



INSTITUTE OF RADIOELECTRONICS
WARSAW UNIVERSITY OF TECHNOLOGY
FACULTY OF ELECTRONICS AND INFORMATION TECHNOLOGY



ANNUAL REPORT

2004

Warsaw, January 2005

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From the Director

Welcome to the 2004 edition of our Annual Report!

As we approach the end of 2004, I have been looking back over this and previous years of activities carried out at the Institute of Radioelectronics. There have been many important milestones in our research and didactic projects, matched by many advancements in our capabilities for undertaking new tasks. My first and foremost feeling is, therefore, that of pride of having been at the heart of the Institute's vibrant life. For reasons of conciseness, we will be able to feature our 58 projects, 144 courses, and over 200 printed deliverables only very briefly throughout this annual report.

The most valuable asset of the Institute of Radioelectronics, the way I see it, is our staff. We cherish a legacy of innovative research dating back a few decades. This has always been combined with class leading dedication to technical teaching as well as education in its broader sense. Over the past few years several personnel changes and valuable extensions have taken place, and I am pleased to say that we have grown in rank as well as in number of young, brilliant scientists. Our day-to-day work as well as strategic planning are now driven by 14 professors (including 9 with state professorial titles) and 44 assistant professors. The positive trend seems fairly constant, e.g. with 5 state professorial titles, 4 habilitation degrees, and over 10 Ph.D. degrees awarded quite recently.

We have been making noteworthy contributions to science, engineering, and technology. This year our teams have published even more extensively than in previous years, covering the areas of radiocommunications, multimedia, microwaves and acoustics, and medical electronics, to mention but a few. A complete list of 4 text books, 49 journal papers and 136 conference reports can be found further. Many of our colleagues are recognised worldwide for their contributions and many prestigious responsibilities have been bestowed upon them. They act as reviewers for papers submitted to transactions and proceedings of the IEEE and other series, members of technical programme committees of leading international conferences, and judges in paper or thesis contests.

The above scientific and leadership qualities have been achieved whilst retaining top quality teaching in as many as 144 different courses. During regular course hours, we span a variety of complementary approaches from sound theoretical background to hands-on experience in our well equipped 14 laboratories. These include just new, advanced Antenna Laboratory, Radiocommunications Laboratory with a GSM system, anechoic chamber and a sound studio, Microwave Laboratory, Tomography Laboratories, and various computer rooms with professional software packages. Moreover, the Institute stimulates development of student research groups: Space Technology Group, Microwave Group and Advanced Information Technologies Group.

Just how exciting the field of radioelectronics research can be, and how fast moving the area of radioengineering technology remains, is the message we want to deliver to our students but also further across the society. That is why we have developed a programme of continuing education complementing regular studies. Courses in radiocommunications and multimedia technology lie at its basis, though we also do offer tailored courses and consultancy services. They help transfer leading edge research and technology from academia to industry.

Another proof of our commitment to ensure that our research results are integrated into the industrial practice - is through the participation in design projects for and together with industrial and commercial companies from Poland, Europe, Asia, US and South Africa. Recently, direct contracts have been signed with manufacturers in the field of multimedia technologies and microwave power systems. Another important strand in project activities, facilitated by Poland accessing the European Union this year, is through the Sixth Framework initiatives, including VISNET, TARGET and WISE. Our continuing participation in Socrates, Eureka and Polonium schemes ensures that both scientific and business opportunities are motivating to our staff and students. New project proposals are now under way, and new directions of contacts are always sought, both geographically and thematically.

We further recognise that leading international and national conferences form a real marketplace of new ideas and new partnerships. We therefore encourage our researchers to have a strong presence there and we also co-organise important events. One is Microwave and Radar Week, held biannually in Poland and attracting presenters from all around the world. In May 2004 it took place in Warsaw with over 500 attendees from 40 countries, which the centrepiece was 15th International Conference on Microwaves, Radar and Wireless Communications MIKOM'2004. The other group of events that we co-organise on regular basis is National Conference on Radiocommunications and Broadcasting KKRRiT'2004. It has become the most important conference in Poland on this subject, and integrates academics and researchers with the providers of telecommunication services and equipment, radio and TV broadcasting, as well as national administration. Over 550 registrants participated in the last Conference, held at our University in June 2004. This conference was followed by VISNET and TARGET workshops.

The latest results of our research are thus already in use. New developments are proceeding which will keep our Institute at the forefront of radioelectronics research and engineering. We are on track for more achievements and looking forward to the challenges ahead. I wish to extend warm invitation to academic institutions in Poland and abroad, and especially throughout the European Union that we have become a member of this year, to join forces in a quest for scientific and teaching excellence. I do believe that new threads of common activities will drive our multilateral efforts and targets even further. I also hope that our accomplishments highlighted in the following parts of this report will serve as an incentive for new industrial partners to exploit synergy effects of collaboration with our Institute. Last but not least, I also wish to thank our existing partners, supporters and friends for their stimulating interest and assistance over the years.

