebeck, Germany (MCP Group GmbH, Luebeck), in period from 2th to 9th July 2008 (3 researchers).
- visist to University of Praha laboratories, RCMT Institute, visit to SIEMENS company, participation in Siemens software workshop/training, participation in International conference 25th Danubia-Adria Symposium on Advances in Experimental Mechanics, period from 23th to 28th September 2008

According defined plan for training, three researchers of RWG SD had 4 flows so far, from Serbia to EU, as follows (described in details in deliverables D9-2 to D9-6, and D10-7 to D10-8):

- specialized training for reverse engeneering technology in Zagreb, Hrvatska (Topomatik, Zagreb), in period from 22th to 25th October 2008 (1 researcher).
- visits to University of Praha laboratories, RCMT Institute, visit to SIEMENS company, participation in Siemens software workshop/training, participation in International conference 25th Danubia-Adria Symposium on Advances in Experimental Mechanics, period from 23th to 28th September 2008 (2 researchers).

WP4 Expected result

International evaluation of RWGs is finished (month 8)
Plan for training of researchers is finished (month 8)
Researchers at RWGs are trained at EU partners laboratories and centers in fields of Virtual Engineering, Information technologies and Software Development.
Exchange of knowledge and experience realized.

WP5 – Strengthening the networking and research integration

Objectives

- to strengthen and expand networking with EU partners and with other European R&D institutions, through mobility of senior project stuff
- to strengthen RWGs for further FP7 projects applications, through scientists-advisors
- to increase cooperation with regional R&D institutions and SMEs
- joining knowledge and technologies networks in EU

Coordinator of RWG VE, Prof. Vesna Mandic stayed at NTF (University of Ljubljana, Slovenia) in M9 (from 25th till 30th September) with aim to strengthen partnership with NTF and other EU networking partners. During visit, preparation of 2 FP7 new projects were started and agreed, with EU partners from Italy, Slovenia, Denmark, Poland, United Kingdom and Netherlands. Improved cooperation of RWG Virtual Engineering with EU networking and other partners during 2007 resulted in seven proposals for FP7 projects:

1. *NMP-2007-2.5-2, M5 DSS for optimization of micro-structural changes in hot precision forming*
2. *FP7-REGPOT-2007-3, Concurrent engineering network for RTD integration of WBC with Europe*
3. *BKBE-2007-2-4-04: Innovative and safe packaging, Improvement of Biosafety and Shelf-Life of Organic Coatings of Cans by Multi-scale Modelling of Polymer-Metal Laminates*
4. *FP7-SME-2007-1, Development of materials and technologies for production of nano-structured human implants based on pure titanium*
5. *FP7-NMP-2008-2.5-2, Multi-scale modelling of metallic-organic interfaces for environ-mentally friendly packaging applications*

Vital questions of further cooperation through joint research, personnel exchange and applications for future 7th Framework Programme projects within common research fields were discussed during visit. At the regional level, existing cooperation was intensified with University centres (Novi Sad, Nis, Belgrade, Podgorica and Banja Luka), institutes and domestic large companies and SMEs. Several meetings with managers, entrepreneurs, researchers, engineers are performed in order to recognize their needs and ways for future cooperation and efficient transfer of knowledge and technologies.

During this reporting period, Coordinator of RWG VE, Prof. Vesna Mandic had intensive cooperation with partners in Slovenia and Italy (NTF, DIMEG), as well as new partners from Denmark, United Kingdom, Germany, and other Western Balkan Countries. As result

of this expanded cooperation, several FP7 proposals, one TEMPUS project, and one Erasmus Mundus – Basileus project are submitted during 2008:

6. *FP7-NMP-2008-2.5-2, Multi-scale modelling of metallic-organic interfaces for environ-mentally friendly packaging applications*
7. *FP7-REGPOT-2008-1, Upgrading the regional impact of CEVIP by networking and twinning with EU centres in the area of converging sciences and technologies*
8. *FP7-SME-2009-1, **Su**pport to the **D**evelopment of **SME** Networks and Programmes into Production Technology Sector by **V**irtual **E**ngineering **S**ervices for Bosnia and Herzegovina*
9. *144684-TEMPUS-2008-RS-JPHES, WBC Virtual Manufacturing Network – Fostering an Integration of the Knowledge Triangle, ACCEPTED FOR FINANCING by EC, 2009-2012.*
10. *Erasmus Mundus programme, BASILEUS_122 application, ACCEPTED FOR FINANCING by Basileus programme team, 2009.*

At the regional level, existing cooperation was intensified with University centres in Serbia, Macedonia, Montenegro, Croatia, Bosnia and Herzegovina, institutes and domestic large companies and SMEs. Several presentations of RWG VE and its equipment, resrach activities and services, performed in this centres, institutes and companies, for more than 300 participants. Memorandum of understanding between Mechanical Engineering Faculty Skopje, CIRKO centre, Macedonia, and Mechanical Engineering faculty Kragujevac, CEVIP centre, Serbia was prepared for signing.

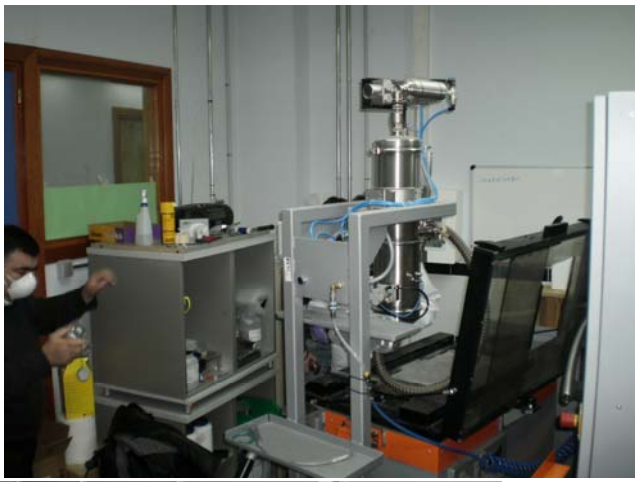
During this period, Coordinator of RWG IT, Prof. Nenad Grujovic had cooperation with colleagues in Greece and Germany (NTUA, TUBS), as well as new partners from Italy, Czech Republic, United Kingdom, and also partners from regional WBC countries, Bosnia and Herzegovina and Montenegro. As result of this expanded cooperation one REGPOT proposal has been submitted in 2008: *FP7-REGPOT-2008 -1 Reinforcement of Research Potential in Sustainable Water Resources Management.*

At the domestic level new links and existing cooperation was intensified with University centres in Serbia, institutes and domestic companies and SMEs. Several presentations of RWG IT and its capabilities, equipment, research activities and services are performed for about 100 participants.

