



INSTITUTUL NAȚIONAL DE STUDII ȘI CERCETĂRI PENTRU COMUNICAȚII
NATIONAL COMMUNICATIONS RESEARCH INSTITUTE
INSTITUT NATIONAL D'ETUDES ET DES RECHERCHES DES TELECOMMUNICATIONS
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Laborator de încercări în
comunicații cu sistem de
management al calității
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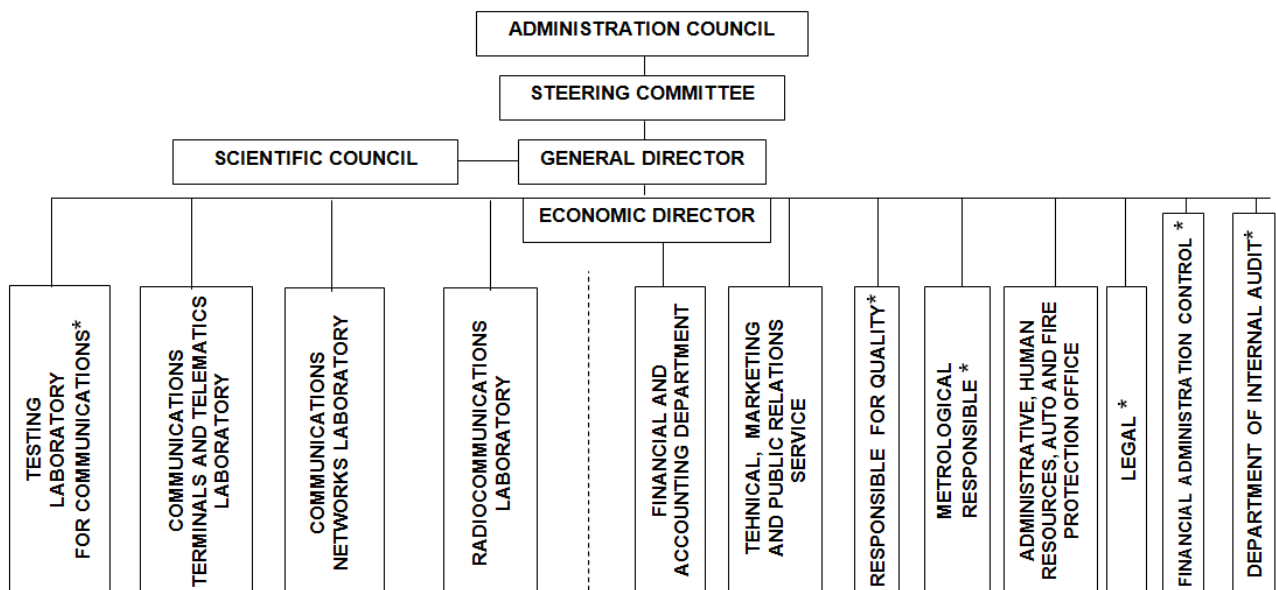
Self-assessment report 2007 -2011

1 Administrative structure diagram of the institution

NATIONAL COMMUNICATIONS RESEARCH INSTITUTE
I.N.S.C.C.

ANNEX I
APPROVED AT THE ADMINISTRATION
COUNCIL MEETING DATED 29.05.2007

ORGANIZATIONAL AND FUNCTIONAL STRUCTURE



Approved by MCTI with Nr.893/27.06.2007

*) Engaged to necessity, by collaboration or as supplementary function

2 General activity report of the institution

2.1 General situation of the Institution

National Communications Research Institute – I.N.S.C.C. Bucharest, was established according to regulation of Government Ordinance Nr.57/2002, approved by Law Nr.324/2003, by Government Decision Nr.1234/1996, as the National Institute for Research and Development under the coordination of the Ministry of Communications and Information Society – M.C.S.I.

I.N.S.C.C.'s main mission is to participate in the elaboration development strategies in Communications Domain, by elaborate and providing for Central Public Administration the strategic and prospective studies, to define the technologies and communications services, new or improved, advanced structures and solutions for communications, transport and distribution networks.

In the same time, INSCC performs research and development activities in the Field of Communications, in order to increase the level of knowledge, to develop platforms and generic technologies and to solve specific problems in this area.

Also, INSCC offers technical assistance, consulting and providing scientific services to network operators and equipment suppliers or other interested parties and runs tests and checks for equipments and communications networks.

During an over 55 years activity, as in the last 4 years, INSCC acted with maximum competence and impartiality, constantly strengthening its role and recognition as the main Body of technical expertise, neutral in the Communications Domain. At the same time, the Institute continuously expanded the domain of addressed issues, and the results of its activity potential beneficiaries field.

To achieve this, INSCC's experts have been and are in touch with the latest technology, Regulations and Agreements applicable in the Domain, which is a regulated area, by the use of limited natural resources (radio frequency spectrum, numbering and addressing system, satellite orbital positions and dominant land positions).