Warsaw, January 2005

Professor Józef Modelski, Ph.D., D.S

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This Annual Report summarizes the research activities of the Institute in 2004, as well as the teaching activities of the academic year 2003/2004

1. GENERAL INFORMATION

1.1. Mission of the Institute

In defining its mission, the Institute of Radioelectronics is amenable to contemporary needs of academia, industry, and society. Therefore, it aims at the three measurable objectives: to provide teaching of societal relevance; to seek excellence in scientific research; and to run projects meeting the international standards. Technically, we focus on the three well-defined specialisations: radiocommunications, multimedia, and biomedical engineering. These are very well perceived by our students and partners in national and international activities.

As educators, our staff performs sterling work and exhibit immense stamina. The effects are directly measurable in terms of quality and numbers of supervised diplomas. Our graduates prove competitive on the demanding job market in Poland and abroad. They find employment in telecommunication services, mobile communications, information technology, television, and also in public services. We reach further into these sectors through the successful scheme of continuing education. The offer of courses including Radiocommunications and Multimedia Technologies attracts an increasing number of participants.

As researchers, we are faithful to the highest standards of the Faculty and the University. We also feel quite unique due to an extremely broad spectrum of addressed subjects, which comprise:

- electromagnetic and acoustic field theory, acoustic and electromagnetic wave generation and propagation,
- signal theory, processing, coding, transmission, with regard to electronic, electroacoustic, and TV signals,
- physical phenomena in radio engineering, acoustic, nuclear engineering, and medical systems,
- biomedical signal analysis, medical imaging, medical informatics,
- X-ray, MR, and emission tomography,
- detection and spectrometry of radiation,
- analysis and synthesis of electronic systems,
- intelligent multimedia systems and multimedia converged (video, data, and voice),
- measuring methods and systems,
- analysis, measurement, and estimation of sound and image distortion.

It is also our ambition to implement the new scientific knowledge into a good engineering practice. The Institute covers the full process of technological development, from innovative ideas up to the construction of prototypes. The products are applicable in: radio communication systems, radio-location antennae, television equipment, radiomonitoring systems, high-efficiency energy sources, high-power radio engineering devices, equipment for time and frequency services, biomedical instrumentation, measurement systems involving industry, nuclear engineering for scientific research, medicine, and food industry.

The Foundation for Development of Radiocommunications and Multimedia Technologies plays a special role in perpetuating scientific research within our Institute and the whole Faculty. The Foundation subsidises undergraduate and graduate scholarships. It monitors and awards the progress of young Polish researchers. Its generous support helps us face the socio-economical obstacles, and compete with commercial opportunities awaiting the young people on the open market.

The Institute carries out its tasks under long-term contracts with national and foreign universities as well as research and commercial institutions listed in our previous reports. We work in partnership with Worcester Polytechnic Institute (US), Lviv Polytechnic National University, Technische Universitaet Graz, SIEMENS AG Oesterreich, Landeskrankenhaus-Universitätsklinikum Graz and the Swedish Institute for Food and Biotechnology. The Institute actively participates in the Socrates and NATO scholarship programmes. Relatively new forms of activity are students' projects performed at the Institute and sponsored by foreign industrial companies.

1.2. Board of Directors

Director of the Institute:

Józef Modelski, Ph.D., D.Sc., Tenured Professor
room 422, phone +48(22)6607233, +48(22)8253929
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Secretariat:

Anna Tratkiewicz
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Deputy Director for Research:

Wiesław Winięcki, Ph.D., D.Sc., Associate Professor
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Secretariat:

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Deputy Director for Academic Affairs:

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Deputy Director for Technical Affairs:

Maciej Konwicki, M.Sc., Head R&D Engineer (0.5)
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Secretariat:

Beata Zielińska (from 01.06.2004)
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e-mail: B.Zielinska@ire.pw.edu.pl

1.3. Organization of the Institute

The Institute of Radioelectronics consists of the following research and teaching divisions:

- Electroacoustics Division;
- Microwave and Radiolocation Engineering Division;
- Nuclear and Medical Electronics Division;
- Radiocommunications Division;
- Television Division;
- Digital Processing of Measurement Signals Group.

The structure of the Institute also includes Library, Financial Section, and Supply Section.

