



**FP7-REGPOT-2012-2013-1**

**Grant Agreement: 316087**

# **AComIn: Advanced Computing for Innovation**

**FP7 Capacity Programme  
Research Potential of Convergence Regions**

**D4.2**

## **Innovation Capacity Building Activities in AComIn - Month 18**

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<b>Summary</b>	Deliverable D4.2 reports about the AComIn activities in Work Package 4 (WP4) "Development of Intellectual Property (IP) and Knowledge Transfer (KT) Plan and Innovation Capacity Building" in project months 1-18. Training in IPR issues was done, IICT registered two industrial designs, currently the institute prepares an Application to WIPO. AComIn proposes an Innovation Strategy to IICT, and IP Policy and an Exploitation and Dissemination Plan.	
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## **Executive Summary**

Deliverable D4.2 reports about the AComIn activities in Work Package 4 (WP4) "Development of Intellectual Property (IP) and Knowledge Transfer (KT) Plan and Innovation Capacity Building" in project months 1-18.

D4.2 presents:

- the organisation of a training seminar in IPR issues,
- applications for industrial design and patent applications,
- running IICT projects in the Competitiveness Operational Programme,
- activities for development of Regulatory documents, proposed to IICT for consideration and adoption,

and discusses the complementarity of the IICT's Technology Transfer Office and AComIn.

No deviations from the planned schedule are encountered.

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## 1. INTRODUCTION: WP4 OBJECTIVES, PLANNED TASKS AND ACTIVITIES

The Objectives of Work Package 4 (WP4) “Development of Intellectual Property (IP) and Knowledge Transfer (KT) Plan and Innovation Capacity Building” are, in general, to support the institute in the development of Regulatory documents and their adoption, to train the staff and enable patent applications at European level. In particular, WP4:

- supports IICT to set up IP Policies and KT processes at the level of institute. The Policies will be harmonised with the European standards for transferring research results to industry and the best EU practices;
- organises training courses in IP management for the IICT researchers, in order to create sufficient awareness with the staff of the value of protecting their IP, and of measures for early identification of IP potential;
- organises applications to the European Patent Office based on ideas generated in AComIn as well as applications to the Bulgarian Patent Office for ideas generated in AComIn.

According to the AComIn Technical Annex, the WP4 activities are organised in two tasks:

**Task 4.1: Implementation of IP and KT Strategy at IICT** which comprises the following activities:

- Discussion of the (meanwhile elaborated) IP policies of IICT and proposal for their harmonisation with the best EU practices. This activity will be performed with the help of an External IPR Consultant;
- Wide training campaign will be carried out aiming to raise the level of IP awareness among the IICT staff. Three seminars will be given by an External IPR Consultant, the Joint Innovation Centre (JiC) IP specialists and patent attorneys.

**Task 4.2: Protection of IP to the European and Bulgarian Patent Offices:**

- Three patent applications are expected to be submitted to the European Patent Office based on novel AComIn results, obtained using the Smart Lab equipment in months 1-18 (the AComIn team hopes that the process in EPO will be completed in months 19-36).
- Applications will be delivered to the Bulgarian Patent Office too, reflecting innovative ideas generated in the project years 2-3.

In AComIn months 1-18, progress has been made in all activities planned in the DoW. Moreover, the AComIn team has been pro-active in producing results as early as possible, to enable timely patent applications. For instance, after the delivery of the SmartLab Infrared Camera in month 11, experiments have been carried out for five months and the first steps for a patent application to the European Patent Office have been made in month 18.

Another pro-active initiative is to submit project proposals to the Competitiveness Operational Programme of the Structural Funds, and this has been done immediately after submitting the AComIn proposal in early January 2012. Today IICT has 12 projects running in parallel to AComIn in the Competitiveness area “Supporting the RTD potential of Bulgarian companies” and 6 of them are relevant to the AComIn Topics. IICT also runs another Competitiveness project for the establishment of its own Technology Transfer Office.

Deliverable D4.2 reports about all the tasks, performed in WP4 in months 1-18.

## 2. TRAINING IN IPR ISSUES

Two lectures concerning the problems on Intellectual property rights were conducted on 18 April 2013. Fig. 1 shows the Announcement for the event, organised jointly with the AComIn Bulgarian partner: the Joint Innovation Centre of the Bulgarian Academy of Sciences.

The invited lecturers gave detailed information of intellectual property rights and application of corresponding legal documents. Intellectual property rights are legally recognised exclusive rights to creations of the mind. Common types of intellectual property rights include patents, copyright, industrial design rights, trademarks, trade dress, and in some jurisdictions trade secrets.

In lectures special attention was paid to the intellectual property concerning the software. There are four types of intellectual property rights relevant to software: patents, copyrights, trade secrets and trademarks. Each affords a different type of legal protection. Patents, copyrights and trade secrets can be used to protect the technology itself. Trademarks do not protect technology, but the names or symbols used to distinguish a product in the marketplace.

In general there are three basic types of software: (i) system software – set of programs that manages all the concurrent tasks performed by a computer; (ii) utility software – collection of programs that perform routine tasks such as copying, compressing data, etc. (iii) application software that performs specialized functions not directly related to the computer itself. These distinctions are important because software is a creation that may qualify for both patent and copyright protection.

Both copyright and patent can be used to protect software. Copyright may protect the program as such, the program's literal expression and perhaps its structure, sequence and organisation. A patent may be issued on the program's innovative approach to solving a particular problem or producing a particular result in a computer-related invention. Patent protection offers broader rights than copyright protection because a patent creates a monopoly over the ideas it covers, whereas copyright only protects the expression itself. Also, a copyright cannot be claimed by independent creators, i.e. those who write a similar or even identical program to one already existing without copying it from the copyrighted program or using it as a basis for a later work. It is much easier and less expensive to obtain copyright protection than patent protection.

The discussion after the lecture was very useful because it was based on case studies in the area of software intellectual property. More than 35 IICT staff members attended the lectures and established contacts with the lecturing experts, for further contacts, because many IICT researchers are interested in intellectual property of software.

Short CVs of both lecturers are shown below:

**Prof. Georgi Dimitrov** is a founding partner of the law firm "Dimitrov, Petrov & Co." and manages the Department of Law of Information and Communication Technology (ICT) and the Department for the protection of intellectual property. He is doctor of ICT Law at the Catholic University in Leuven, Belgium (2008) and specialised in the Academy of American and International Law in Dallas, Texas (2002). Dr. Dimitrov is a leading expert and leader of numerous working groups developed a contemporary Bulgarian legislation in the field of information and communication technologies such as the Laws of Electronic Commerce, E-Government, the Electronic Communications, the Commercial Register etc. Since 2009 he is an expert of the Advisory Council on electronic communications, postal services, information society and e-government at the Ministry of Transport, IT and Communications.

**Lawyer Plamena Georgieva** is a senior expert in the law firm "Dimitrov, Petrov & Co.". She is lecturer and participant in numerous seminars and conferences related to competition, copyright and intellectual property protection on the Internet. Lawyer Georgieva represents industrial property in the field of patents, trademarks and industrial design of the Patent Office of Bulgaria and is European Representative for trademarks and industrial designs. She is a member of Sofia Bar and Trade Mark Association of European Community (ECTA).



 **ИИСТ**  
Institute of Information and Communication Technologies - BAS

**JOINT INNOVATION CENTRE - BAS** 

**СЕМИНАР**

**Enterprise Europe Network – услуги в подкрепа на бизнеса и иновациите**  
**Защита на интелектуалната собственост**

**София, 18 април 2013 г., Институт по информационни и комуникационни технологии – БАН**

**Организатори: Единен център за иновации**  
**Институт по информационни и комуникационни технологии**

14:45 – 15:00	Регистрация
15:00 - 15:45	Защита на интелектуалната собственост – авторски права върху софтуер и бази данни Доц. д-р Георги Димитров, адвокатско дружество „Димитров, Петров и Ко“
15:45 – 16:00	Дискусия
16:00 – 16:15	Пауза
16:15 – 17:00	Защита на интелектуалната собственост – патентна защита Адвокат Пламена Георгиева, адвокатско дружество „Димитров, Петров и Ко“
17:00 – 17:30	Дискусия, обобщения и закриване

 **Европейска комисия**

 **SEVENTH FRAMEWORK PROGRAMME**



**Figure 1.** Announcement for an IPR training seminar, organised jointly with the AComIn partner JiC<sup>1</sup> (Joint Innovation Centre of the Bulgarian Academy of Sciences)

<sup>1</sup> AComIn provided no financial support to this initiative. IICT provided the premises and organised the audience. JiC included the seminar as a training event in its schedule.