Due to the status of unique National Institute for Research and Development in Communications, INSCC pay particular attention to quality and neutrality of provided solutions and conclusions, which are used to technical ground the developing strategies and policies in the Domain, as well as to promote communications services by operators in competition on these services free market.

2.2 Evolution of the Institution in the last 4 years

2.2.1. From a scientific point-of-view

The evolution of INSCC followed to provide scientific support for specific activities under the very rapid evolution of communications technologies. It involves permanent and easy access to information sources, primarily the International Telecommunication Union and European Telecommunications Standards Institute Documents and general scientific information in Communications.

The scientific concerns covered the full range of specific subjects areas to **Communications that Radiocommunications, Broadcasting, Communications Networks, Communications terminals and Telematics applications, Systems and complex applications, Electronic communications services.**

At the same time, the scientific level of INSCC specialists increased permanently that obtained information would be penetrated into the most intimate technical substance, to be

adapted and extended, if necessary, for transformation into applications for the provision of technologies, structures and Communications services, new or improved.

Dominant feature of the scientific evolution of the unit, in the last 4 years, was to stimulate permanent growth the ratio of PhDs technical science, in total research staff certified, the ratio of certified research staff in total research staff and the ratio of research staff in total staff.

This, in the conditions of continuous adaptation in terms of the number of staff at the contract portfolio and personnel leaving the unit through retirement or switching to productive communications activities, including the highest scientific skills.

In this context, **the comparative situation 2011/2007, is as follows:**

	<u>Ratio</u>	
	<u>2007</u>	<u>2011</u>
1. Research staff in total staff	77,4%	82,7%
2. Certified research staff in total research staff	41,7%	54,2%
- of which PhD	30%	38%

2.2.2 Addressed issues

This favorable evolution of statistical indicators, corresponding to the scientific evolution of the INSCC staff was accompanied by permanent widening of the training base and specialized expertise on communication techniques and technologies, as well as deepening their updated variants to expand the area of application and turn them into practical solutions for new or improved services and network structures, adapted to the specific conditions for widespread access to electronic communications services throughout the national territory.

Thus, among many objectives and scientific issues addressed in the last 4 years, **we can mention:**

- ✓ **Hybrid solutions and new network architectures for broadband access to electronic Communications services;**
- ✓ **Increase security of communication networks and the use of biometric identification technologies;**
- ✓ **Analysis and reliability modeling of the access systems for broadband Communications security;**
- ✓ **The use of satellites for mobile communications networks;**
- ✓ **Impact of new wireless techniques and technologies on the structure and evolution of National Table of Frequency Bands Assignment;**
- ✓ **Integration of communications technologies to develop a platform for electronic services at home;**
- ✓ **New algorithms for adaptive/smart antennas in Communications systems 3G and post 3G;**
- ✓ **Integrated wireless platform of local access for broadband and mobility, with self-organization of resources;**

✓ **Virtual Network IT&C for education and research units geographically dispersed;**

✓ **Unguided optical communication systems and by solitons.**

2.2.3 Involvement

The several objectives and issues addressed, mentioned from a total of over 90, treated in the last 4 years, shows that addressed issues meet the growth of both general scientific level and elaboration of solutions and concepts referring to communication technologies and services, new or improved, for INSCC participation to the objectives achievement of **National strategic Documents for the development of Information Society**, in accordance with the **Digital Agenda for Europe in 2020**, mainly:

✓ **Romania Digital Strategy – e-Strategy for Information Society;**

✓ **E-Inclusion strategy;**

✓ **Telecommunications strategy;**

✓ **Government program – Information Society;**

✓ **Radio spectrum strategy;**

✓ **Government development strategy of broadband electronic communications in Romania;**

✓ **Strategy for transition from analogue terrestrial to digital television and digital multimedia services nationwide deployed;**

At the same time, know-how, data, technologies, services, strategic studies and analysis provided to Central Administration of Communications, have contributed substantially to the absorption of European funds through projects, thus the absorption percentage on the level of Ministry of Communications and Information Society, which coordinates INSCC, is **about 3 times higher than the average for Romania;**

Also, through the development, approval and implementation of strategies and policies for development of the Information Society in Romania, in which INSCC is heavily involved by providing technical and scientific substantiation, **electronic communications market in Romania has increased significantly during this period;**

2.2.4 Achievements

Among the results of many projects achieved in this period may to remark **some concrete achievements, as follows:**

✓ **Multimedia platform for the implementation of complex medical services;**

✓ **Integrated communications platform with flexible broadband access;**

✓ **Complex system for teleassistance on NGN support for elderly people at home;**

✓ **Integrated wireless platform of local access for broadband and mobility, with self-organization of resources;**

✓ **Virtual Network IT&C for education and research units geographically dispersed;**

✓ **System for assessment and comparison of the technical performance of mobile phone handsets based on a set of parameters that influence the perceived quality of telephone service users.**

In the same period, **11 projects and tests** were made to direct order of beneficiaries acting as service providers and/or equipment and communications network operators;

2.3 Visibility and dissemination

Evolution of the Institution, in the last 4 years, includes an important component of visibility and dissemination of results through intense participation of INSCC specialists at prestigious international conferences and congresses in the Communications domain, in the country and abroad, with papers presented and included in the Proceedings of these events;

In this sense and completely synthetic, in the last 4 years, research staff, including a total annual average of **10 experts**, participated **with 45 papers to 25 international conferences and congresses, including 8 abroad**, with a very diverse topics and with reference to the latest techniques, technologies, applications and communications services.