During this period, Coordinators of RWG SD, Prof. Miroslav Živković and Prof. Radovan Slavković have intensely cooperated with colleagues in Greece, Germany, Italy and United Kingdom (NTUA, AMSUB, TUBS, CU), as well as new partners from Czech Republic, and also partners from regional Western Balkan Countries, Bosnia and Herzegovina and Montenegro. As result of this expanded cooperation one proposal has been submitted in MANUNET ERA-Net Project HI – CUT New materials and technology for an efficient stone cutting

During this period, Coordinator of RWG IT, Prof. Nenad Grujovic, Coordinators of RWG SD, Prof. Miroslav Živković, Prof. Radovan Slavković and young resaercher Vladimir Dunić had cooperation with colleagues in Valencia, Spain (Metal-Processing Technology Institute, AIMME). They attended meetings with Luis Portoles Grinan, head of Product engineering team, and Manuel Sanchez de la Asuncion, head of R&D. As result of this cooperation, improvements in one REGPOT proposal has been implemented and submitted in 2009: *FP7-REGPOT-2010 -5 Reinforcing Research Potential in Advanced*

Engineering Technologies and Materials. At the domestic level new links and existing cooperation was intensified with University centres in Serbia, institutes and domestic companies and SMEs. Several presentations of RWG IT and RWG SD and its capabilities, equipment, research activities and services are performed.



RWG Information Technologies as coordinator with support of EU networking and other partners have produced 2 FP7 proposals in 2009.

FP7-REGPOT-2010-5, Date of publication: *30 July 2009*, Proposal Acronym: RapidMAT, Proposal reference number: **FP7- 256838**

FP7-REGPOT-2010-1, Date of publication: *30 July* 2009, Proposal Acronym: RapidMAT, Proposal reference number: **FP7-264068**

Although applications were highly ranked with marks 12 of maximum 15 (threshold 10), unfortunately projects were not selected for financing.

WP5 Expected result

Improved cooperation with R&D institutions and SMEs at regional and EU level

WP6 – Increasing local job and career opportunity for young researchers

Objectives

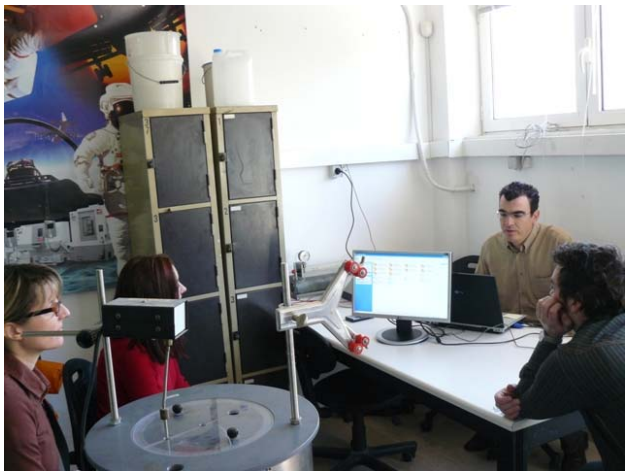
- to motivate young people to join the scientific-research work, PhD studies and to increase awareness on necessity of life long learning
- to select the most ambitious and talented young researchers for inclusion into RWGs
- to create attractive conditions for their employment
- to train young researchers from MFK at EU laboratories for development, application and transfer of new innovative technologies in engineering

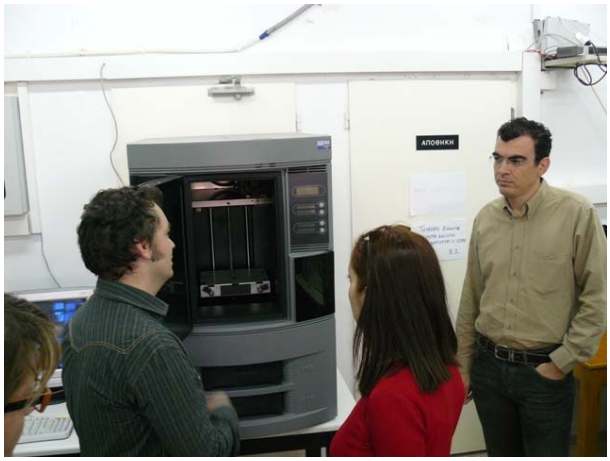
Motivational seminar “BE INVOLVED AND DESIGN YOUR CAREER” was organized in June 2008, in order to identify the most ambitious and talented young engineers and graduates. Seminar increased awareness of young people on importance of science for general prosperity and necessity of a life long learning. Seminar had more then 50 participants. Beside lecturers from engineering fields, coordinators of RWGs, representative of Ministry of Science, i.e. National contact point for FP7 programme (PEOPLE), Mrs. Nada Milosevic and Director of Centre for Career Development of University of Kragujevac, Mr. Marko Bankovic were engaged.

The selection and employment of 4 young researchers at RWGs was done after that. Their scientific and professional development is defined in career development plan, described in D12-1 to D12-4, in details. Also, trainings are planned for new employed researchers, in EU centres, not only within this FP6 project, but in scope of other current projects of RWGs, and available programs for research mobility.

Four researchers visited Design & Manufacturing Laboratory (DML) at Technological Educational Institute of Crete and Technical University of Crete (TUC), Greece to attend the seminar of new technologies in 3D printing with Dimension SST 768 and 3D scanning with Terrestrial laser scanner (Optech ILRIS-3D). Seminar was held between December, 12th 2009. – Monday, 15th 2009. DML has recognized education and research in area 3D printing and 3D scanning and also of RP techniques in general. They have successful cooperation with all major stakeholders throughout Europe and Asia in area of rapid prototyping. Dr. Eng. Maravelakis Emmanuel, Lecturer - DML Director, presented 3D

printing and 3D scanning technologies and techniques and also the ways he organize demonstration of 3D printing and 3D scanning methods. He presented all major relevant aspects in successful realisation of parts by 3D printing and 3D scanning methodology. Researchers actively took part in practical manipulation with Dimension SST 768 and Optech ILRIS-3D, materials and techniques used in these methods. Yiannis Tsompanakis, Assistant Professor, Department of Sciences (TUC) talked about Artificial Intelligence Methods in Engineering all in the context of simulation and creation of natural and physical models. Researchers have made significant agreements for the regional networking and preparation of common EU research projects.





WP6 Milestones and expected results
Selected and employed 4 young researchers (month 18)
Generated career development plans (month 19)
Young researchers trained for application of new innovative technologies in different engineering fields.

WP7 – Dissemination and exploitation of the research and project results
Objectives

- to promote results of FP6 INCO project
- to promote scientific-research activities of MFK at regional, national and European level
- to realize trainings for regional R&D centers and SMEs for application of Virtual Engineering technologies in area of product, process and tool development, of ICT technologies in water management and for applicative software development.
- to increase public awareness on science impact for a prosperity of society in general

to increase women awareness on their socio-professional role and on significance of their engagement in science-related fields and also about opportunities offered by EC Framework programme

Together with other RWGs, RWG Information Technologies performed software and hardware preparations for project web site setup. Upon agreeing the structure and functionality of web site, an adequate platform has been selected.
RWG Virtual Engineering prepared electronic material for WEB site development and its upgrade and maintenance. The whole set of activities in a scope of this WP during the 1st year were realized, regarding promotion of research results of RWG Virtual Engineering, RRCSD INNCODE project and of new equipment and software, mainly at the project web site and then throughout public appearances, press conferences etc. New VR equipment, VM software, means of their applications, technical characteristics and functions were presented to regional researchers and SMEs representatives, in order to create new possibilities for further joint research work.
Together with other RWGs, RWG Software development performed software and hardware preparations for project web site setup. Upon agreeing the structure and functionality of web site, an adequate platform has been selected.
Project Web site has been setup and maintained together with other RWGs. All realized activities during the 1st year of the project, new equipment and software for reverse engineering are presented on the web site and public promoted.
Presentation of RWG VE realized in following institutions (R&D centres, Institutes, SMEs and large companies):