### 3. IICT CERTIFICATES FOR INDUSTRIAL DESIGN

The Department of Information Processes and Decision Support Systems (IPDSS) at IICT carries out basic and applied research in the area of modern IT applications that optimise processes and decision support systems. The application of Operations Research for modelling and design of night vision devices is a significant topic in its research agenda. After many years of research and collecting experience in the area of night vision, it was possible to develop and propose two new industrial designs for night vision devices.

The proposed industrial designs rights protects the visual design of night vision devices. The latter consists of the creation of a shape, configuration and composition of devices and is a three-dimensional pattern used to produce a product. According to the requirements of the Patent Office of Republic of Bulgaria exclusive right to industrial design is acquired if the registered design is a new and original one. The working team submitted the developed two new industrial designs to Patent office of Republic of Bulgarian in the frame of AComIN project on 07 November 2012 under request #10350 and request #10351. On 25<sup>th</sup> June 2013 IICT received the notification for validity of the proposed industrial designs and corresponding patent registrations under #7826/25.06.2013 and #7827/25.06.2013.

The authors of patent registrations numbers #7826/25.06.2013 and #7827/25.06.2013 are members of the IICT staff:

- Boiana Bantutova,
- Daniela Borissova,
- Evgeni Bantutov and
- Ivan Mustakerov.

The patented industrial designs are developed for night vision devices of monocular type based on light enhancement technology using image intensifier tube.

The device design under number #7826 allows using objectives with different focal length to achieve device magnification bigger than 1 to carry out long-range surveillance. Within this design configuration different generations of image intensifier tubes can be used. This type of night vision device design can be used for security activities, early warning of natural disasters, in emergency situations and for purposes of scientific research. The Certificate for registration of industrial design #7826 is shown in Fig. 2 and Fig. 3.

The design under number #7827 is characterised by ergonomics and portability of the device. It allows integrating image intensifier tubes of different generations to realize different device parameters for different users. This design is intended for devices with magnification equal to 1. The night vision device with this design can be used by researchers, scientists, security guards and environmental defenders. The Certificate for registration of industrial design #7826 is shown in Fig. 4 and Fig. 5.

Both registered patents for industrial design have duration of protection up to 07 November 2022 year. The owner of industrial design rights for both patents #7826/25.06.2013 and #7827/25.06.2013 is the Institute of Information and Communication Technologies – BAS.





ПАТЕНТНО ВЕДОМСТВО  
на Република България

# СВИДЕТЕЛСТВО

ЗА  
РЕГИСТРАЦИЯ НА ПРОМИШЛЕН ДИЗАЙН

(19) BG (11) 7826  
(15) Регистриран на 25.06.2013 (51) МКПД: 16-06  
(17) Срокът на защита е до 07.11.2022

(21) Заявка No. 10350  
(22) Заявен на 07.11.2012

Конвенционен приоритет  
(31) (32) (20) (33)

(43) Публикувана заявка  
(62) Разделен от заявка No.

(28) Брой дизайни: един  
(74) Представител по индустриална  
собственост

(54) ПРИСПОСОБЛЕНИЕ ЗА НОЩНО  
ГЛЕДАНЕ

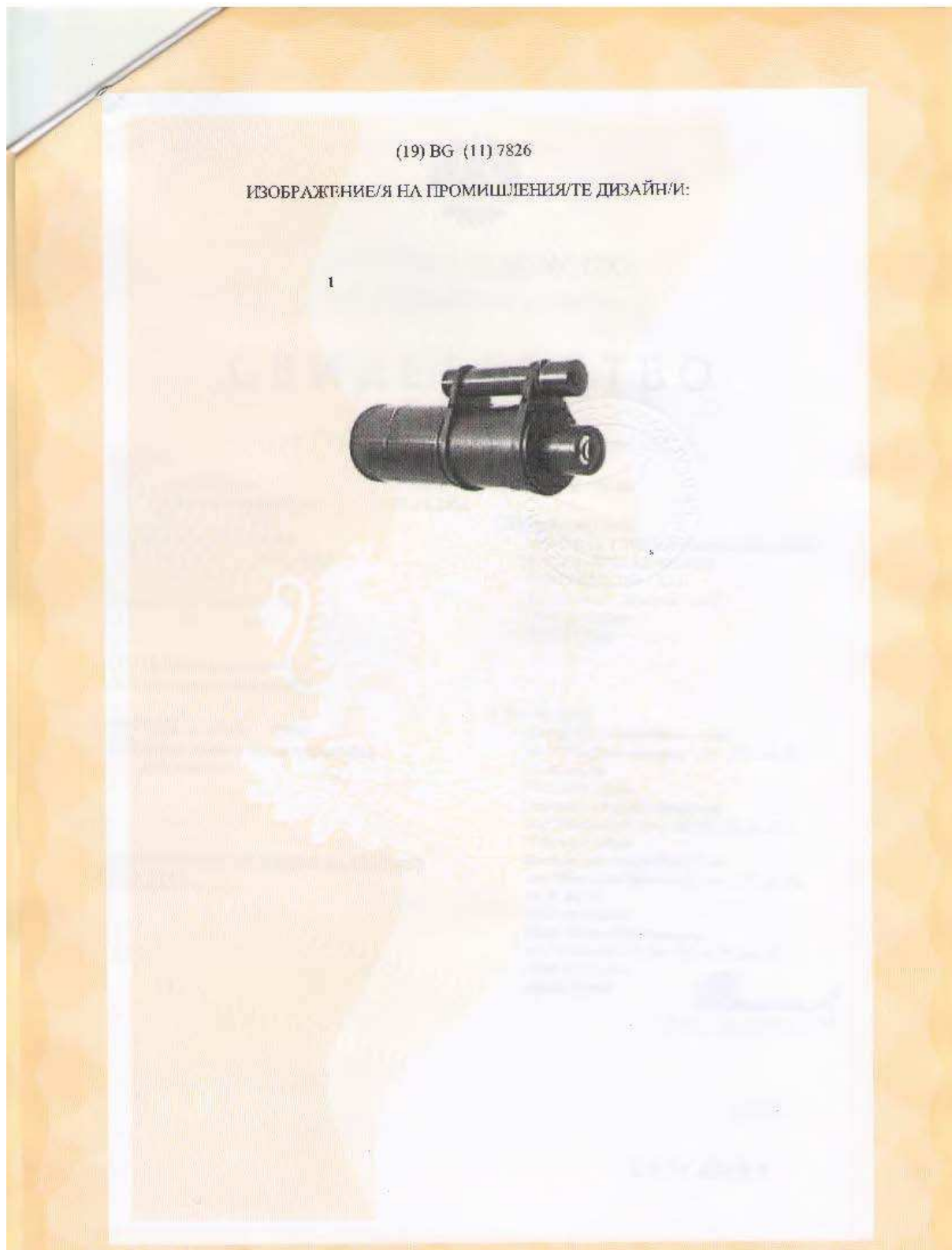
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Председател

Дата:  
23.07.2013 г.

Figure 2. Certificate for registration of industrial design #7826 – page 1



**Figure 3.** Certificate for registration of industrial design #7826 – page 2



**ПАТЕНТНО ВЕДОМСТВО**  
на Република България

**СВИДЕТЕЛСТВО**  
ЗА  
РЕГИСТРАЦИЯ НА ПРОМИШЛЕН ДИЗАЙН

(19) BG (11) 7827  
(15) Регистриран на 25.06.2013 (51) МКПД: 16-06  
(17) Срокът на закрила е до 07.11.2022

(21) Заявка No. 10351  
(22) Заявен на 07.11.2012

Конвенционен приоритет  
(31) (32) (20) (33)

(43) Публикувана заявка  
(62) Разделен от заявка No.