Of these, without any hierarchy, **we mention some themes:**

- ✓ **Telecentres network for complex medical services;**
- ✓ **The Patient Home Assistance Application based on Telemedicine Service;**
- ✓ **Secure Information System for Concurrent engineering applications;**
- ✓ **Information security in Wi-Fi networks;**
- ✓ **Capacity of MIMO Wireless systems;**
- ✓ **Procedures based on the Dialog Semantics for Emergency and Teleconsulting Call Centres;**
- ✓ **Home electronic integrated services;**
- ✓ **Modeling biometric systems using UML language;**
- ✓ **Securing medical databases access by mixed authentication methods;**
- ✓ **Self Calibration Method for the Fiber Optic Raman Distribution Temperature Sensor;**
- ✓ **A synthetic impulse noise environment for DSL access networks;**
- ✓ **Decision Optimization Criteria in Multimodal Biometric Systems;**
- ✓ **Atmospheric Constraints on free Space Optical Communications Links.**

In addition to publication in proceedings of international conferences and congresses, an important component of scientific visibility of the unit is made in the examination period by publication of the articles in professional journals and by books.

In this regard, during over 55 years of existence, INSCC contributed intense and permanent to the occurrence of biannual and uninterrupted, for over 50 years, of “Telecommunications” journal with international broadcasting and edited under authority of the Ministry of Communications and Information Society and the Ministry of Education, Research, Youth and Sports, including foreign authors and articles in English.

INSCC experts, in the annual average number previously mentioned, in the last 4 years, individually and collectively, published **over 50 articles** on very diverse current topics and that we exemplify the **following themes:**

- ✓ **Field Measurements on In Service Optical Fiber;**
- ✓ **Use of resources for broadband services in WIMAX networks;**
- ✓ **Short Review on Mechanical Reliability of optical fiber;**

- ✓ **Hybrid solutions for broadband access. MAP Platforms (Multiservice Access Platform);**
- ✓ **Integrated wireless platform of local access for broadband and mobility, with self-organization of resources;**
- ✓ **Integrated platform for home teleassistance;**
- ✓ **Multi-view video coding;**
- ✓ **Mobile terminal positioning in GERAN access networks;**
- ✓ **Evaluation of network security and communications systems using attack graphs;**
- ✓ **Measurements of mobile phones speech transmission parameters in ambiental noise conditions;**
- ✓ Concerning to **published books** of INSCC specialists in this period, they are **in number of 10** covering topics of current interest in Communications domain as follows:
 - **Wireless network access - Dynamic allocation of resources;**
 - **Broadband wireless access;**
 - **Security in Wi-Fi networks;**
 - **Digital terrestrial television;**
 - **Dispersed virtual networks;**
 - **Localization of mobile terminals in GSM and UMTS networks;**
 - **Unguided optical communications.**

The Institute activity took place in an important measure and in partnership with in profile Universities for 11 projects, with Research Institutes in Related Domains for 3 projects and with Economic Operators as service providers for 3 projects, several years during the reporting period.

2.4 Technical basis

To ensure technical base of activity, in the analyzed period, the Institution was equipped with equipment, devices and programs of own development funds and projects funds. These facilities has been destined **to modernize the computer network and Internet access of INSCC, twice during this period**, the last time even in 2011.

On the other hand, it was purchased specific equipment for experimental research of communications.

From this second category we can mention:

- ✓ **PSTN automatic test set;**
- ✓ **Access points and wireless devices.**

All concrete information underlying those presented in this Report is detailed on the website: www.inscc.ro.

3 Activity report by team

3.1 Radiocommunications team

Main Research Domains

Radiocommunications team (RDC) is the oldest team in Institute. It was founded at the same time as INSCC, in 1955, adapted its plans with the technology, and activated continuously till present. In the last four years, the team concerned with present radiocommunications problems and with access networks and with user's mobility, according to trends in domain.

Objectives

- ✓ Analysis of conditions and strategies for implementation of radiocommunication services in Romania.
- ✓ Analysis of the objectives and development of new broadband wireless services and applications, including services security.
- ✓ Flexible utilization of radioresources and frequency spectrum.