1. Zastava Kovacnica, Kragujevac, Serbia, January 2008,
2. Institute for automobile, Kragujevac, Serbia, March 2008,
3. Prva Petoletka, Krusevac, Serbia, May 2008
4. Meeting with 20 companies, about Cluster organization, RWG VE leader, May 2008,
5. Petar Drapsin, Mladenovac, Serbia, Jun 2008
6. Prva Petoletka, Krusevac, Serbia, July 2008

7. Metalka Majur, Jagodina, Serbia, August 2008
8. Technical faculty, Doboj, Bosnia and Herzegovina, August 2008
9. Technical Engineering faculty, Rijeka, Croatia, August 2008
10. Faculty of Natural Sciences and Engineering, Ljubljana, Slovenia, August 2008
11. Faculty of Technical Sciences Novi sad, Serbia, Instutute for Production Engineering, September 2008
12. Sloboda, Cacak, Serbia, October 2008
13. Mechanical Engineering faculty, Skopje, Macedonia, October 2008
14. Nissal, Nis, Serbia
15. Krusik, Valjevo, Serbia, December 2008
16. Metalac, Gornji Milanovac, Serbia, December 2008

RWG Information Technologies presented research results, project and new equipment and software, through web site, public appearances, press conferences etc. Presentation of RWG IT realized in following institutions (R&D centres, Institutes, SMEs and large companies):

1. Institut for the development of water resources “Jaroslav Černi” A.D. Beograd
2. Faculty of Civil Engineering, University of Belgrade
3. Faculty of Information Technology (FIT) Belgrade
4. Faculty of Mechanical Engineering, ICIT, Univeristy of Nis
5. Zastava Mašine Kragujevac, Kragujevac, Serbia
6. Institute for automobiles, Kragujevac, Serbia
7. METAL sistemi d.o.o., Kragujevac, Serbia
8. IC Inženjering d.o.o., Kragujevac, Serbia
9. Milanović Inženjering d.o.o., Kragujevac, Serbia
10. Boox computers, Kragujevac, Serbia

RWG Software Development have presented research results, project, new equipment and software, through web site, public appearances, press conferences etc. Presentation of RWG SD realized in following institutions (R&D centres, Institutes, SMEs and large companies):

1. Milanović Inženjering d.o.o., Kragujevac, Serbia
2. Mannesmann, Düsseldorf, Germany
3. MV Engineering GmbH, Krefeld, Germany
4. Siemens group, Krefeld. Germany
5. Asema, Kragujevac, Serbia
6. Jofa, Torino, Italy
7. Fiat Automobili Srbija, Kragujevac, Serbia
8. Metalac AD, Gornji Milanovac, Serbia

9. METAL sistemi d.o.o., Kragujevac, Serbia
10. FAD, Gornji Milanovac, Serbia
11. Faculty of Dental Medicine, Belgrade, Serbia
12. Faculty of Medicine, Kragujevac, Serbia
13. Faculty of Medicine, Niš, Serbia

	Task	SME	Picture
1	**Geometry check up of controller**	**Siemens**	
2	**Geometry check up of B beam, Yugo Florida**	**Zastava**	
3	**Check up measuring of line for puncturing sheet metal frame for current transformer**	**Assema**	
4	**Measuring of tool**	**Manesman**	

5	**Measuring of medical equipment stand**	**Metal Sistemi DOO**	
6	**Digitalization of prosthesis and lower alveolar reef (RAG)**	**Faculty of medicine in Belgrade**	
7	**digitalizacija obloge zadnjeg sedista, zastava 10**	**Zastava**	
8	**Digitalization of sheet metal of back seat, zastava 10**	**Zastava**	
9	**Check up measurement of rear part of car floor, Zastava 10**	**Zastava**	

10	**Check up measurement of right side, and front and rear wing panel, Zastava 10**	**Zastava**	

During the third project year several, several visits to International courses and conferences were organized. Course on “Structural Design by Experiments” was organized in March 2009 and one researcher attended and passed all scheduled activities. The course was held at University Center of Bertinoro (Italy) from 1st March to 4th April in collaboration with the DIEM department of the University of Bologna.
In cooperation with National Institute for water resources “Jaroslav Cerni” we have participated in organization of the course “Hydroinformation systems for rivers Vrbas and Trebisnjica” for experts in field of hydroelectric power production and integrated water management coming from region.
The first visit in this project period to international conference was in March 2009 to YUINFO 2009. Conference was held at Kopaonik (Serbia) from 8th to 11th March. That was 15th anniversary conference in the field of IC technologies. Five researchers presented their papers in the field of IT and Software development and made important network with other relevant researchers from EU and international network of ICT experts.

On June 4th, five researchers visited 2nd International Congress of Serbian Society of Mechanics and presented their papers. The purpose of the Congress was to bring together the scientific communities of Theoretical and Applied Mechanics in an effort to facilitate the exchange of ideas in topics of mutual interests and to serve as a platform for establishing links between research groups with complementary activities. The Congress was held at Palić, near Subotica (Serbia).

Between May 17th and 19th, workshop: „State of Art in Fatigue Research in Mechanical Engineering and Application" was held. Two researchers attended this international workshop and presented their work trough paper presentation "Numerical Analysis of the Fatigue: the Case of Welding Joints". On the workshop were presented the activities of laboratory in the field of fatigue analysis of wagon welded joints. The complete procedure of low and high-cycle fatigue analysis of wagon with reference to common European standards is shown. The entire process of analysis is shown on a concrete example.

The last visit to the international conferences in this project year was made on October 16th. At Faculty of Mechanical engineering, University of Belgrade, XIX Triennial International Conference on Material Handling, Constructions and Logistics - MHCL'09 was held. One researcher attended this conference and successfully presented his work. The aim of these conferences is to be a forum to exchange views, opinions and experience on MHCL from technical viewpoints in order to track the current achievements, but also to look at to future developments. Also, one of the main goals of the Conferences is to make the scientific/research exchange between similar academic Departments and Institutes from different countries, as well as individual researcher in the field, in order for possible cooperation in applying for international programs or bilateral research and scientific projects.

In March 2009 workshop was organized for RWG IT. Production of medical implants and use of biomechanical models for educational and training purposes produced with RP technology was presented and demonstrated. This workshop was implemented through collaboration with medical experts for orthopaedic fixation techniques. Attendees could clearly understand RP requirements, economical aspects as well as obvious benefits gained with newest technology implementation. Comparison to traditional methodology was strong base and guide for further improvements

RWG SD organized workshop that was held on 5th May 2009 at the premises of Faculty of Mechanical Engineering in Kragujevac. Title of the workshop was „3D imaging and its application in Quality Control and Reverse Engineering". RWG SD presented 3D imaging devices which were acquired in scope of this project, and showed variety of its application. Participants have recognized the potential of networking and expressed their readiness for

joint action in the application of 3D imaging Technologies in the areas of Quality Control and Revere Engineering.
Workshop “Virtual Engineering” was held on 24th December 2009. Workshop was aimed at the presentation of achieved project results, facilities at RWG VE, new equipment and software, as well as potential and means of the application of virtual engineering technologies and their integration aspect in innovative product and process development. Participants of the workshop, over 30 of them from enterprises, faculties and research centres, have expressed great interest for the current project activities, the proposed model of cooperation, and joint research projects.