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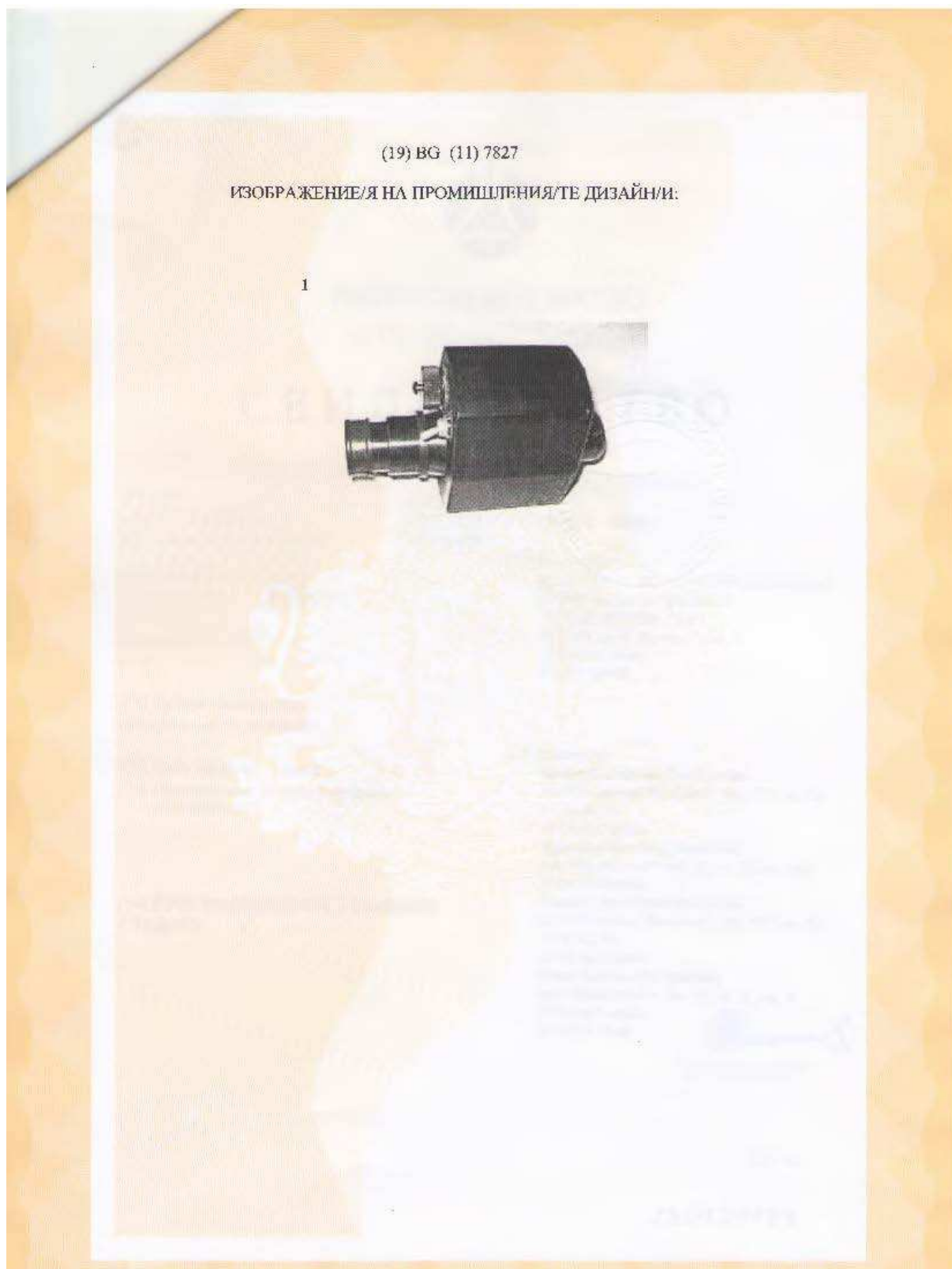
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Дата:  
23.07.2013 г.

Figure 4. Certificate for registration of industrial design #7827 – page 1



**Figure 5.** Certificate for registration of industrial design #7827 – page 2



## 4. PREPARING AN APPLICATION TO THE EUROPEAN PATENT OFFICE

Currently, a Bulgarian Patent Application:

**Karastoyanov D.**, Yachev I., Hinov K., Balabosov Y., *Braille display*, Bulgarian Patent Application No 111638, 29.11.2013

is prepared for PCT submission. One of the authors, Prof. Dimitar Karastoyanov, is a member of the core AComIn team.

Upgrading a Bulgarian Patent Application to the EU level is an excellent example how AComIn adds new value to the present IICT achievements. Initially the Braille display idea has been elaborated in the project “Assistive computer interface for visually impaired” funded by the Bulgarian National Science Fund in 2009-2012. In general, the invented Braille display is a net with holes (Fig. 6); beneath the net, on a base, a matrix of electromagnets is mounted (Fig. 7). The device has a simplified construction and is easy to manufacture; it has improved static, dynamic and energy-consumption features. In addition all portable elements are interconnected, the tactile feedback has extended sensitivity, and the Braille display has high-efficiency drive system with low power consumption. After the project end, a patent application has been made to the Patent Office of the Republic of Bulgaria.

Within AComIn, after the delivery of the Smart Lab devices and more especially the termocamera FLIR P640 in August 2013, the Braille matrix sketched above have been improved. The subject of investigation was the termodistribution given the high number electromagnetic linear microdrives. Moreover the distribution of electromagnetic field has been investigated as well as mutual influence between the linear electromagnetic microdrives. The present proposal for the Braille display has better characteristics and is an invention that is worth to be protected at European level. To illustrate further the device, Fig. 8 presents a single electromagnetic drive.

For accomplishing the further steps in the patent registration process, a contract with a European patent expert is under preparation in the framework of AComIn. Currently the patent application text in English is almost finalised.

The Application will be registered in the World Intellectual Property Organisation (WIPO) within one year after the date of the Bulgarian registration (i.e. by 29.11.2014).

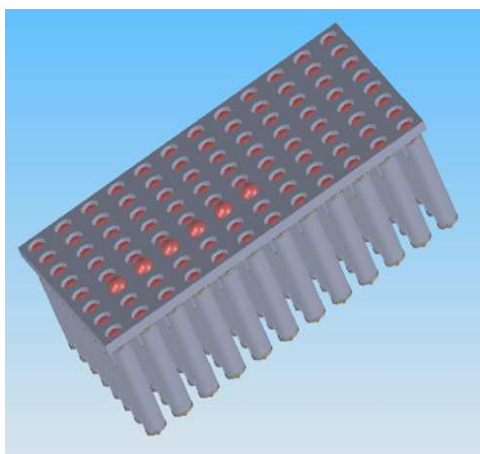


Figure 6

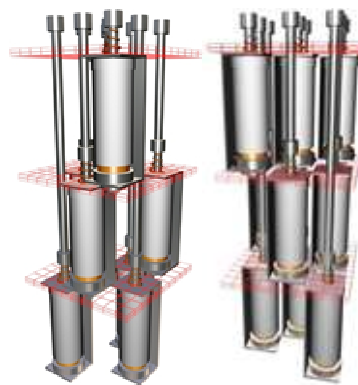


Figure 7

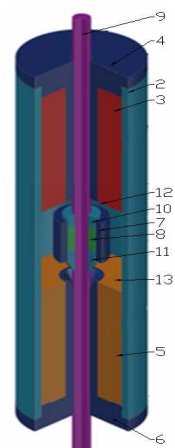


Figure 8

## 5. KNOWLEDGE TRANSFER TO SMALL AND MEDIUM ENTERPRISES (SMEs)

After the successful submission of the AComIn proposal (at 03/01/2012) and hoping that its high quality would be evaluated properly, the AComIn seniors have been quite influenced by the knowledge transfer ideas. They prepared and submitted in January-June 2012 some 12 proposals to the Operational Programme Competitiveness to a call for increasing the research potential of Small and Medium Enterprises in Bulgaria. Six of these projects are directly related to the topics of AComIn and were inspired by the research plans elaborated for the AComIn submission, so in a sense the IICT seniors started proactive Technology Transfer tasks. Today these six Competitiveness projects with total budget of 360 000 euro run in parallel to AComIn, whenever possible in close collaboration for Technology Transfer. We present here briefly the most essential information regarding these projects.

### 5.1. Project BG161PO003-1.1.06-0001-C0001

**PROJECT TITLE:** Innovative technology for efficiency evaluation of ERP systems in small and medium enterprises

**COMPANY-BENEFICIARY:** ERP Bulgaria Ltd. with R&D activities related to the development of software for efficient management of business processes.

**PRINCIPAL INVESTIGATOR from IICT SIDE:** Assoc. Prof. Dr. Vladimir Monov

**PROJECT STARTING DATE:** 17 July 2012

**PROJECT DURATION:** 24 months

**GRANT NUMBER:** BG161PO003-1.1.06-0001-C0001

**EXPECTED RESULTS:** The enterprise resource planning (ERP) systems are related to the class of business software systems which are characterized by high complexity and whose design is based on the best business practices. Presumably these systems are built on a modular basis with a common database and they have to cover the whole enterprise i.e., on the one hand they manage supplies, production, sales, finance and accounting, etc., and on the other hand they provide an integrated and direct access to information flows in real time. Development and implementation of software applications and the study of ERP systems in general is a difficult and responsible task. The success of future work with the system to a great extent depends on the successful selection of modules for implementation and the process of implementation itself.