Activities

The topic of RDC team was generally pointed out to different aspects of the domain. RDC team followed the rapid pace of technological change and the growing connectivity, digital communications, that made possible new radiocommunication technologies, new network solutions, new products and so on. Different aspects of new radiocommunications systems were tackled as:

- ✓ digital broadcasting (DVB-T, DVB-T2, DRM etc.),
- ✓ point to point, point to multipoint communications,
- ✓ new cellular communication systems, like LTE and LTE advanced and IMT-2000 advanced,
- ✓ satellite communications (DVB-S, DVB-S2),
- ✓ new wireless access systems for:
 - personal area (Bluetooth, UWB, Zig-Bee etc.),
 - local area (Wi-Fi),
 - metropolitan area (WiMAX).

Mobility in new wireless systems is a main domain of preoccupation. The cellular systems represented also a point of interest for RDC team, for example UMTS systems (release 8 – 12). RDC team works also in radiofrequency spectrum regulation.

All the research ensured a continuous and systematical development of a bundle of items concerning the wireless and access systems as: network structure and functioning, interconnection with other networks, protocols, services, applications, quality, security, etc., briefly radiocommunications under different aspects are the goal of RDC team research activity.

The research projects were realized solitary or in cooperation with other partners from universities or other research institutes.

Research works

In the last four years can be mentioned projects achieved in cooperation, where the RDC team assured the coordination of the project as:

- ✓ Integrated, communications Platform with flexible access to broadband (in cooperation with Polytechnic Institute of Bucharest, Technical University of Jassy, National

Institute for Informatics), project finished in 2008. The main objective of the project was to prove the possibilities of modern access wireless networks to improve transmission capacity and the quality of communication.

✓ Integrated local access wireless platform for broadband and mobility, with resources self-organization (in cooperation with Technical University of Jassy, Technical University of Pitesti and Technical University of Cluj-Napoca), finished in 2010. The main objective was to study broadband wireless access solutions and self-organization, with users' mobility. The optimization of resources' utilization is a main objective of many researches and has a direct impact on quality of services.

✓ IT-C virtual network for geographically dispersed research and teaching units (in cooperation with Technical University of Jassy, Technical University of Pitesti and Technical University of Cluj-Napoca), finished in 2011.

RDC team worked as partners to projects coordinated by universities or other research institutes:

✓ New algorithms for adaptive antennas – smart 3G and post 3G communications systems (coordinator of project was Technical University of Jassy).

✓ Quality assessment system for services generated by e-business mobile applications (coordinator of project was Academy of Economic Studies, from Bucharest)

In the last four years, RDC team worked on other project as:

✓ Study concerning evolution of 3G cellular systems to EPS, completed in 2010.

✓ Study on introduction of DVB-T2, completed in 2010.

✓ Study and methodology for introduction of mobile WiMAX, completed in 2010.

✓ Study on wireless mesh networks, completed in 2011.

✓ Study on DVB-S2 system, completed in 2011.

✓ Study on UWB system, completed in 2011.

✓ Wireless ad hoc systems, completed in 2011.

✓ Radiofrequency spectrum utilization for wireless access systems, completed in 2011.

In the last four years, RDC team developed studies for Romanian Ministry of Communication and Information Society and helped to develop strategies. RDC team coordinated projects destined for Ministry of Communication and Information Society as:

✓ Analysis and identification of hybrid solutions for broadband access (finished 2009).

✓ Study on use of satellites for mobile communication networks (finished 2009).

✓ Impact of new techniques and wireless technologies on the structure and evolution of National Table of Frequency Bands Assignment (finished 2009).

Nowadays, RDC team is involved in cooperation with other teams from Institute in new projects for Ministry of Communications and Information Society concerning subjects as electronic communication platform, networks security, access networks.

Briefly, the main results obtained by RDC team can be summarized as obtaining good knowledge and expertise on:

- ✓ Modern, wireless systems – functions, services, quality, security.
- ✓ Frequency spectrum utilization and optimization.

Visibility

The main scientific results of RDC team were spread out in scientific community at international conferences, seminars, workshops, in technical journals.

The main results of RDC team works were also published in books (in romanian language), disseminated to the interested institutions and libraries. The published books generated by the RDC in the last four years are:

- ✓ Broadband wireless access – Presentation and analysis (2008).
- ✓ Broadband wireless access – Measurements and results (2008).
- ✓ Digital terrestrial television, DVB-T (2008).
- ✓ Wireless access networks – Resources' dynamic allocation and self-organization (2010).
- ✓ 3G cellular systems evolution to Evolved Packet System, EPS (2010).
- ✓ VPN networks with wireless access (2010).
- ✓ Dispersed virtual networks (2011).
- ✓ Mesh networks (2011).
- ✓ Mobile terminals location in GSM and UMTS networks (2011).

Research staff

RDC team is dynamically adapted to the research working plan and consists of a core team and associated experts from Institute or from outside, depending on the project. In the same time, RDC team associate to other teams from Institute if the team expertise is useful for their projects. Depending on the project, as in the last years, RDC team can be associated with other research teams from other research institutes or from universities.