Workshop of RWG VE was held on 24th December 2009 at the Faculty of Mechanical Engineering in Kragujevac. The workshop was entitled „Virtual Engineering Applications in Serbia“.

Workshop was attended by participants from:

1. R&D Institutions

- Faculty of Technical Sciences, Novi Sad
- Faculty of Mechanical Engineering, Kragujevac
- Institute of Zastava factory – Development Department

2. Clusters:

- Embedded.rs
- Serbian Software

3. Enterprises:

- Advanced Control Systems, Belgrade
- EUROICC, Belgrade
- Spinnaker New Technologies d.o.o., Belgrade-Kragujevac
- EDOPS d.o.o., Kragujevac
- Milanovic Inzenjering d.o.o., Kragujevac
- Zastava procesna oprema d.o.o., Kragujevac
- Zastava oruzje, Kragujevac
- Metalka – Majur, Jagodina
- Sloboda a.d., Cacak
- Metal-Produkt d.o.o., Smederevska Palanka

Participants have recognised the potencial of networking and expressed their readiness for joint action in the development and application of Virtual Engineering Technologies in the areas of product and process development.

RWG SD organized workshop that was held on 5th May 2009 at the premises of Faculty of Mechanical Engineering in Kragujevac. Title of the workshop was „3D imaging and its application in Quality Control and Reverse Engineering“.

Workshop was attended by representatives from:

- Faculty of Mechanical Engineering, Belgrade
- Faculty of Technical Sciences, Novi Sad
- Faculty of Mechanical Engineering, Kragujevac
- School of Medicine, Belgrade
- Faculty of Medicine, Nis
- Institute of Zastava factory – Development Department
- Milanovic Inzenjering d.o.o., Kragujevac
- Fiat Automobili Srbija, Kragujevac
- Zastava oruzje, Kragujevac
- Sloboda a.d., Cacak
- Metal-Produkt d.o.o., Smederevska Palanka

RWG SD presented 3D imaging devices which were acquired in scope of this project, and showed variety of its application. Participants have recognized the potential of networking and expressed their readiness for joint action in the application of 3D imaging Technologies in the areas of Quality Control and Revere Engineering.

RWG SD prepared printed and electronic promotional material which was used to disseminate gained knowledge and experience in area of Quality Control and Reverse Engineering. Presentation of research results was made through web sites, public appearances, press conferences, etc.

Group of students coordinated by RWG IT staff participated on Imagine Cup 2009, national contest organized worldwide by Microsoft. This 4 member group, consisting of 3 males and 1 female, has won and became national no. 1. This is the second time, after same success in 2008, but different team of students. We can conclude that students lead by RWG IT are of the best class educated and motivated in Serbia, in competition with students of electrical departments, specialized informatics schools and in general lager educational centres. This success was even bigger when this team won 2nd world prise in Egypt in international 2009 finale of Imagine Cup, the biggest student's world competition in software design.

Microsoft Imagine Cup Finale 2009, Egypt

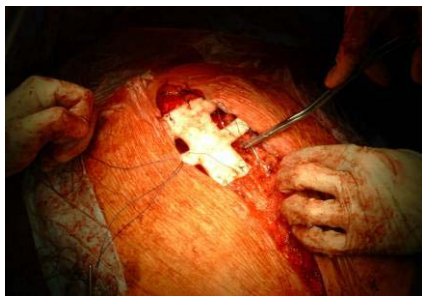
2008 Microsoft Imagine Cup

Cooperation with industry was intensified. Presentations were made and parts produced for company Metal Sistemi, Kragujevac, and research work was carried out for MV Engineering, Krefeld, Germany and Institute for The Development of Water Resources "Jaroslav Cerni", Belgrade (involvement in development of national GIS for water resources). Educational cooperation was continued with institutions from region, i.e. students from Faculty of Technical Sciences of Novi Sad and Faculty of Mechanical Engineering of Banja Luka, Republic of Srpska had lectures with hand on RP and RT equipment and processes. Additionally, members of RWG IT were active in 3 research projects, supported by Serbian authorities, concerning RP (biomedical applications and research), water management and development of information systems for DSS in pharmacology.

In March 2009 workshop was organized for RWG IT. Production of medical implants and use of biomechanical models for educational and training purposes produced with RP technology was presented and demonstrated. This workshop was implemented through collaboration with medical experts for orthopaedic fixation techniques. Attendees could clearly understand RP requirements, economical aspects as well as obvious benefits gained with newest technology implementation. Comparison to traditional methodology was strong base and guide for further improvements.

In the synergy with this strategic orientation in bioengineering of the RWG IT one very important result was realized in April 2009. In the collaboration with Faculty of Medicine at University of Kragujevac and with Clinical Centre Kragujevac, RP technology was used to produce sternum implant that was implemented in patient whose sternum affected bycancer was removed during the operation. Since this was the first surgery of this kind in the world, a lot of publicity was given to this case and this success was very welcomed by scientific and medicine authorities in Serbia. The track of this successful intervention is expected to be extended to various directions: orthopaedic, facial surgery and even animal surgery.





WP7 Milestones and expected result
Scientific papers.
On-line availability of project results.
Final plan for using and disseminating knowledge is finished

2.2 List of Deliverables

Table 1: Deliverables List
List all deliverables, giving date of submission and any proposed revision to plans.

Del.r	Deliverable name	WP no.	Date	Actual/For t delivery	Estima indicat perso months	Used indica person-mor	Lea d cont ra-ctor
D1	Interim report	WP1	13		4		1
D3	Project presentation	WP1	2		2		1
D4	Review of selected equipme and software, with techno-economic characteristics	WP2	8		4		1
D5	Tender documentation	WP2	10		4		1
D6	Regulation o organization a scientific-research work of RWGs	WP3	12		3		1
D7	Regulation on employment young researchers	WP3	12		3		1
D8	Plon for training of research at RWGs(Virtual Engineerin Information Technology, Software Development)	WP4	8		3		1
D9	Personal reports if research on trainings done in EU laboratories and centers	WP4	13		3		1
D10	Travel reports	WP5	8		3		1

Del.r	Deliverable name	WP no.	Date	Actual/For t delivery	Estimate indicativ person-months*	Used indic person-months*)	Lea d cont ra-ctor
D1	Periodic report 2	WP1	25	25	4		1

D9	Personal reports of research on trainings done in EU laboratories and centers	WP4	25	25	3		1
D10	Travel reports	WP5	25	25	3		1
D12	Career development plan	WP6	19	19			1

*)if available

2.3 List of Milestones

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M1	Kick-off meeting report	W1	2		1
M2	EC fund available	W1	3		1
M3	Selection of S&T equipement and software is completed	W2	8		1
M4	Adopted new organizational/management system at MFKG	W3	6		1
M5	Adopted regulation on employment of young researchers within RWGs	W3	12		1
M6	International evaluation of RWGs is finished	W4	8		1
M7	Plan for training of researchers is finished	W4	8		1
M8	Improved cooperation with R&D institutions and SMEs at regional and EU level	W5			1

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M8	4 young researchers selected and employed	WP6	18	18	1
M9	Generated career development plans	WP6	19	19	1

SECTION 3 – CONSORTIUM MANAGEMENT

The Management Board is established in January 2007 as decision making body within the project. It is chaired by Project Coordinator, assisted by Executive Project Manager and Assistant Project Manager and subordinated by Coordinators of three RWGs. It also comprises Key persons of four EU partners.