The main objective of the project is the development of innovative tools for measuring the efficiency of the implementation process of an ERP system, and on this basis determining opportunities/possibilities for improvements in this process. The efficiency is difficult and complex concept with diverse aspects. Indicators that can measure the efficiency of a process are varied widely and are difficult to be defined. Therefore, in studying the implementation process in depth and by applying advanced information technologies, the main results of the project are expected to be an innovative technology and accompanying software solutions for measuring and estimating the efficiency of ERP systems implementation process in small and medium enterprises.

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** In the course of project development, highly qualified scientists from IICT will apply their knowledge and expertise in order to develop an information system employing the underlying technology for efficiency evaluation of the implementation process of ERP systems. Except for achieving the project goals, this will contribute to increasing the potential of small enterprises for utilizing new information technologies and software systems for business purposes.

**RELEVANCE TO THE AComIn TOPIC:** The main activities of the project are relevant to the AComIn topic *Optimisation and Intelligent Control*, and especially, to the problems concerning *Optimisation and Management of Business and Production Processes*.

## 5.2. Project BG161PO003-1.1.06-0004-C0001

**PROJECT TITLE:** Innovative technology solutions for radiofrequency thermoablation

**COMPANY-BENEFICIARY:** AMET Ltd. Sofia, Bulgaria, with R&D activities related to the development, modern manufacturing and distribution of electronic medical equipment and modules, mechanical parts and units for incorporation.

**PRINCIPAL INVESTIGATOR from IICT SIDE:** Prof. Dr.Sc. Svetozar Margenov

**PROJECT STARTING DATE:** 27 July 2012

**PROJECT DURATION:** 24 months

**GRANT NUMBER:** BG161PO003-1.1.06-0004-C0001

**EXPECTED RESULTS:** The advanced electro surgery technologies provide a tool-kit for low invasive operation for deceases of high social impact, including treatment of metastasis tumors. Their importance strongly grows with the increasing demands of the aging EU society. The project concerns development of novel technologies and engineering solutions for radio frequency thermoablation. The addressed case of hepatic tumors is of a particular importance for the clinical practice.

The computer model is based on Finite Element Method (FEM) simulation of mass and heat transfer, and coupled electrical processes in strongly heterogeneous nonlinear media including the electro surgery applicator. A typical number of the space degrees of freedom is  $O(10^9)$ , and  $O(10^4)$  time steps.

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** The high tech contributions of the IICT team include: (i) Development of mathematical model, algorithms and codes for supercomputer simulation of electro surgery instruments for radiofrequency hepatic tumor ablation (RF HTA); (ii) Verification of the computer model of RF HTA. Identification and tuning of bio mechanical parameters based on experimental data; (iii) Verification of the software module for modeling of the heat transfer (looses) due to the blood flow through the portal vein. Analysis of the qualitative and quantitative behavior of the processes of efficient ablation depending on the distance between the tumor and the portal vein.

The simulations are run on the IBM Blue Gene/P machine at NCSA and HPC facilities at IICT, utilizing the Boomer AMG parallel solver in the framework of Open Source Finite Element Software platform for Multiphysical Problems.

**RELEVANCE TO THE AComIn TOPIC:** Advanced computing (a general designator for supercomputing, high-performance computing, parallel processing etc.)

## 5.3. Project BG161PO003-1.1.06-0023-C0001

**PROJECT TITLE:** Analysis and identification of inexplicit relations in large scale numerical data: applications in economics and technological analysis

**COMPANY-BENEFICIARY:** ADISS Lab Ltd, with R&D activities related to the development of integrated information systems and business analytics tools

**PRINCIPAL INVESTIGATOR from IICT SIDE:** Prof. Dr.Sc. Todor Stoilov, Ph.D.

**PROJECT STARTING DATE:** 24 September 2012

**PROJECT DURATION:** 30 months

**GRANT NUMBER:** BG161PO003-1.1.06-0023-C0001

**EXPECTED RESULTS:** The innovative added value of the project concerns the development of numerical algorithms and logical set of rules for the identification of numerical relations between inexplicitly given parameters. These parameters define important technological relations for the case of engineering design as business relations for the case of business domain. The initial input for the identification of such inexplicit relations are assumed to be numerical data, related to the outputs of the technological systems and/or set of data, generated by accounting systems for the case of business systems. The results of these innovative identification techniques are expected to

be incorporated in to two possible outcomes: (i) development of a software tool for local usage on a mainframe; (ii) establishment of a web base service, which can be used distantly in a virtual environment.

The developed algorithms, their implementation in a software application and/or virtually base web service will benefit the management policy of business units in their every day decision making process for business operations and for the optimization of the technological control of complex system.

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** The particular cases of the IICT contributions, implemented by it academic staff are expected both for the stage of the development of the research part of the project and for the test of the software prototype applications. These tasks concerns:

- Formal design of inexplicit relations, having set of numerical input data and lack of explicit relations between system parameters. The estimated relations are validated under set of numerical and logical checks. Important requirement is that the estimation procedures have to satisfy requirements for real time operations;
- Software developments of programming code, by means to achieve mainframe independence for its invocation;
- Incorporation of the software applications in a virtually based information management system.

**RELEVANCE TO THE AComIn TOPIC:** The project developments match with the general AComIn topics defined as *Optimisation and Intelligent Control*, and especially, with Hierarchical Optimisation in Real Time Applications. The optimisation procedures concern the identification of inexplicit relations between system parameters both for technological systems as for business related operations. Particular methods for the optimisation, applied here concern the definition and solution of multilevel/hierarchical optimisation problems.

#### 5.4. Project BG161PO003-1.1.06-0023-C0001

**PROJECT TITLE:** Distributed Information System for Group Control, Distance Diagnostic and Service of Specialised Industrial Robots

**COMPANY-BENEFICIARY:** SPESIMA GMBH, Sofia, Bulgaria - part of the FRECH Holding, Germany, with R&D activities related to the development of automation systems

**PRINCIPAL INVESTIGATOR** from IICT SIDE: Prof. Dr. Dimitar Karastoyanov

**PROJECT STARTING DATE:** 1 October 2012

**PROJECT DURATION:** 24 months

**GRANT NUMBER:** BG161PO003-1.1.06-0025-C0001

**EXPECTED RESULTS:** The idea is to control a group of specialised robots, working in a technological cell (with one machine), to make synchronisation, distance observation and service of the robots. For this purpose the project will develop an unified interface for interaction between the different subsystems independently of their hardware.

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** The scientists from IICT will develop for the project (and for SPESIMA GMBH) a number of hardware components for the communication modules and software for LAN protocols. Also they develop methods for group control, observation and synchronisation of specialised robots.

**RELEVANCE TO THE AComIn TOPICS:** The project is related to RTD activities in the area of System Dynamics and Control. It is relevant to the AComIn topic *Optimisation and Intelligent Control*, more especially to:



- *Hierarchical Optimisation in Real Time Applications* - problems, related to off-line tasks like planning, design, and optimisation of structures; real time applications (optimal control, real time decision making, on-line resource allocation);
- *Energy Efficient Production Technologies* - development of energy efficient technologies and improving production quality.

#### 5.5. Project BG161PO003-1.1.06-0023-C0001

**PROJECT TITLE:** Experimental Development of Software Libraries for Improvement of Image Quality and Stabilisation using Inertial Sensors

**COMPANY-BENEFICIARY:** MM Solutions AD, Sofia; with R&D activities in the area of complete imaging solutions for mobile camera devices

**PRINCIPAL INVESTIGATOR from IICT SIDE:** Assoc. Prof. Dr. Dimo Dimov

**PROJECT STARTING DATE:** 7 December 2012

**PROJECT DURATION:** 30 months

**GRANT NUMBER:** BG161PO003-1.1.06-0038-C0001

**EXPECTED RESULTS:** The Objective is to confirm experimentally the ability to effectively combine video stream and data from inertial sensors for on-line stabilisation of the videos from the camera to a modern GSM handset. The project will develop software libraries for image stabilisation in video stream, noise correction in statics and dynamics, and generate separate videos and images with high dynamic range; all these – implemented, tested and integrated on a particular hardware platform.

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** Video cameras are installed in GSM phones fairly recently and videos produced by them suffer from all the disadvantages of a non-stationary camera filming. Principle task of software 2D stabilisation (and even 3D stabilisation) is considered solved in off-line cases, and even in real time, but by powerful enough computer and/or by a parallel implementation on a GPU, which, at least for now, is not applicable in GSM phones. Thus, the producers are relying on the use of classical inertial additives (gyros and/or accelerometers) in the hardware of a GSM handset as well as on the balancing among hardware and software approaches to achieve an acceptable video stabilization, and suppression of the noise at the flick of the hand singles. For example, the development of effective (i.e. fast enough, accurate and robust) algorithm for video stabilisation, can be used for periodic initialization of the system of inertial sensors in GSM, responsible for the full (possibly 3D) stabilization in real time. The research of these options, separately and in combination, is the responsibility of IICT-BAS.