1.3.1. Electroacoustics Division

Head of Division

Zbigniew Kulka, Ph.D., D.Sc., Professor
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e-mail: Z.Kulka@ire.pw.edu.pl

Senior academic staff

Wiesław Winięcki, Ph.D., D.Sc.	Associate Professor
Piotr Bobiński, Ph.D.	Assistant Professor (from 1.11.2004)
Ewa Kotarbińska, Ph.D.	Assistant Professor (0.5)
Andrzej Leszczyński, Ph.D.	Assistant Professor
Krzysztof Mroczek, Ph.D.	Assistant Professor
Maria Tajchert, Ph.D.	Assistant Professor

Junior academic staff

Aleksandra Kruś, M.Sc.	Assistant (0.5 - from 1.10.2004)
Robert Łukaszewski, M.Sc.	Assistant
Michał Moraszczyk, M.Sc.	assistant (0.5 - to 30.09.2004)

Technical staff

Tomasz Daniluk, M.Sc. (0.5)
Jan Żera, Ph.D. (0.5)

Ph.D. students

Michał Kostrzewa, M.Sc.	from 1.10.2001
Michał Kowalski, M.Sc.	from 1.10.2004
Aleksandra Kruś, M.Sc.	from 1.10.2004
Grzegorz Kustra, M.Sc.	from 1.10.2000
Mariusz Mikołowicz, M.Sc.	from 1.03.2001
Piotr Nykiel, M.Sc.	graduated
Michał Moraszczyk, M.Sc.	from 1.10.2003
Marcin Stolarski, M.Sc.	from 1.10.2004

Retirements:

Andrzej Aronowski	foreman
Jerzy Narkiewicz-Jodko, Ph.D.	Assistant Professor

The activities of the Division concern electroacoustics and digital audio techniques including investigations, measurements, and applications. They are focused on:

- digital audio;
- design and measurement of electroacoustic transducers;
- investigation and modelling of acoustic field distribution;
- noise control and active noise reduction;
- psychoacoustics;
- architectural and industrial acoustics;
- sound studio techniques;
- hearing protection.

Current research topics include:

- digital audio signal processing;
- active noise reduction systems applied to acoustic waveguides;
- objective and subjective methods of sound quality evaluation;
- detection of auditory warning signals in the presence of industrial noise;
- elaboration of computation methods for radiated acoustic field by surface acoustic sources in free space and their implementation on a PC.

The other field of interest concerns fundamental and applied research associated with metrology, instrumentation and measuring systems. It is focused on

design of automated computer-based measuring systems. Current research topics include:

- software environment for computer-aided design of measuring systems;
- virtual instrumentation, plug-in boards for data acquisition, IEEE-488 equipment;
- modern information technologies e.g. LabVIEW, Java, XML and modern communications technologies e.g. the Internet, GSM, Bluetooth in distributed control and measuring systems.

The Division is equipped with an anechoic chamber and sound studio with two control rooms.

1.3.2. Microwave and Radiolocation Engineering Division

Head of Division

Tadeusz Morawski, Ph.D., D.Sc., Tenured Professor
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Senior academic staff

Wojciech Gwarek, Ph.D., D.Sc.	Tenured Professor
Stanisław Rosłonec, Ph.D., D.Sc.	Tenured Professor
Małgorzata Celuch-Marcysiak, Ph.D.	Assistant Professor
Daniel Gryglewski, Ph.D.	Assistant Professor
Przemysław Miazga, Ph.D.	Assistant Professor
Krzysztof Robaczyński, M.Sc.	Senior Lecturer (0.5)
Maciej Sypniewski, Ph.D.	Assistant Professor
Andrzej Więckowski, Ph.D.	Assistant Professor
Wojciech Wojtasiak, Ph.D.	Assistant Professor
Jolanta Zborowska, Ph.D.	Assistant Professor

Ph.D. students

Michał Baranowski, M.Sc.	from 1.10.2004
Marek Bury, M.Sc.	from 1.10.2004
Tomasz Ciamulski, M.Sc.	from 1.03.2000
Paweł Kopyt, M.Sc.	from 1.10.2001
Sebastian Kozłowski, M.Sc.	from 1.10.2004
Artur Moryc, M.Sc.	from 1.03.2002
Janusz Rudnicki, M.Sc.	from 1.10.2000
Robert Szelenbaum, M.Sc.	from 1.10.2001

Technical staff

Krzysztof Robaczyński, M.Sc. (0.5)
 Mirosław Lubiejewski
 Ryszard Michnowski, M.Sc.