- The Advisory Board is established in March 2007 and it consists of 4 persons EU experts (from each EU partner institution), leaders in their area of expertise. The

members of the Advisory Board were nominated by the Management Board during the project kick-off meeting in January 2007. They provided advices to MFK via teleconferencing, e-mail messages, telephone, etc., supported in promoting the project results, helped in creation of new FP7 applications.

Coordination activities in concerned period in 2007 were:

- All official communication to the European Commission (EC), especially in the beginning when new procedures at local institution were introduced.
- Attending ordinary project meetings at regular 6-month intervals and also more often in first period due to start up activities.
- Overseeing the overall project achievements in relation to the planning and corrective measures.
- Overall quality control of the deliverables in relation to the detailed implementation plan and corrective measures within each RWG and on the institution level as a whole.
- Consultation with the Advisory Board sometimes on the daily basis.
- Collecting the decision-making procedures.
- Preparation of the annual report by collecting and editing the information required
- Preparation and the edition of the Financial Statements.
- Summarising the financial spreadsheets automatically generated by the management tools for approval or modifications.
- Preparatory tasks for calls for offers and purchase.

Coordinators of RWGs were responsible for integrating the results of each activity carried out within the respective Research Workgroup into deliverables. To ensure the suitable content and format for deliverables vertical integration and horizontal integration was enrolled. The interaction of the three research groups was intensively coordinated by RWGs leaders with support of Project coordinator.

ANNEX – PLAN FOR USING AND DISSEMINATING THE KNOWLEDGE

Section 1 Exploitable knowledge and its use

No results of RWG Virtual Engineering suitable for commercial exploitation have arisen from this project, as this is Specific Support Action.

Section 2 Dissemination of knowledge

Planned/ actual dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible/involved
M3-M30	Project web-site	General public	N.D.	2000 per month	MFK
M6, year1	Press release (TV)	General public	Serbia	5000	MFK, RWG VE
M11, Year1	Exhibition on Fair-Business Base 2007	Research, Industry, SMEs	Serbia,	2000	MFK, RWG VE
M11, Year1	Exhibition, Presentation of RWG VE and RLS company from Slovenia	Research, Industry, SMEs	Serbia,	30	MFK, RWG VE
M12, Year1	Exhibition, Presentation of RWG VE and DM Documenten Management, Serbian-Germany company	Research, Industry, SMEs	Serbia,	30	MFK, RWG VE
M4, M6, M9, M11, Year2, M2, M4, M6, Year3	Presentation of RWG VE for regional R&D and Industry (large companies and SMEs)	Research, Industry, SMEs	Serbia, Bosnia and Herzegovina, Montenegro	200	MFK, RWG VE
M9, Year2	Conference	Research, Industry, SMEs	Germany	300	MFK, RWG VE
During whole project implementation	Direct e-mailing	Research, Industry, SMEs	WBC countries, EU MS	400	MFK, RWG VE
M3, Year3	Thematic Workshop	Research	WBC	50	MFK,

		, Industry, SMEs	countries		RWG VE
M5, Year3	Motivation seminar	Research , Industry, SMEs	Serbia	30	MFK, RWG VE

M1-M6, Year1	Research cooperation	Research	Serbia	50	MFK, RWG IT
M6, Year1	Presentation of RWG IT for regional Industry (large companies and SMEs)	Industry, SME	Serbia	50	MFK, RWG IT
M9, Year1	Conference	Research , Industry, SMEs	Serbia, WBC, EU	400	MFK, RWG IT
M10, Year1	Conference	Research , Industry, SMEs	Spain, EU	500	MFK, RWG IT
M11, Year1	Conference	Research , Industry, SMEs	Serbia	300	MFK, RWG IT
M5, M6, M10 Year2, M3, M5, M6, Year3	Presentation of RWG IT for regional R&D and Industry (large companies and SMEs)	Research , Industry, SMEs	Serbia, Bosnia and Herzegovina, Montenegro	200	MFK, RWG IT
M6, M10 Year2	Conference	Research , Industry, SMEs	Serbia, WBC	300	MFK, RWG IT
M11, Year2	Thematic Workshop	Research , Industry, SMEs	WBC	50	MFK, RWG IT
M1-M6, Year1	Research cooperation	Research	Serbia	50	MFK, RWG SD
M4, Year1	Conference	Research	Serbia, Kopaonik, WBC, EU	100	MFK, RWG SD
M5, Year1	Conference	Research ,	Serbia, Kraljevo, WBC, EU	200	MFK, RWG SD

M8, Year1	Conference	Research , Industry,	Austria, EU	200	MFK, RWG SD
M5, M9, Year1	Conference	Research , Industry,	Spain, EU	300	MFK, RWG SD
M12, Year1	Published results	Research , Industry,	Serbia, WBC, EU	500	MFK, RWG SD
M3 Year2	Conference	Research , Industry,	Serbia, Kopaonik	300	MFK, RWG SD
M5 Year2	Conference	Research , Industry,	Spain, EU	300	MFK, RWG SD
M5, M10 Year2, M6, Year3	Presentation of RWG SD for regional R&D and Industry (large companies and SMEs)	Research , Industry, SMEs	Serbia,	200	MFK, RWG SD

Planned/ actual dates	**Type**	**Type of audience**	**Countries addressed**	**Size of audience**	**Partner responsible/involved**
M3-M30	Project web-site	General public	N.D.	2000 per month	MFK
M6, year1	Press release (TV)	General public	Serbia	5000	MFK, RWG VE
M11, Year1	Exhibition on Fair-Business Base 2007	Research , Industry, SMEs	Serbia,	2000	MFK, RWG VE
M11, Year1	Exhibition, Presentation of RWG VE and RLS company from Slovenia	Research , Industry, SMEs	Serbia,	30	MFK, RWG VE
M12, Year1	Exhibition, Presentation of RWG VE and DM Documenten Management, Serbian-Germany company	Research , Industry, SMEs	Serbia,	30	MFK, RWG VE
M4, M6, M9, M11, Year2, M2, M4, M6, Year3	Presentation of RWG VE for regional R&D and Industry (large companies and	Research , Industry, SMEs	Serbia, Bosnia and Herzegovina ,	300	MFK, RWG VE