**RELEVANCE TO THE AComIn TOPIC:** *Signal and Image Processing*, a subtopic of *Smart Interfaces*.

#### 5.6. Project BG161PO003-1.1.06-0023-C0001

**PROJECT TITLE:** Industrial Research for New Technologies in Image Stabilization and Image Quality Enhancement by Implementation of Inertial Sensors

**COMPANY-BENEFICIARY:** MM Solutions AD, Sofia; with R&D activities in the area of complete imaging solutions for mobile camera devices

**PRINCIPAL INVESTIGATOR from IICT SIDE:** Assoc. Prof. Dr. Kiril Alexiev

**PROJECT STARTING DATE:** 7 December 2012

**PROJECT DURATION:** 30 months

**GRANT NUMBER:** BG161PO003-1.1.06-0037-C0001

**EXPECTED RESULTS:** Development of algorithms and prototypes for (i) 2D video stabilisation in GSM in real-time using consecutive videoframes; (ii) Video stabilisation by means of inertial sensors (3 gyroscopes and 3 accelerometers) and Extended Kalman Filter; (iii) Determination of intentional camera trajectory; (iv) Inertial sensor video stabilisation aided by consecutive video frames (video odometry); (v) Image deblurring (for a blur as a result of camera movement); (vi) Image fusion for high dynamic range images

**TECHNOLOGY TRANSFER, IICT CONTRIBUTION IN TERMS OF RESEARCH CAPACITY:** IICT-BAS will perform research on image processing technologies, video stabilisation, inertial sensor navigation, extended Kalman filtering, sensor data fusion, and deblurring.

**RELEVANCE TO THE AComIn TOPIC:** *Signal and Image Processing*, a subtopic of *Smart Interfaces*.

## **6. COLLABORATION WITH THE ACOMIN INNOVATION CONSULTANT DR FRANK HEEMSKERK**

Dr. Frank Heemskerk (founder of Research & Innovation Management Services bvba /RIMS/ <http://www.rimsinternational.eu/>) is a world recognised expert in the field of innovation and technology transfer. He was invited to act as a subcontractor of AComIn with two major tasks:

- (i) with his professional advice, to help IICT to develop the first IP Policy and Innovation Strategy in the Bulgarian Academy of Sciences, and in general to help IICT to align its innovation related activities to the best EU practices;
- (ii) to give lectures in hot issues related to valorisation of academic results and technology transfer from academia to industry, sharing his specific experience of a researcher who moved to activities related to innovation capacity building.

In 10-12 July 2013 Dr. Heemskerk visited IICT for 2 days and joined the team developing the draft of the Innovation strategy, in order to give advices how to align the institute's Innovation Activities to the best EU practices.

The draft of the Innovation strategy had been sent to Dr. Heemskerk two weeks in advance, for comments, suggestions and improvements. The discussion in Sofia took one day. In addition to the team preparing the Draft, other key staff of IICT took part in the Meeting:

1. Prof. Ivan Dimov – Chairman of the IICT Scientific Council;
2. Prof. Dimitar Karastoyanov – Manager of AComIn Smart Lab, Leader of AComIn WP4;
3. Assoc. Prof. Rumen Andreev – Head of the Technology Transfer Office of IICT;
4. Assoc. Prof. Gennady Agre – Scientific Secretary of IICT.

The Conclusions from the discussion with Dr. Heemskerk, taking into consideration his comments and suggestions are:

- An Innovation Strategy should simply form the framework around a workable Action plan, which has to be elaborated for the short and the long term future of the institute, focusing on (i) what the institute wants to achieve, (ii) what the institute does not want to achieve and (iii) on the principles how the institute wants to do that;
- A SWOT analysis of the Institute should be elaborated with the following accents: (i) to map the strengths that the IICT has at the moment, (ii) the directions where the IICT can improve its performance relatively easily, (iii) the things the IICT really needs to amend and avoid, and (iv) the opportunities for new initiatives so the IICT can grow.
- This SWOT analysis can then form the basis for the next step - an Action plan for change: (i) what can be done now, (ii) what should be done in the near future, (iii) who - and (iv) at what level - should take action and (v) how can this be done?
- A Research management function should be established for reviewing Institute's contract procedures to enable more industry contracts;

- IICT could consider installing a TT function later to connect it with the existing TTO;
- IICT should consider Training the support staff so they can take up new responsibilities, setting goals for the Institute (such as: how to obtain x number of externally funding grants and industry contracts per year? how to upgrade our infrastructure to accommodate the acute needs for projects x, y, z? how to connect own staff knowledge and know-how with what is needed in the market? which clusters & platforms should IICT be engaged in, etc).

All comments and suggestion were integrated in the second version of the draft Innovation strategy of IICT (Appendix 1 of Deliverable D4.1), where also the qualitative and quantative indicators have been improved and tuned for monitoring of the successful implementation of the IICT's Innovation strategy (Appendix 2 of Deliverable D4.1).



In addition Dr. Heemskerk also did some training in valorisation and technology transfer from academia to industry. He delivered two lectures of several parts to the IICT staff:

- *Exploitation of Research Results: European Practises, Expectations and Trends; How to Create Impact, Project examples, Cases;*
- *Developing Innovation Capacity in a Globalized World: How to bring Competences together; Examples of organisational structures to support Innovation.*

The presentations are available in the Team Area of the project site (Figure 9).

Currently the AComIn team develops further Regulatory documents to support the innovation capacity development in IICT. They will be discussed with Dr Heemskerk in the autumn of 2014.

The screenshot shows the AComIn website interface. At the top, there is a search bar and a navigation menu with links for HOME, ABOUT THE HOST, E-NEWSLETTERS, NEWS, and CONTACT. Below the navigation, the main content area is titled 'WP4: Innovation potential development'. It contains two main sections: 'Lectures on Innovation Capacity development, 10-11 July 2013' and 'Lectures on Intellectual Property issues, 18 April 2013'. The first section includes links to the programme, CV of Dr. Frank Heemskerk, and materials like 'Exploitation of research results', 'Developing innovation capacity', 'Innovation in Horizon 2020', 'Responsible partnering guidelines', and 'Responsible partnering'. The second section includes links to presentations on 'Protection of IP, Authorship and Patents'. On the left side, there is a vertical menu with various site sections: Objectives & Work Packages, Topics in ICT, Progress beyond the State of the Art, Employed Incoming Postdocs, SmartLab Equipment, User Communities, Publications and Talks, Events, Deliverables, Opened Positions, and Team Area.

**Figure 9.** Presentations and certificates, related to the WP4 activities in project months 1-18, in the Team Area of the AComIn site

## 7. SUMMARY OF DELIVERABLE D4.1: SUGGESTIONS FOR TUNING THE IICT INNOVATION STRATEGY TO THE BEST EU PRACTICES

Deliverable D4.1 has been presented at the end of year 1, when has progressed with the innovation activities and started to develop the first institute's Regulatory documents in the Bulgarian Academy of Sciences. It contains two major documents: the draft of the IICT Innovation Strategy and Suggestions for tuning it to the best EU practices. The Deliverable D4.1 is accessible via the Team Zone of the AComIn site.

### 7.1. SUMMARY OF IICT DRAFT INNOVATION STRATEGY

IICT is considered in the National Innovation system as a **potential** with the opportunity to create knowledge and technology, to provide know-how specialists, related expertise and consultancy services to all sector of the Bulgarian economy. Hence, the institute can play very specific roles in the Value chain: "*knowledge creator*", "*source of specialist know-how*", "*training centre*", "*validation centre*", perhaps even "*independent expert centre*" for preparing Opinions to policy makers, etc.

**Definition:** An Innovation strategy is a plan made by the IICT to encourage advancements in research, technology or services, usually by investing in research, organisational and development activities.

The main objective of the IICT innovation strategy is to increase the competitiveness of the Bulgarian industry mostly in the ICT sector and all related branches. It is aligned with the Institute mission:

- (i) to increase the competitiveness and effectiveness of scientific research performed by the institute, as well as
- (ii) to increase the institute's innovation potential for problem-oriented research according to the industry and societal needs and requests.

The innovation strategy of IICT is a synergy instrument to fulfill the Institute mission to carry out competitive fundamental and problem oriented scientific research in ICT field.

#### **Desired outcome and type of innovation strategy:**

IICT innovation strategy is determined by what the institute wants to achieve from the research carried out. Once the Institute determines intended outcome and how it fits to the IICT growth phase, the type of innovation strategy that will best achieve those outcome is chosen:

**Proactive** – since the IICT, having strong research capacity, will often have the first mover advantage and be a technology market leader.

The types of technological innovation used in a proactive innovation strategy are *radical* and *incremental*.