The projects were carried out using a staff within the team: 0,65CSI, 1,15CSIII, 1,05CS, 1,80ASC and 1,65 technicians, of which two are PhD. The research staff worked in a good cooperation with other teams from INSCC or from universities (Bucharest, Jassy, Cluj, Pitesti) with preoccupations in wireless domain.

Research team has been working on FP7 proposals in international cooperation, namely 1. Project ICAPLOCS „*Integrated Convergent Access Platform with Low Cost Services*” (with partners from Turkey, Romania, Great Britain, Serbia, Slovakia, Cyprus). 2. Project INTEROP „*Interoperability of Communications Networks for Truly Effective Response and common Operational Picture*” (with partners from Israel, Romania, Spain, Sweden, Greece).

Future directions

As well as in the last four years, the future works of RDC team will be directed to follow the general development of radiocommunications domain, their dramatic growth, the current and future trends in wireless network technologies and applications.

Digital Agenda for Europe is a leading guide for future development of the researches of the RDC team.

Mobility ubiquosity, security and new wireless services, mainly broadband and multimedia, for new digital era, their quality and user's satisfaction will be objectives for the future researches of the RDC team.

3.2 Communications Systems for Electronic Services Team

Main Research Domains

Given the tendency of electronic services development using ICT, attention was given to matters relating to use of communications systems that support to implementation of integrated e-services applications in the context of information society development, the Internet and digital systems to large scale.

Objectives

- ✓ Analysis of conditions for implementation of electronic services in Romania,
- ✓ Analysis of ways to use of technology and communication networks that support for the development of teleassistance services,
- ✓ The development of experimental models teleassistance platforms.

Activities

To achieve the objectives the following activities were planned:

- ✓ Works having as theme the use of telecommunications technologies in developing networks for the implementation of telemedicine or teleassistance services, namely: mobile communications systems, wireless systems, network access at home, the NFC technology, multimedia networks, NGN networks;
- ✓ Works on the development of experimental platforms for implementation of telemedicine or teleassistance at home services, according to medical practice, using various communications solutions.

Research works

- ✓ *Study and solutions work on the introduction of telemedicine services in Romania*, carried out a study on the issue of implementation and development of telemedicine services, in Romania, resulting in a number of proposals and solutions for field development.
- ✓ *Wireless solutions for complex systems work for medical data acquisition, telemonitoring systems, Implemented on mobile communications networks, with applications in telemedicine* and *Study on the use of NFC for mobile data acquisition for m-Health applications*, have approached the methods of using mobile technologies and wireless systems for medical telemonitoring application development, one of the main branches of telemedicine.
- ✓ *Complex system on NGN support for teleassistance of the elderly, at home, - TELEASIS* and *Multimedia platform for the implementation of complex medical services - TELMES*, experimental models have been developed for integrated platforms for implementation of teleassistance and telemedicine services, aimed at the development of telemedicine applications and assistance at home, for the elderly.

All works listed above, made along with collaborators in research consortia: technical universities, universities of medicine, private companies engaged in the fields of software, medical assistance or home care.. The project manager for each work was a team member Communications systems for electronic services.

The results of the project is an technical support for MCSI, in the development strategies of electronic services as part of the electronic government policy in Romania.

Research Achievements

Research projects have had an important contribution on:

- ✓ the development of telemedicine, teleassistance at home, and the development of ambient intelligent environment fields;

- ✓ the technologies used to implement electronic services such as teleassistance, namely: wireless networking, access network to Internet, technologies for personal area networks for implementation of teleassistance devices with Bluetooth, ZigBee, or NFC technology;
- ✓ teleassistance network models with their hardware and software components;
- ✓ teleassistance experimental platforms. The experimental platform architecture has specifically been designed to meet social, technical and economic users' stringent requirements. The system ensure a support for to medical and social personnel to provide the teleassistance with installation and use reasonable cost. Therefore, the platform is aiming to provide the elderly people with medical and social decent home assistance while living the everyday live undisturbed. Last but not least, the system is allowing users to fully benefit from friendly/familiar electronic technologies, for example TV-based teleassistance.

The activity was recovered by carrying out projects of a *doctoral thesis: Contributions for National Telemedicine Network - 2007*. and is finishing the thesis: *Optimizing decision biometric identification systems* - with applications in security systems for telemedicine.