	SMEs)		Montenergo, Croatia, Macedonia		
M9, Year2	Conference	Research, Industry, SMEs	Germany, Italy, Slovenia	500	MFK, RWG VE
During whole project implementation	Direct e-mailing	Research, Industry, SMEs	WBC countries, EU MS	400	MFK, RWG VE
M3, Year3	Thematic Workshop	Research, Industry, SMEs	WBC countries	50	MFK, RWG VE
M5, Year3	Specialized trainings	Research, Industry, SMEs	Serbia	50	MFK, RWG VE
Year 3	Scientific papers	Research	International	1000	MFK, RWG VE
M1-M6, Year1	Research cooperation	Research	Serbia	50	MFK, RWG IT
M6, Year1	Presentation of RWG IT for regional Industry (large companies and SMEs)	Industry, SME	Serbia	50	MFK, RWG IT
M9, Year1	Conference	Research, Industry, SMEs	Serbia, WBC, EU	400	MFK, RWG IT
M10, Year1	Conference	Research, Industry, SMEs	Spain, EU	500	MFK, RWG IT
M11, Year1	Conference	Research, Industry, SMEs	Serbia	300	MFK, RWG IT
M6, M10 Year2	Conference	Research, Industry, SMEs	Serbia, WBC	300	MFK, RWG IT
M11, Year2	Thematic Workshop	Research, Industry, SMEs	WBC	50	MFK, RWG IT

M5, M6, M10 Year2, M3, M5, M6, Year3	Presentation of RWG IT for regional R&D and Industry (large companies and SMEs)	Research, Industry, SMEs	Serbia, Bosnia and Herzegovina, Montenegro	200	MFK, RWG IT
M1-M6, Year1	Research cooperation	Research	Serbia	50	MFK, RWG SD
M4, Year1	Conference	Research	Serbia, Kopaonik, WBC, EU	100	MFK, RWG SD
M5, Year1	Conference	Research,	Serbia, Kraljevo, WBC, EU	200	MFK, RWG SD
M8, Year1	Conference	Research, Industry,	Austria, EU	200	MFK, RWG SD
M5, M9, Year1	Conference	Research, Industry,	Spain, EU	300	MFK, RWG SD
M12, Year1	Published results	Research, Industry,	Serbia, WBC, EU	500	MFK, RWG SD
M3 Year2	Conference	Research, Industry,	Serbia, Kopaonik	300	MFK, RWG SD
M5 Year2	Conference	Research, Industry,	Spain, EU	300	MFK, RWG SD
M5, M10 Year2, M6, Year3	Presentation of RWG SD for regional R&D and Industry (large companies and SMEs)	Research, Industry, SMEs	Serbia,	200	MFK, RWG SD

Within 1st year of project realization RWG Information Technologies published scientific and technical papers related to rapid prototyping and water management. At 31st Conference on Production Engineering of Serbia and Montenegro with Foreign Participants held at Kragujevac from September 19th to 21st, 2007, a paper titled "Experiences in Rapid Prototyping with 3D Printing Technology" was published in proceedings in full. Also, at V SPIN Conference held at Belgrade from November 1st till 2nd, 2007, a paper "Rapid Prototyping with 3D Printing Technology" was presented and published. Two papers related to water management were presented and published at HYDRO 2007 Conference held at Granada, Spain, from October 15th till 17th, 2007, and these are: "Drina river basin hydro information system: Simulation model concept" and "The Serbian-Romanian hydropower system 'Djerdap': Mathematical model".
Various forms of cooperation with industry were also made. These include presentations and part production for company Metal Sistemi, Kragujevac, and research work for MV Engineering, Krefeld, Germany and Institute for The Development of Water Resources "Jaroslav Cerni", Belgrade (involvement in development of national GIS for water

resources). It is very important that educational cooperation was established with several institutions from region, so that students from other faculties can get familiar with RP and RT equipment and processes. Visits from Faculty of Technical Sciences of Novi Sad and Faculty of Mechanical Engineering of Banja Luka, Republic of Srpska were made, while with Faculty of Mechanical Engineering of Nis a monograph on RP was prepared for publishing.

Within 1st year of project realization RWG Software development published scientific and technical papers related to reverse engineering, software development and structural analysis. The papers related to FE simulations were presented and published at 1st International Congress of Serbian Society of Mechanics held at Kopaonik from April 10th to 13st, 2007, and these are: "The penalty methods applied to nonlinear contact problems", "Drucker-Prager Material model without hardening" and "Numerical methods for determination crack growth on the real structure". At 6th Youth Symposium on Experimental Solid Mechanics Conference held at Kraljevo from May 9th to 12nd, 2007, a paper titled "Dynamic analysis of mechanism for setting down a brake pedal in crash worthines" was published in proceedings in full. Also, at EURO:TUN Conference held at Vienna, Austria from August 27th till 29th, 2007, a paper "Application of Drucker-Prager material model in the tunnel analysis" was presented and published. A paper "Formulation of a Heterogeneous Stochastic Elasto-Plastic Material" were presented and published at Conference COMPLAS 2007, held at Barcelona, Spain form 5 th till 7 th September, 2007. At Journal of the Serbian Society for Computational Mechanics, Numer 1, Vol. 1, 2007, two papers were published. These papers are: "A comparative Study of Contact Problems Solution Based on the Penalty and Lagrange Multiplier Approaches" and "Extended Finite Element Method for Two-dimensional Crack Modeling". The presentations of equipment and software, quality control, reverse engineering and structural analysis of parts for many companies were made.

Within 2nd year of project realization RWG Information Technologies published scientific ant technical papers related to rapid prototyping and water management. At YU INFO 2008 Conference, Kopaonik, March 2008, a paper titled "3D Printing in Process of Reverse Engineering" was published in proceedings in full. The PhD thesis "Optimisation Methods in Simulation and Control for Hydropower Systems", was successfully defended by RWG2 collaborator and under mentoring of RWG IT coordinator.

Group of students coordinated by RWG IT staff participated on Imagine Cup 2008, national contest organized worldwide by Microsoft. This 4 member group, consisting of 3 males and 1 female, has won and became national representative on the international finale held in Paris in July 2008.

Various forms of cooperation with industry were also made. These include presentations and part production for company Metal Sistemi, Kragujevac, and research work for MV Engineering, Krefeld, Germany and Institute for The Development of Water Resources "Jaroslav Cerni", Belgrade (involvement in development of national GIS for water resources). It is very important that educational cooperation was established with several institutions from region, so that students from other faculties can get familiar with RP and RT equipment and processes. Visits from Faculty of Technical Sciences of Novi Sad and Faculty of Mechanical Engineering of Banja Luka, Republic of Srpska were made, while with Faculty of Mechanical Engineering of Nis a monograph on RP was published. Additionally, members of RWG IT became participants in very 3 important research projects concerning RP (biomedical applications and research), water management and development of information systems for DSS in pharmacology.

Within 3rd year of project realization RWG Information Technologies published scientific and technical papers related to rapid prototyping and water management. At YU INFO 2009 Conference, Kopaonik, March 2009, a paper titled “Rapid Prototyping Using Vacuum Casting Technology” was published in proceedings in full. This was important step since for the first time announced results achieved with new equipment acquired within this project. Another important task was application of this new technology for biomedical application and research since this is recognized as priority topic for future activities.

Section 3 Publishable results

N.A.