- **Radical innovations** are breakthroughs that change the nature of products and services. Most of them are results from the institute's research projects supported by EC framework programs or national funding.
- **Incremental innovation** is the constant technological or process changes that lead to improved performance of products and services. They are mostly results of sponsored or contracted research such as innovative contracts with companies supported by the National Innovation Fund, Operative Program Competitiveness of Bulgarian Economy, EUREKA, etc.

Another factor that fosters innovation is the creation of a proper environment/culture. *The development of a framework to support innovation* includes: Integrating innovation into Institute's objectives; Taking a holistic approach to innovation; Establishing strong channels of communication; and Developing an environment of trust.

Development of Innovation Strategy in a research institute is just a first step in the creation of proper environment. There should be measures supporting the execution of the Innovation strategy and measures for increasing the innovation potential. The role of innovation in research organisations is to help them achieve growth targets including revenue growth from innovation. When we speak about innovation at IICT, we speak about successfully commercialising new ideas and research results.

#### **Measures for increasing the innovation potential of the IICT:**

- *IP is a key to the success of the Innovation strategy.* The model used for implementing the IP Protection in IICT is the Deal based Model (Just in time) where the rate of production of IP = expected rate of transfer/licensing. This includes the minimisation of non-reimbursed patent protection expenses. For this measure the appointment of a special IPR manager is necessary. The IPP and related regulations should be integrated in the general Institute's regulations.
- *Encouraging the cooperation between the IICT R&D departments and the business:* IICT management should support the participation of research teams in proposals submitted to the National Innovation Fund which ensures financing to innovative and market-oriented projects through partnerships with the state administration, scientific institutions and companies.
- *Support of Innovation leadership in IICT:* The leadership should come from the top – at least in the form of active top management sponsorship but better as active personal involvement, guidance and inspiration for the respective innovation teams. The IICT needs to favor a 'dedicated innovation champion' to take innovative development a step closer to the market.
- *Support of establishment of start-up company for commercialisation of IP:* In many cases the innovation is better done in a start-up environment, rather than in the Institute. There are many reasons why innovation is not easily executed within the institute environment, but entrepreneurs know that it is not easy in a start-up either.
- *Support of the Technology Transfer Office "ICT for energy effectiveness":* The IICT's TTO has been established in 2012. Market demand is driving principle of this TTO to work with companies seeking new knowledge, technology and skilled personnel to realise their own innovation strategies. The range of TTO activities has to cover the whole institute's research activities.
- *Supporting participation in clusters in Bulgaria:* The IICT should supports participation of its research teams especially in high technology and innovative clusters in order to be an active part in the vertical and horizontal integration of the value-added chains in the field of ICT and related industry and society sectors;
- *Support creation and participation of IICT in Technology Parks:* IICT should actively search for cooperation with emerging advanced key players in the ICT domain;
- *Support the mobility of researchers to/from industry:* IICT should foster the development of a favourable environment to attract, develop and retain the necessary human resources in research and innovation and stop the brain drain of qualified scientists. To improve the realisation of the institute innovation potential IICT should supports the mobility of researchers between academia and industry;
- *Establishing an Innovation Advisory Board to position and control the IICT's innovation potential in the national and global market:* The Innovation Advisory Board should include most innovative persons in ICT from the research institutes, industry and society who are decision makers in their own companies, clusters, branch or any other public organisations;
- *Focus and being realistic about how many and which kind of innovation initiatives and projects the institute can drive simultaneously:* IICT needs to decide every time which innovation projects to follow, how to significantly increase their technology success rate and reduce their time to market. One way to achieve that is to open up the innovation process, i.e. embrace open innovation.

**Indicators for Successful Implementation of IICT's Innovation Strategy:**

- Intellectual property policy launched
- Regulation for registration, protection, control and commercialisation of IP launched
- Number of patents and other forms of protected IP
- Exploitation and commercialisation support process of IP
- Number of innovative, market-oriented and supported by industry projects through partnerships with the state administration, scientific institutions and companies funded by the National Innovation Fund, the Operational Program Innovation and Competitiveness as well as by EUROSTARS
- Number of innovative and market-oriented projects through partnerships and supported by companies or use of the research infrastructure
- Number of start-ups created by IICT
- Number of clusters in which IICT is a member
- Number of Technology Parks in which IICT takes part
- Number and Impact of contracts managed by the TTO "ICT for Energy Efficiency" with the industry for exploiting the research potential of the Institute
- Number of Awards (stimuli, bonuses) given by IICT to the innovation leaders (after elaboration of suitable award indicators)
- Innovation Advisory Board of IICT launched
- Number of researchers in mobility to/from industry
- Liability / Plan at Institute level, or at specific project level or for specific relations (e.g. one particularly big industry contract or a large infrastructure facility).
- Communication with Stakeholders
- Contingency plan launched
- Accept regulators in IICT for safety, privacy etc embedded in specific regulations and in the 'house rules or charter'
- Skill Development Policy launched
- Quality indicators in use

**7.2. SUMMARY OF SUGGESTIONS TO IMPROVE THE IICT DRAFT INNOVATION STRATEGY**

The suggestions for further development of the IICT Innovation Strategy came from Dr Frank Heemskerk, Mrs Karina Angelieva (former Director of the Joint Innovation Centre of BAS, present Representative of the Bulgarian Ministry of Education and Science at the EC, Brussels), and Dr Elissaveta Gourova (external advisor of IICT-BAS on innovation capacity building). They are as follows:

- Make a SWOT analysis of the Institute and assess its potential to generate and exploit innovation;
- Develop then an Action plan for change: (i) what can be done now, (ii) what should be done in the near future, (iii) who - and (iv) at what level - should take action and (v) how can this be done
- Develop Partnering strategies and a Knowledge Transfer strategy
- Establish Research management function;
- IICT could consider installing a TT function later to connect it with the existing TTO;
- Consider Human Factors: Train the institute staff including support staff
- Integrate Balanced Scorecards in the IICT Innovation Strategy
- Use hard indicators (quantitative) and soft indicators (measures of change, effectiveness, value building) to assess the progress, and visualise them by radial diagrams.

## 8. PROPOSAL FOR AN INTELLECTUAL PROPERTY POLICY OF IICT

In this section we propose a set of principles that form the basis of the IICT Intellectual Property Policy. This Policy is to be considered and adopted by the IICT Scientific Council as a document within the framework of all Innovation Supporting Regulations.

### INTELLECTUAL PROPERTY POLICY

#### PREAMBLE

Intellectual Property (IP) is an asset that may have commercial value.

The Institute of Information and Communication Technology, Bulgarian Academy of Sciences is responsible to ensure that the IP produced in the institute, as a result of its RTD activities, is managed effectively.

It is the IICT's INTELLECTUAL PROPERTY POLICY that:

- (i) The product of Research Tasks carried out using the IICT environment (which includes facilities, resources, expertise and intellectual assets) constitutes Intellectual Property that should be owned, protected and exploited by the IICT for the benefit of the IICT, BAS and the society as a whole.
- (ii) The IICT should make provision to recognise and reward persons who
  - a) create products within the IICT that may have commercial value or
  - b) bring into the IICT for its benefit already created products which they own.
- (iii) The IICT should not infringe the rights of Owner and Authors who own and control Intellectual Property.
- (iv) The IICT should meet its obligations to the Entities who contracted the research including where required the management and commercialisation of the research results.
- (v) The Research Results should be exploited in order to ensure added value for the IICT and the society as a whole. This exploitation should lead to increasing:
  - the individual competitiveness of the institute's staff
  - the innovation potential of the IICT.
- (vi) The technology transfer and innovation activity is considered as main activity of the IICT for realisation and commercialization of generated IP. Mainly this activity is performing by the IICT's Technology Transfer Office.

The related Regulations are a subject to be designed, considered and approved by the IICT Scientific Council in order to implement the institute's IP Policy and allow the IICT to acquire, protect, exploit and commercialise the Intellectual Property generated within the IICT environment, to recognise and reward the creators of IP and to avoid infringement of third party's IP rights.

These Regulations should comply to the COMMISSION RECOMMENDATION C(2008)1329 on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations.

## 9. PROPOSAL FOR AN IICT EXPLOITATION AND DISSEMINATION PLAN

In this section we propose a draft Plan for exploitation and dissemination of results in IICT. This Plan is to be considered and adopted by the IICT Scientific Council as a document within the framework of all Innovation Supporting Regulations.

### PLAN for the exploitation and dissemination of research results in IICT

This Plan presents the strategy and concrete actions of IICT RTD project teams, to be performed in order to ensure the protection, exploitation and dissemination of project results.