Visibility

Project results have been reported in various scientific papers at national and international conferences and journals. Some examples:

- ✓ **Integrated Teleassistance Platform with Enhanced Accessibility to Information – TELEASIS**, S. Puscoci, L. Stoicu-Tivadar, V. Stoicu-Tivadar, D. Berian, F. Serbanescu, S. Ionita, F. Bajan, *6th IEEE International Symposium on Applied Computational Intelligence and Informatics (SACI 2011), May 19-21, 2011 in Timisoara, Romania*

- ✓ **Integrated tele-assistance platform – TELEASIS**, Sorin Puşcoci, Lăcrămioara Stoicu-Tivadar, Florin Şerbănescu, Flavius Băjan, Ion Bogdan, Silviu Ioniţă, Cristian Ciortan, *The Second IFAC Symposium on Telematics Applications TA 2010, 5-8 oct 010, Timișoara, România;*

- ✓ **Home electronic integrated services**, Sorin Puşcoci, Eng.Radu Dragomir, *Proceedings of Designing Ambient Interactions for Older Users, European Conference on Ambient Intelligence - AMI09, 18-21 Nov.2009, Salzburg, Austria*

- ✓ **TELEASIS – the integrated platform of teleassistance**, Sorin Puşcoci, *Integrated and Innovative Health Care Services for rural Romania Conference, Progam Innovations Norway, 7-8.10.2010, Bucharest Romania;*

- ✓ **TELMES - A Romanian Multimedia Platform for Medical Teleservices Implementation**, Puşcoci S, Serbanescu F, Dionisie B. Bajan, F, *Healthcare IT Management vol.3, Issue 3, Autumn 2007;*

- ✓ **Multimedia Network for Complex Telemedicine Services in Romania**, H.costin, S. Puşcoci, C. Rotariu, B. Dionisie, G Andruseac, F.Şerbănescu, S. Ioniţă, F. Bajan, M Cimpoescu, C. Costil, *Conferința „TeleMed & e-Health”, Londra, 26-27 nov. 2007*

- ✓ **Some Aspects Regarding Elder Patients Acceptance over an ICT Mobile Platform**, Radu Dragomir, Sorin Puscoci, Mihaela Tache, *DAI'09 – Designing Ambient Interactions for Older Users, 18th November 2009, Conference AmI 09 2009*

- ✓ **Telecenters networks for complex medical services –TELMES**, S. Puscoci, S. Ionita, F. Bajan, F. Şerbănescu, *The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT -Med-e-Tel, 18-20 Aprilie 2007, la Luxemburg.*

✓ **Multimedia Platform for Medical Teleservices Implementation**, Puscoci S, Ionita S, Costin H, Serbanescu F, Dionisie B, Bajan F., *Rev Med-Chir, SMN Iași. april-iun 2007; vol 111, 2 (supl.2): 161-163.*

✓ **An Internet Embedded Monitoring Unit for Telemedicine Services**, C Rotariu, H. Costin, S. Puscoci, G. Andrusac, C. Costin, *Euro-Mediterranean Medical Informatics and Telemedicine- EMMIT 2007 Mangalia, 3-5 Mai 2007;*

✓ **Evaluating the Impact of AmI over the e-Health Service User**, .Mihaela Tache, Radu Dragomir, *Proceedings Of the International Conference e-Health and Bioengineering – EHB 2009, Constanța , Romania, 17-18 Sept.2009, ISSN 2066-7590.*

Also, the research **TELEASIS project** received **The eHealth Excellence Award 2011, at the Congress of Telemedicine - Bucharest2011**

Research staff

The projects were carried out using research staff within the team: 0,45 CSI, 0,8 CSII, 1,95 CSIII, 0,3 CS, 1,5AS, and 1,25 technicians (of which three PhD, and one and one PhDstudent), and in collaboration with higher education institutions performing research activities and private sector establishments, including healthcare solutions that have experienced results of projects to exploit further.

The Communications systems for electronic services team has established close connections with universities in Bucharest, Iasi, Pitesti, Cluj and Timisoara, in order to share knowledge, experience, and resources in the field, as well as with units of state or private with medical activity, considering that a number of electronic services such as telemedicine, are multidisciplinary.

Research team has been working on FP7 proposals in collaborations international competition in this field, namely: 1. *MOBAP Project - Chronic Disease Management Predictive Model Base, FP7-ICT-2007-1* 2. *NeMuCoPA Project - Network and Multimedia Content for Continuous Chronic Patients' Call FP7-ICT-2007-1* 3. *Project Regional Centre of telemedicine - TELEREN, 2009* filed with the agency **Innovation Norway The Norwegian Centre for telemedicine - NST**, in the "Memorandum of Understanding on the Implementation of the Norwegian Cooperation Programme for Economic Growth and Sustainable Development in Romania "- the fourth priority - health.

Future Directions

Team *Communications systems for electronic services* proposed future developments through contributions to achieve the objective: high-speed access the Internet - as required by the Digital Agenda for Europe. It also will be involved in developing applications with a high degree of complexity, which would allow public access, such large-scale electronic services at home, with positive consequences for the citizen, government or bussines.

We also propose increasing the number of researchers in the team, with complementary specialties to address a number of different areas - communications (radio, wireless, optical fiber), data, communications and data security, and increase the number of doctoral students in the field and participation in national or international competitions or international cooperation.