ANNEX – Motivational seminar agenda and gallery (Jun 2008)

Motivacioni seminar

Poštovani,

U okviru realizacije medjunarodnog FP6 projekta RRCSD INNCODE pod nazivom „Unapređenje istraživačkih kapaciteta u razvoju softvera i inovativnog kolaborativnog okruženja u oblasti inženjeringa u Srbiji i Crnoj Gori“, Mašinski fakultet u Kragujevcu u saradnji sa Centrom za razvoj karijere Univerziteta u Kragujevcu organizuje motivacioni seminar, 10. juna 2008. godine, u sali malog Amfiteatra Mašinskog fakulteta u Kragujevcu (objekat A) sa početkom u 11 časova.

Ciljevi seminara

Seminar je namenjen jačanju ljudskih resursa u nauci iz oblasti aplikativnih i fundamentalnih istraživanja i organizuje se za studente završnih godina studija i apsolvente, diplomce, nezaposlene i sve one koji su zainteresovani za svoje profesionalno usavršavanje. Cilj seminara je da se prezentiraju mogućnosti koje postoje na MFK u Kragujevcu, da se mladi uključe u najnovija istraživanja, realizaciju međunarodnih projekata a posebno da se ohrabre za uključivanje u medjunarodne programe za razvoj njihove karijere i zapošljavanje. Kroz ciljano opremanje prethodnih godina, MFK i istraživačke grupe poseduju opremu i specijalizovane softvere (jedinstvene na Balkanu) čime se nude atraktivne mogućnosti za usavršavanje mladih i njihovo uključivanje u istraživanja na svetskom nivou. U tom smislu biće prezentirane mogućnosti koje se nude mladim istraživačima u okviru tri istraživačke grupe RWGs: Virtuelni inženjering, Razvoj softvera i Informacione tehnologije, koje su uključene u realizaciju RRCSD INNCODE FP6 projekta.

Suorganizator seminara je Centar za razvoj karijere Univerziteta u Kragujevcu koji nudi podršku studentima i diplomcima u njihovom razvoju karijere i zapošljavanju.

Poseban deo seminara je posvećen prezentaciji specifičnog programa „People“ u okviru Sedmog okvirnog programa kojim u Srbiji koordinira Sektor za međunarodnu saradnju Ministarstva nauke Republike Srbije.

Koristi za učesnike motivacionog seminara su dobijanje informacija o:

- mogućnostima za zapošljavanje,
- mogućnostima za samostalno apliciranje za međunarodne grantove kojima se finansira profesionalno usavršavanje i povezivanje sa institucijama u svetu
- mogućnostima angažovanja na međunarodnim projektima
- istraživačkim trening programima u laboratorijama i institutima EU i regionalnih partnera,
- mogućnostima povezivanja sa EU mrežama u cilju transfera znanja i tehnologija
- ostalim aktivnostima MFK

Mašinski fakultet u Kragujevcu spada u grupu najuglednijih i prestižnih naučno-obrazovnih institucija u oblasti tehničkih nauka. Danas je to savremena naučno-obrazovna institucija sa jasno definisanom misijom, vizijom, ciljevima i programskim opredeljenjima.

Misija Mašinskog fakulteta u Kragujevcu, kao obrazovno naučne ustanove, je da uz maksimalno i stalno inoviranje nastavnih sadržaja, primenu savremenih metoda i tehnika edukacije i kroz istraživački proces obrazuje mlade i kvalitetne stručnjake u oblasti mašinskih nauka sposobne da budu lideri u razvoju industrije regiona i šire. Obrazovanje na Mašinskom fakultetu obuhvata čitav spektar razvoja moderne i savremene tehnologije usklađen sa Evropskim trendovima, idealno postavljen za praktičnu profesiju, ali i kao osnova za delotvorne kreativne radove. Uloga Mašinskog fakulteta je i da osmisli, ispita i razvije inovacije u oblasti inženjerskih odnosno tehničkih nauka kao i da kroz naučnu i tehničku podršku pomaže razvoj regiona i šire.

Vizija Mašinskog fakulteta u Kragujevcu je da se razvije u modernu evropsku visokoškolsku instituciju priznatu po svojim naučnim i naučno-istraživačkim dostignućima i dostignućima svršenih studenata i postdiplomaca u oblasti mašinske tehnike. Namera je da Fakultet osposobi lidere koji će voditi napredak industrije u regionu i celoj zemlji, mlade stručnjake sposobne da se uključe u saradnju sa univerzitetima u celom svetu.

Centar za razvoj karijere i savetovanje studenata Univerziteta u Kragujevcu

Centar za razvoj karijere i savetovanje studenata Univerziteta u Kragujevcu je nova organizaciona jedinica Univerziteta koja je osnovana u novembru 2007. godine i ima ulogu posrednika između akademske i poslovne zajednice. Sa jedne strane, Centar pruža podršku studentima i diplomcima u razvijanju sposobnosti, znanja i veština koje su ključne za zapošljavanje kao i informacije o mogućnostima dodatnog obrazovanja, stipendijama u zemlji i inostranstvu i ponudama za poslove i prakse, a sa druge strane omogućava poslodavcima da se aktivno uključe u proces obrazovanje svojih budućih zaposlenih. Centar ne posreduje direktno u zapošljavanju studenata, već pruža relevantne informacije o zapošljavanju, povezuje studente sa poslodavcima radi organizovanja praksi i volonterskog rada i organizuje treninge, seminare, prezentacije kompanija, sajmove zapošljavanja i slične događaje.

Mašinski fakultet u Kragujevcu
u saradnji sa
Centrom za razvoj karijere i savetovanje studenata Univerziteta u Kragujevcu,

organizuje

MOTIVACIONI SEMINAR

UKLJUČI SE I KREIRAJ SVOJU KARIJERU

10. jun 2008

Mašinski fakultet u Kragujevcu
Sestre Janjić 6

Šesti okvirni program Evropske Unije

Strateški cilj projekta RRCSD INNCODE je unapređenje naučno-istraživačkih potencijala na Mašinskom fakultetu u Kragujevcu (MFK) u okviru prioritetnih tematskih oblasti za područje Zapadnog Balkana. Projektom se predviđa uspostavljanje konkurentne istraživačke infrastrukture kao podrške efikasnom transferu znanja i tehnologija na nacionalnom, regionalnom i EU nivou, usmerene ka integrisanom i unapređenom Evropskom istraživačkom prostoru (ERA). To su neophodni preduslovi da Mašinski fakultet u Kragujevcu postane vodeći Centar Izvrsnosti u regionu Zapadnog Balkana.

U cilju dostizanja ovog strateškog cilja **pet operativnih (merljivih) ciljeva** je postavljeno:

1. Izvršiti modernizaciju istraživačke infrastrukture i radnog okruženja, kroz organizacionu harmonizaciju i opremanje najsavremenijom opremom i softverima tri istraživačke grupe (RWGs): Virtuelni inženjering, Razvoj softvera, Informacione tehnologije
2. Sprovesti program treninga istraživača u laboratorijama i institutima Evropskih partnera (Nemačka, Italija, Grčka, Slovenija) i povećati njihovu mobilnost u okviru ERA
3. Unapređenje integracije Mašinskog fakulteta u Kragujevcu s aspekta umrežavanja i realizacije zajedničkih istraživanja sa EU i regionalnim partnerima
4. Realizovati diseminaciju istraživačkih rezultata i dostignuća iz oblasti sotvera, informacionih tehnologija i virtuelnog inženjerstva, kod nas i u svetu, i stvoriti efikasne mehanizme za njihovu eksploataciju na nacionalnom, regionalnom i evropskom nivou
5. Povećati atraktivnost istraživačke karijere i mogućnosti zapošljavanja mladih istraživača i naučnika u oblasti virtuelnog inženjerstva, razvoja softvera i servisa, informacionih tehnologija, što treba da dovede do smanjenja „odliva mozgova".