Once the project results are reached and the contractual issues are fulfilled, lots of project teams or consortium partners do not care about the REAL use of these results. This clearly contributes to lack of return on investment for any National or International funding institution, as well as for the partnering organisation that invests resources and efforts in the project execution. Nowadays many funding institutions require mandatory exploitation plans at the early proposal stages. Even more leading research organisations have IP policy and apply Exploitation strategy in their research activities.

Project consortia prepare early Exploitation plans to show to the funding organisations that the team has already clear ideas about actions to be set up after the project end. During the project life cycle, the participants are required to inform the funding organisation about the evolution of their work (achievements and accomplishment of tasks defined in the grant agreement, where the technical work to be carried out in the project is described). This paves the way to the final step, since the plan for the use and dissemination of foreground has to be detailed and complete. Actually, at the end of the project the plan has to be presented and must be very detailed, describing the plans of each partner for the management of foreground.

Due to the reasons stated above, IICT should accept the Exploitation plan as a mandatory document that increases the competitiveness of its research teams applying for public funding. The utility of the Exploitation plan is fourfold:

- It ensures good cooperation within the teams while preparing the plans for the exploitation and dissemination of knowledge;
- It helps the project team to establish a basis for the dissemination and exploitation of foreground and possibly reach any necessary agreements;
- It enables the funding organisation to evaluate the success of a project;
- It allows the funding organisation to keep track of the evolution of all IICT projects in general, to make statistics, and possibly help to the IICT's TTO with the dissemination of results through its channels.

#### How to draft a plan for the exploitation and dissemination of research results (foreground)?

The plan is generally divided into two sections: one related to **exploitable** results and another one to the results that are simply going to be **disseminated** to the public or provided for open innovation. The contribution to standards, contributions to policy developments and potential risks associated with the project results should be described as well.



## **EXPLOITATION OF R&D RESULTS**

The team submitting a project proposal has to provide a list of results that can be commercially or industrially applied. These may include software, inventions, prototypes, compiled information and data, etc. The Plan has to mention the owner of each piece of foreground, whether this is one of the participants or several of them (in the case of joint ownership). Furthermore, participants should explain how they plan to use the foreground, either in further research or commercial activities. It is important to stress that every project participant can use its foreground investing its own efforts (direct use) or engage technology transfer actors and license the foreground to third parties (indirect use). In both cases, participants should point out and analyse, among other things: (i) Main features and benefits of each technology or product derived from the research results; (ii) Customer detection; (iii) Features of the target market; (iv) Positioning.

The main objective of the exploitation of the research results is to create revenues and/or provide social benefits.

**Definition of Exploitable Results** (in the context of Exploitation plan for research projects): *Achieved and Expected Results coming from the project which have commercial/social significance and can be exploited as a standalone product, process, service, etc. These results in principle might need after the project further R&D, prototyping, engineering, validation etc. before they become commercially exploitable.*

Exploitable R&D results can be products, processes, methods, services, etc. which are *new, improved or less costly*. The combination of these can raise different issues that need to be identified and understood to enable successful exploitation:

- new product implies an anticipation of change in behaviour of a customer and its willingness to pay for it,
- for an improved product one must clearly identify the *limitations* of the existing ones,
- the use of technology to reduce cost should guarantee *performances required*.

The main characteristics of *Exploitable Results* are:

- Type or result (product, process, software, service, etc.)
- Innovation;
- Benefit (or exploiting organization(s) );
- Customers;
- Time to market;
- Investment costs;
- Price, market, competition;
- Exploiting partners/economic impact on them;
- Protection and IPR issues (in the IICT or inside consortium);
- Type of exploitation.

The main IICT benefits of exploiting the research results include: New knowledge (не го разбираам); Increase of market share; Increase of revenue; Cost savings; etc.

Two important definitions concerning Intellectual Property Rights (IPR) issues are the following ones:

**BACKGROUND INFORMATION (B)** - Information, excluding foreground information, brought to a project from existing knowledge, owned or controlled by IICT or by project partners in the case of joint research, in the same or related fields to the work carried out in the research project.

**FOREGROUND INFORMATION (F)** - Information including all kind of exploitable results generated by IICT or by the project partners or 3rd parties working for them in the process of performance of a research project.

It is suggested that IICT considers several types of **EXPLOITATION CLAIMS** (among them the following six types denoted **P, M, U, L, O, T**), meaning the intention of IICT to exploit the results by:

- protecting the Intellectual Property (**I**);
- making them and selling them (**M**) via an Institute's spinout company;
- using them internally to make something else for sale (**U**);
- licensing them to 2<sup>nd</sup> or 3rd parties (**L**);
- providing services such as consultancy, etc. (**O**);
- allowing the IICT TTO to commercialise them (**T**).

### **DISSEMINATION OF R&D RESULTS**

It may happen that the foreground obtained at the outcome of a project is not suitable for commercial exploitation or that the results have already been protected and possibly put on the market. Nevertheless, it is still interesting to contribute to future scientific developments or it is still worthwhile to disseminate results to the public to provide an opportunity for future innovation, so called open innovation.

Relevant measures and procedures have to ensure that dissemination of foreground doesn't bring prejudice to parties and is carried out with the agreement of all project parties. Dissemination activities use scientific journals, conferences, workshops, seminars, publications, websites, etc. in order to reach as much audience as possible. In this way the results subject of dissemination (**D**) as open innovation (**O**) could be disseminated by: Journal publications (**J**), Conference or workshop publication (**C**), websites (**W**), other communication channels (**CC**) and so on.

The proposal is that IICT employs in its Regulations a structured representation of research results using a Table displaying Results and Departments (i.e. the institute Exploitation plan is formulated at the level of the IICT departments). Table 1 shows how two results presented in D4.2:

- "Visual design of night vision devices", developed by the IICT Department of Information Processes and Decision Support Systems and
  - "Braille Display", developed by the IICT Department of Embedded Intelligent Technologies
- are marked by "I", as results with protected Intellectual Property. This suggestion is very useful having in mind that the applied research has a significant share in the Institute agenda (more than 25%) with tendency to increase it in the near future.

Further suggestions are that IICT employs also Table 2 (to describe in a structural manner every Exploitable result) as well as Table 3 (to assess the technological, partnership, market, legal, management, as well as environmental regulation and safety risks for every Exploitable Result).

<b>RESULTS</b>	Result 1	Result 2	....	Result "Braille Display"	Result "Visual design of night vision devices"	.....	Result <sub>n</sub>
Department 1							<b>FJ</b>
Department 2		<b>FC</b>					
.....							
IPDSS: Inform. Processes and Decision Support Systems					<b>I</b>		
Embedded Intelligent Technologies				<b>I</b>			
.....							
Department 13			<b>BUL</b>				
Department 14	<b>BTO</b>						

**Table 1.** Structuring the IICT List of Exploitable Results by Departments and Exploitation Type

Legend:

**B** – Background, **F** – Foreground

Exploitation types:

- protecting the Intellectual Property (**I**);
- making products out of the result and selling them (**M**) via an Institute's spinout company;
- using the result internally to make something else for sale (**U**);
- licensing the result to 2<sup>nd</sup> or 3rd parties (**L**);
- providing services such as consultancy, etc. (**O**);
- allowing the IICT TTO to commercialise the result (**T**).

Dissemination types:

- dissemination (**D**);
- open innovation (**Oi**);
- journal publications (**J**);
- conference or workshop publication (**C**);
- websites (**W**);
- other communication channels (**CC**).

**Table 2:**

**Characterisation of each Exploitable Results**

**Exploitable Result n° #:** Sensors for robot system (components) *(template)*

Describe the innovation content of result	
Who will be the customer?	
What benefit will it bring to the customers?	
When is the expected date of achievement in the project (Month/year)?	
When is the time to market (Month/year)?	
What are the costs to be incurred after the project and before exploitation?	
What is the approximate price range of this result / price of licences?	
What is the market size in M€ for this result and relevant trend?	
How this result will rank against competing products in terms of price / performance?	
Who are the competitors for this result?	
How fast and in what ways will the competition respond to this result?	
Who are the partners involved in the result?	
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	
Have you protected or will you protect this result? How? When?	