3.3 Optical Communications Team

Main Research Domains

Since the year 2008 the Optical Communications Team (OCT) has been continuously activating in both the optical communications technologies development and the optical networking domain.

The OCT has conducted research works addressing enabling technologies, optical networking challenges, and wavelength-routed optical networks. The scientific research has focused on processes engineering, systems design, and optical transmission modeling. Last but not least, integrating optical solutions into translucent networks has been intensely studied.

Activities

Major research projects:

- ✓ Integrating Communications Technologies into a Public and Personal Electronic Services Enabling Platform in Accordance with e-Romania Strategy.

Research Achievements

The research projects has resulted in an impressive enrichment of the scientific knowledge regarding:

- ✓ signals traveling in fiber optics;
- ✓ emission and noise in optical amplifiers;
- ✓ spectral efficiency with modulation schemes;
- ✓ dispersion-managed solitons.

The OCT has been contributing to the development of best practices in optical transmission engineering by:

- ✓ refining the granularity of a WDM system to the wavelength level;
- ✓ increasing the optical technologies survivability;
- ✓ designing synergetic models of an optical traffic.

Our OCT results has contributed to:

- ✓ define communications terms and clarify concepts within the documents of the Ministry of Communications and Information Society - MCSI;
- ✓ support communications policies, broadband strategies, and e-Romania Digital Agenda with MCSI;
- ✓ elaborate regulations and legal provisions for the communications market;
- ✓ provide the communications market with deterministic and differentiate electronic services.

Research Leads

Optical WDM switching, notably crossconnects (OXC), has been paid attention to build transparent switches, which are intended to complement the opaque technology for a multi Gb/s bit rate traffic.

The Communications Team has been better understanding the issues and challenges of the cross-layer design, involving the physical layer (optics and electronics), the network layer (architecture), and the application layer (software). Accordingly, the OCT has started to search

the territory of the network control and network management which is broadening our research fields with the new domain of the network management.

About the Team

The projects were carried out using research staff within the team: 0,45CSI, 0,7CSII, 1,55CSIII, 1,2CS, 0,6AS, and 1,35 technicians.

Fiber optics has become the core of the telecommunications and data networking infrastructures. The second generation of fiber optics network is just emerging. The rapid evolution of the technologies, married with an insatiable demand for bandwidth, is resulting in a quick transition of the networks from research laboratories into the marketplace.

The OCT is surveilling the evolution, the prevailing tendency, and the stimuli which are driving the communications market. National and international conferences, workshops, seminars, business meetings are opportunities we are attending to learn the latest requirements of the communications market players.

Also, we are actively in providing both the scientific community and the communications market with papers to show out our results and solutions. More than twenty scientific papers has been released in international conference proceedings and journals. AMI08 in Nurenberg (Germany), AMI09 in Salzburg (Austria), and WSEAS in Prague (Czech Republic) are international conferences abroad where we presented some of our work.

The OCT has established close connections with universities in Bucharest, Iasi, Pitesti, and Brasov, in order to share knowledge, experience, and resources in the field.

Accomplishing projects has needed the OCT become larger in number and wider in technical and scientific domains. Today, the OCT comprehends two PhDs senior research engineers, two research engineer, and two technicians.

Some of the papers are presented below:

✓ R. Dragomir, Gh. Pescaru, S. Puşcoci, **Field Measurements on In-Service Optical Fiber**, Telecomunicații, Anul LI, Nr.1, 2008, ISSN 1223-6527

✓ R. Dragomir, **Short Review on Mechanical Reliability of Optical Fiber**, Telecomunicații, Anul LI, Nr.2, 2008, ISSN 1223-6527

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3.4 Communications Systems Security Team

Main Research Domains

Since the year 2007, the Communications Systems Security Team (CSST) has been continuously performing research activities in the communications networks and systems security, concerning novel security technologies and solutions.

The CSST research addressed the actual issues on the communications networks and systems security, also looking for security models and solutions based on the actual technologies. The scientific research domains included: security engineering, security models design, data security for broadband communications networks and systems, biometric identification technologies for networks security.

Also the conducted research addressed the performance evaluation models for the security solutions, and their integration in a full security framework for the broadband communications systems.

Activities

The following major research projects are in progress within the last four years:

- ✓ **Analysis and modeling the access systems reliability for broadband communications security**
- ✓ **Biometric identification solutions for communications networks security improvement**
- ✓ **Solutions to security risks minimization in wireless networks**

Research Achievements

The research projects has enriched the scientific knowledge concerning:

- ✓ state-of-the art on security issues and technologies, especially for broadband networks;
- ✓ modern biometric identification technologies and their application on communications security;
- ✓ relationships between the communications infrastructures security and their reliability;
- ✓ The CSST has been contributing to the establishing of reliable security framework and solution design methods especially for broadband communications networks, by
 - ✓ improving the performance of the actual authentication solutions by focusing on multimodal biometrics;
 - ✓ improving the cost/performance ratio by suitable cost evaluation model for the security solutions;
 - ✓ designing security models based on the equipment and network reliability, in order to improve the communications infrastructures security