Unapređenje i ojačanje MFK je esencijalno u ovom trenutku za ispunjenje gore navedenih ciljeva, što treba da doprinese tranzicionim procesima u Srbiji, ne samo u industrijskom domenu, već i u socijalnom. Uzimajući u obzir geografsku poziciju i istorijsku ulogu Srbije, rezultati projekta mogu imati pozitivan uticaj i na zemlje u regionu, a u krajnjoj instanci na Evropsku uniju u celini.

AGENDA

10. jun 2008

10.00 – 11.00 Registracija učesnika

11.00 – 11.10 Uvodna obraćanja

Prof. dr Miroslav Babić
Dekan Mašinskog fakulteta u Kragujevcu

Prof. dr Miloš Djuran
Rektor Univerziteta u Kragujevcu

11.15 – 11.30 Prezentacija projekta

Prof. dr Radovan Slavković
Rukovodilac projekta RRCSD INNCODE

11.30 - 11.50 Upoznavanje sa radom i mogućnostima RWG Virtuelni inženjering

Prof. dr Vesna Mandić
Upravnik Centra za Virtuelnu proizvodnju

11.50 - 12.10 Upoznavanje sa radom i mogućnostima RWG Razvoj softvera

Prof. dr Miroslav Živković
Vodja tima za razvoj PAK softvera

12.10 - 12.30 Upoznavanje sa radom i mogućnostima RWG Informacione tehnologije

Prof. dr Nenad Grujović
Upravnik Centra za informacione tehnologije

12.30-12.45 Diskusija

12.45-13.15 Kafe pauza

13.15- 13.30 Predstavljanje Centra za razvoj karijere i savetovanje studenata

Marko Banković
Upravnik Centra za razvoj karijere i savetovanje studenata

13.30-14.15 Predstavljanje programa PEOPLE u okviru FP7 programa

G-đa Nada Milošević,
NCP za PEOPLE program, Sektor za međunarodnu naučnu i tehnološku saradnju
Ministarstva nauke

14.15-14.30 Diskusija

14.30 – 15.00 Obilasci centara i laboratorija MFK

15.00 – Zatvaranje seminara

INFORMACIJE

Sve potrebne informacije u vezi seminara možete dobiti od
CeVIP – Centra za virtuelnu proizvodnju
Mašinski fakultet u Kragujevcu
Sestre Janjić 6, 34000 Kragujevac
tel/fax. 034 501 201
e-mail. cevip@kg.ac.yu
www.cevip.kg.ac.yu

Kontakt osoba: Miloš Ćirović

Mapa

University of Kragujevac, Faculty of Mechanical Engineering / Univerzitet u Kragujevcu, Mašinski fakultet

25th December 2009. / 25. Decembar 2009.

LIST OF PARTICIPANTS / SPISAK UČESNIKA

R.br. No	Name of participant Ime učesnika	Institution/Company Institucija / Preduzeće	Occupation Zanimanje	Phone Telefon	e-mail
1.	GORAN STOJANOVIĆ	FACULTY OF TECHNICAL SCIENCES	INDIVIDUAL EX PERT	064/3905715	SGOCKA@UNSAC.RS
2.	IVANA BOŠKOVIĆ	Spinnaker New Technologies doo	HR and Project Assistent	064/6413813	IVANA.BOSKOVIC@HERMES-PAPIR.COM
3.	MARIJANA BOŽIĆ	REDASP KRAGUJEVAC	SAVETNIK ZA RAZ. LJUD. RES.	063/409-202	HRD@REDASP.RS
4.	NATAŠA BREHAK	NSZ FILIJALA KRAGUJEVAC	SAVETNIK ZA ZAPOŠ.	034/307-028	nbrehjak@nsz.gov.rs
5.	Зорица Тимотијевић	НСЗ филијала Крагујевац	саветник за запош.	034/307-021	ztimotijevic@nsz.gov.rs
6.	SLAVIŠA TOPOPOVIĆ	METAL-PRODUKT .D.O.O	GLAVNI INŽENJER	026/327-425	SLAVISA@METALPRODUKT.RS
7.	Горан Недељковић	METALKA-MAJUR Јагодина	Супервизор QMS	064/8891141	goran.nedeljkovic@metalka-majur.com
8.	GORAN MATOVIĆ	SCGM DOO - KRAG.	DIR.	062/220560	GMATOVIC@SCGM.COM
9.	ĐOKOVIĆ SREĆEN	JPSC „MLADOST" KRAG	TEH. RUKOVODILAC	065/1075040	SRECEN02@GMAIL.COM
10.	ANDRIJA SAVČIĆ	DIREKCIJA RAZVOJA AUTOMOBILA, A.D.	ZAM. DIR DRA	065/5210730	savcice@ia.kg.ac.yu (RS)
11.	IVAN MILOSAVLJEVIĆ	T.P. „MORAVA"			

This project has been funded with support from the European Commission

R.br. No	Name of participant Ime učesnika	Institution/Company Institucija / Preduzeće	Occupation Zanimanje	Phone Telefon	e-mail
12.	Snežana Veljković	Zastava Oružje	dipl. maš. ing.		
13.	Sonja Jeličić	ZASTAVA ORUŽJE, KG	dipl. maš. inž.		
14.	slavica Stamenović	Edops doo	dipl. maš. inž.	034/304-403	
15.	DRAGOVAN VASOVIĆ	KOMPANIJA SLOBODA	dipl. el. inženjer	064/1795-002	mira.vaske@yahoo.com
16.	MILOMIR ČEKANOVIĆ	GRAH AUTOMOTIVE D.O.O	DIPL. ING. INFORMAT.	034/501-060	INFO@GRAH-AUTOMOTIVE.com
17.	Бараћ [illegible]	UNIOR formingtools	Dipl. inž. mašinstva	034 503703 0653737379	d.barac@unior-formingtools.rs
18.	JASMINA TIJANIĆ	UNIOR formingtools KRAG.	DIPL. INŽ. MAŠINSTVA	034503728	jtijanic@unior-formingtools.RS
19.	IVAN JANKOVIĆ	MILANOVIĆ INŽENJERING	DIPL. ECC.	034/692660	JJANKOVIC@MINS.RS
20.	[illegible]	Univerzitet u Kragu.	dipl. maš. inž.	034/501-201	cevip@kg.ac.rs
21.	Саша Ранђеловић	Маш. факултет у Кр.	дипл. маш. инж.	034/501-201	SASARANDJELOVIC@KG.AC.RS
22.	В. Луковић	Центар за ВП	дипл. инж. ел.	034/501-209	vladanlukovic@kg.ac.rs
23.					
24.					
25.					
26.					

This project has been funded with support from the European Commission