**Table 3:**

**Risks at Exploitable Result level**

**Result N°: ###**

**Rapporteur: D. Karastoyanov**

Risks	Groups	G 1		Ranking (I x L)	Comments
		Impact (I)	Likelihood (L)		
<b>Technological risks:</b>					
1	Worthless result: ill-timed disclosure.	2	2	4	
2	Worthless result: earlier patent exists.	2	3	6	
3	Worthless result: better technology/methodology exists.	4	2	8	
4	Significant dependency on other technologies.	3	3	9	
5	The life cycle of the new technology is too short.	1. 1	2. 1	1	
6	Result aiming at replacing existing and well entrenched technologies	3. 1	4. 4	4	
<b>Partnership risks:</b>					
7	Disagreement on further investments: some partners may leave.	1	2	2	
8	Industrialization at risk: no manufacturer for the exploitable result.	1	2	2	manufacture: if advantages of the technology are there we will find one
9	Industrialization at risk: an industrial partner leaves the market.	1	1	1	no risk from IICT point of view as we.....
10	Industrialization at risk: a partner declares bankruptcy.	1	1	1	the partner company's state is very good

11	Disagreement on ownership rules	3	2	6	the partners seem very reasonable
12	Partners on the same market	1	1	1	not the case
<b>Market risks:</b>					
13	Exploitation disagreement: partners on the same market.	1	1	1	not the case
14	Exploitation disagreement: partners with divergent interests.	1	1	1	
15	Worthless result: performance lower than market needs.	4	4	16	from the current point of view unacceptably high risk
16	Nobody buys the product. Nobody needs it.	1	1	1	we believe they need it
17	Nobody buys the product. Too expensive.	3	1	3	
18	Nobody buys the product. Unsuitable sales force.	1	1	1	sales infrastructure is available
19	Nobody buys the product. The project hits against a monopoly.	1	1	1	
20	Nobody buys the product. Problems at the time of the first sales.	1	1	1	
21	Nobody buys the product. Rejected by end-users.	1	1	1	
<b>Legal risks:</b>					
22	Legal problems: proceeding against us.	2	1	2	
23	Legal problems: we are sued for patent infringement.	3	1	3	in the branch it is not common to sue each other: freedom to operate
24	Know- how risks: it is easy to counterfeit the patent.	1	1	1	maybe the patent if any, but not the machinery

25	Know- how risks: a counterfeit cannot be proved.	1	1	1	such a technology could be seen on the market, at least through Asian customers
26	Know- how risks: the patent application is rejected.	1	2	2	
<b>Management risks:</b>					
27	Nobody buys the product. Our licensee is not exploiting his exclusive license.	1	1	1	
28	Know- how risks: there are leaks of confidential information.	2	2	4	
29	Multiple changes to original objectives.				
30	Inadequate communication among partners.	2	2	4	
31	On time supply of financial means.	1	1	1	
32	Weak exploitation. Inadequate business plan	1	1	1	
<b>Environmental/regulation/safety risks:</b>					
33	Nobody buys the product. Does not comply with the standards.	2	2	4	reliability standards, production standards
34	Nobody buys the product. Standards to make it compulsory don't yet exist.	1	1	1	
35	Research is socially or ethically unacceptable.	1	1	1	
36	Influence of laws and regulations.	1	1	1	

## 10. COMPLEMENTARITY OF ACOMIN ACTIVITIES AND THE TASKS OF THE IICT'S TTO

The Technology Transfer Office "Information and Communication Technologies for Energy Efficiency" (TTO "ICTEE") is a new functional unit of IICT-BAS for supporting the successful interaction between researchers and the industry. Its main goal is to further the innovation in business activities and to increase the number as well as the level of market success of innovative products, processes and services developed by research organisations. The TTO "ICTEE" assists in the knowledge transfer and transfer of know-how to businesses and initiates and coordinates projects for innovative ICT-based products and solutions in the field of energy efficiency.

The TTO "ICTEE" implements this main function through the following activities that are complementary to AComIn objectives and tasks:

- Providing SMEs, government institutions and research organisations with services for the evaluation of possible applications of ICT for energy efficiency;
- Encouragement of realisation and commercialisation of generated research results in IICT and other institutes of BAS for achieving Exploitable Results;
- Participating as a full member in Networks of Technology Transfer Offices as well as in existing or emerging innovation infrastructures;
- Providing consulting and expert services in the field of Technology Transfer, Intellectual Property and financial management of innovation projects;
- Disseminating and promoting industry-related results of applied research conducted by the institutes of BAS countrywide/worldwide.

The package of services, provided by the TTO "ICTEE", is divided into the following groups:

- *Information Services*: Development of a database of energy efficiency related micro-, small and medium-sized enterprises; Advancement of novel technological and scientific achievements in the field of energy efficiency and implementation of ICT; Organisation of workshops, seminars, exhibitions, etc.;
- *Consultancy Services*: Evaluation and assistance in the protection of intellectual property and patent rights, legal support; Development, consultancy and coordination of new project proposals concerning knowledge transfer to SMEs; Market analysis of the market of ICT based energy efficiency innovation products;
- *Financial Services*: Facilitation of easier access to funding and support of achieving of exploitable results; Access to finance schemes; Promotion of energy efficiency related developments towards investment funds;
- *Technological Services*: Transfer of technologies, innovations and know-how, scientific solutions to particular problems, related to the usage of ICT for energy efficiency; Technology valuation and technology audits of SME; Pilot testing of energy efficiency technologies; Experts and consultants services, related to technology transfer and products (prototypes) realisation.

Some TTO's tasks listed above might concern and support the AComIn activities:

- Facilitation of easier access to funding and support of achieving Exploitable Results,
- Organisation and participation in events in order to disseminate information to SME about the potential of IICT-BAS to collaborate with industrial firms in achieving Exploitable Results,
- Expert and consultancy services, related to technology transfer and products (prototypes) realisation.



The TTO "ICTEE" has promoted the project and disseminated AComIn results and especially information about SMART LAB during its presentation at the International Plovdiv Fair on 29 September 2013. The same done at the Business Meeting in Stara Zagora organised by the TTO on 3 December 2013. The TTO took part in the organisation of the SMART Lab presentation on 19 December 2013.

AComIn also contributes to the TTO success. At first this is done by the systematic development of proposals for Regulations concerning the IICT Innovation potential. These proposals contain useful ideas that might be directly adopted to the TTO concepts and tasks.

When the AComIn project speeds up in the second period and starts to generate more Exploitable results, the TTO will take care about the registration of every generated foreground knowledge. The TTO will also help in the follow up activities in order to support the foreseen Exploitation Plan.

## 11. ASSESSMENT OF THE ADDED VALUE OF THE ACOMIN WP4 ACTIVITIES TO THE STRENGTHENING OF IICT RESEARCH AND INNOVATION CAPACITY

The Added Value of WP4 to the IICT innovation capacity can be assessed in two directions.

First, there are some new developments in the patent activity that would be impossible without AComIn. There is funding to support an application to the WIPO, extending a Bulgarian application. But it is more important that the new equipment, purchased within the project, enables to produce patent applications with better quality.

Second, AComIn catalyses joint research activities with Users. Section 5 explains that the AComIn submission inspired further submissions to the National Calls of the Competitiveness Operational Programme in January-June 2012; today IICT has 6 running projects for know how transfer to six Bulgarian SMEs in topics, related to AComIn (and another 6 projects in the same Programme in other topics). This activity continues and accelerates. By 31 March 2014 IICT prepares two submissions to the National Innovation Fund, which deal with topics related to AComIn, entitled:

- *An intelligent system for producing of bio-oil using pyrolysis of bio-mass*. Beneficiary - Alfalift Ltd, IICT coordinator Prof. Dimitar Karastoyanov;
- *High-frequency interference portable instrument for contact-less removal of ectoparasites*, Beneficiary - Amet Ltd, IICT coordinator Prof. Svetozar Margenov;

Another application for the next call of the National Innovation Fund (entitled "*An innovative technology for producing of high temperature materials and alloys, containing nano elements*" with beneficiary Retel Ltd), foresees purchase of Bulgarian Patent Applications authored by the IICT senior Prof. Karastoyanov. Three patents might be purchased:

- Georgiev G., **Karastoyanov D.**, Method for the coatings renovating of the steel surfaces, Patent Application No 110745, 2.9.2010
- **Karastoyanov D.**, Micromanipulator, Patent Application No 111056, 13.10.2011
- **Karastoyanov D.**, Method and test stand for investigation of the surface of steel shafts, Patent Application No 111361, 05.12.2012

In case that the application is successful, the Retel Ltd will be the first Bulgarian company purchasing a Bulgarian patent of IICT.

All these activities show that IICT innovation potential gradually increases.

## **12. DEVIATIONS FROM SCHEDULE**

There are no deviations from the scheduled tasks in WP4.

## **13. CONCLUSION**

The work package WP4 progresses according to the schedule planned in the AComIn Technical Annex. WP4 also accelerates since some experience in knowledge and technology transfer has been already gathered.

One can feel considerable change in the spirit within IICT, regarding the increasing prestige of and higher interest to applied and industrial research. This is certainly implied by various factors, including the changing environment in Bulgaria in general, but especially for IICT AComIn is one of the major driving factors for the change. In this context the project is successfully entering in its Period 2.