The CSST **results has contributed to:**

- ✓ define a comprehensive framework on security issues (terms and concepts) within the documents of the Ministry of Communications and Information Society –MCSI;
- ✓ support communications policies and broadband strategies;
- ✓ elaborate regulations and legal provisions in order to support providing the secured and reliable electronic communications services;

✓ provide the communications market with modern security solutions, able to protect either the end-user data but also the communications support

Research Leads

We have been focused either on physical and logical security issues, models and solutions, in order to ensure a comprehensive framework to build reliable and trusted broadband communications infrastructures. Such a framework is intended to provide optimal solutions to increase the communications security, but keeping the quality of services for the end-users and with costs optimization.

Our team has been better understanding the challenges of the security issues, involving either the physical security level (reliability-based security) but also the logical security level (data security). Also the CSST has approached the area of the security management and its components, as much as it is an inherent component of the network management.

About the Team

The projects were carried out using research staff within the team: 0,45CSI, 0,5CSII, 1,55CSIII, 0,45CS, 1,1AS, and 1,25 technicians

Communications systems security has become a big challenge within the last years, as much as it involves not only technical issues, but also economical and even social impact issues. The rapid evolution of the security threats, but also the wide range of the electronic services, together with the quality of service and cost optimizations requirements, is resulting in more concerns on ensuring of a trusted and secured broadband communications support.

The CSST is looking for the actual trends in the security area in order to support development and providing optimal solutions as requested on the communications market. National and international conferences, workshops, seminars, business meetings are opportunities in order to learn the latest worldwide developments and approaches in security solutions design, implementation and impact. Also we are providing both the scientific community with papers revealing our results and proposed models and solutions.

The CSST has established close connections with universities in Bucharest and Pitesti, in order to share knowledge, experience and resources in the field.

In order to accomplishing the projects objectives, the CSST has needed to increase in number and enrich the knowledge in the communications security-related domains. Today, the CSST includes one Ph.D student senior research engineer, one Ph.D senior research engineer, and two technicians.

Some of the papers are presented below:

1. **Security breaches detection within complex applications support systems**, S.Soviany, Telecomunicații, Anul LI, Nr. 1, 2008, ISSN 1223-6527

2. **Modelling Biometric Systems Using UML Language**, S.Soviany, M.Jurian, S.Pușcoci, G.Pescaru, Proceeding of the International Conference on Electronics, Computers and Artificial Intelligence (ECAI 2009), 2-5 Iulie 2009, Pitesti, România, ISSN 1843-2115

3. **Securing Medical Database Access By Mixed Authentication Methods**, **Proceeding of the International Conference on e-Health and Bioengineering (EHB 2009)**, S.Soviany, M.Jurian, R.Dragomir, S.Pușcoci, Proceeding of the International Conference on e-Health and Bioengineering (EHB 2009), 17-19 septembrie 2009, Constanța, România, ISSN 2066-7590

4. **Intrusion Detection Systems**, S.Soviany, S.Pușcoci, G.Pescaru, R.Dragomir, Telecomunicații, Anul LII, Nr. 1, 2009, ISSN 1223-6527

5. **Communications Systems Access Securing by Biometric Identification Methods**, S.Soviany, Telecomunicații, Anul LII, Nr. 1, 2009, ISSN 1223-6527
6. **Physical Security Assessment for Communications Networks and Systems**, S.Soviany, R.Dragomir, S.Pușcoci, Telecomunicații, Anul XV, Nr. 1, 2010, ISSN 1223-6527
7. **Communications Networks and Systems Assessment using Attack Graphs**, S.Soviany, M.Tache, Telecomunicații, Anul XV, Nr. 2, 2010, ISSN 1223-6527
8. **A Reliability-based Security Model for Communication Network and Systems**, S.Soviany, R.Dragomir, S.Pușcoci, Proceeding of the 6th International on Electrical and Power Engineering (EPE 2010), 28-30 oct 2010, Iași, România, ISBN 978-606-13-0078-5
9. **Multimodal Biometric Securing Methods for Informatic Systems**, S.Soviany, M.Jurian, Proceeding of the 34th International Spring Seminar on Electronics Technology, ISSE 2011, Slovakia, 12-15 May 2011, ISBN 978-80-553-0646-9
10. **Decision Optimization Criteria in Multimodal Biometric Systems**, S.Soviany, M.Jurian, S. Pușcoci Proceeding of the International Conference on Electronics, Computers and Artificial Intelligence (ECAI 2011), June 30th-July 2nd 2011, Pitești, România, ISSN-1843-1115
11. **A Multimodal Approach for Biometric Authentication with Multiple Classifiers**, S.Soviany, C.Soviany, M.Jurian, Proceeding of the International Conference on Communications, Information and Network Security (ICCINS 2011), November 28-30, 2011, Venice, Italy