Retirement

Krzysztof Kowalski, Ph.D. Assistant Professor

The Microwave and Radiolocation Engineering Division conducts scientific and applied research in the area of electromagnetic field theory, microwave theory and techniques, measurement techniques for very high frequency range as well as computer-aided design, data acquisition and data processing. Specific research topics in 2004 included:

- design of high-frequency systems for radar techniques and radiocommunications (oscillators, synthesisers, modulators, amplifiers, high-power noise sources, transmitter/receiver modules);
- methods of synthesis and computer-aided design of passive and active microwave circuits (couplers, summaters and dividers, switches, transistor circuits);
- analysis and design of multielement planar in-phase radar antenna arrays intended to work at high power level;

- development of new structures of noncommonsurate nonsynchronous transmission line stop-band filters and application of them in various radar equipments;
- development of new optimization algorithms for computer-aided synthesis of antenna arrays with especially shaped radiation patterns;
- design of modern computer-aided measuring systems;
- development of numerical methods and implementation of computer programmes for full-wave analysis and design of two- and three-dimensional microwave circuits (filters, matching circuits, uniform and periodic guiding structures, polarisers, antennae);
- development of non-linear programming and artificial intelligence methods, and their application to the automated design of microwave circuits.

1.3.3. Nuclear and Medical Electronics Division

Head of Division

Krzysztof Zaremba, Ph.D., D.Sc., Professor
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Senior academic staff

Zdzisław Pawłowski, Ph.D., D.Sc.	Tenured Professor
Janusz Marzec, Ph.D., D.Sc.	Associate Professor
Artur Przelaskowski, Ph.D., D.Sc.	Associate Professor
Piotr Bogorodzki, Ph.D.	Assistant Professor
Piotr Brzeski, Ph.D.	Assistant Professor
Grzegorz Domański, Ph.D.	Assistant Professor
Tomasz Jamrógiewicz, M.Sc.	Senior Lecturer
Marek Karolczak, Ph.D.	(to 30.09.2004)
Marian Kazubek, Ph.D.	Assistant Professor
Bogumił Konarzewski, Ph.D.	Assistant Professor
Tomasz Olszewski, M.Sc.	Senior Lecturer
Lechisław Padée, Ph.D.	Senior Lecturer (0.33)
Ewa Piątkowska-Janko, Ph.D.	Assistant Professor
Artur Przelaskowski, Ph.D. D.Sc.	Associate Professor
Dariusz Radomski, Ph.D.	Assistant Professor
Waldemar Smolik, Ph.D.	Assistant Professor
Roman Szabatin, Ph.D.	Assistant Professor

Graduate trainees

Michał Dziewiecki	Assistant (0.5 - from 1.10 to 30.09.2005
Katarzyna Skrajnowska	Assistant (0.5 - from 1.10 to 30.09.2005

Ph.D. students

Paweł Bargieł, M.Sc.	from 1.10.2001
Piotr Boniński, M.Sc.	from 1.03.2002
Dariusz Janusek, M.Sc.	graduated
Wojciech Kozerski, M.Sc.	from 1.10.2004
Robert Kurjata, M.Sc.	from 1.10.2000
Mateusz Orzechowski, M.Sc.	from 1.03.2001
Adam Padée, M.Sc.	from 1.03.2002
Wojciech Padée, M.Sc.	from 1.10.2004
Tymon Rubel, M.Sc.	from 1.10.2003
Robert Sulaj, M.Sc.	from 1.03.2002
Artur Trybuła, M.Sc.	from 1.03.2002
Anna Wróblewska, M.Sc.	from 1.11.2002
Marcin Ziembicki, M.Sc.	from 1.03.2004

Technical and administrative staff

Dariusz Ćwiek, M.Sc. (to 30.09.2004)
 Andrzej Wasilewski
 Joanna Witkowska

Retirement

Waldemar Scharf, Ph.D. Assistant Professor

The research and teaching activities carried out in the Nuclear and Medical Electronics Division are concentrated on two areas: biomedical engineering and nuclear electronics. Research in the inter-disciplinary area of biomedical engineering covers a broad range of topics and integrates sophisticated electronics and information technology with elements of medical knowledge. The activity in the area of nuclear engineering is concentrated on the design of electronics systems and data processing software for the high energy physics experiments. The Division's research is focused on following topics:

- nuclear medicine (emission tomography: SPECT, PET);
- magnetic resonance imaging (MRI), functional MRI, advanced applications of MRI;
- quantitative computer-aided tomography;
- tomographic dynamic studies;
- process tomography, impedance tomography;
- analogue and digital radiography;
- medical image processing and recognition;
- methods and instrumentation for electrocardiography, high resolution electrocardiography and electroencephalography;
- medical applications of isotope techniques;
- telemedicine;
- biomedical accelerators;
- design of apparatus and software for high energy physics experiments;
- mathematical modelling of physiological and disease process.

Areas of recent studies include:

- multimodal imaging of topographic, tomographic and functional studies in medicine;
- region based methods for functional MRI;
- electrical instability of heart study;
- correlated methods for the investigation of neurosystems by NMR and SPECT tomography;
- MR imaging optimisation for functional studies;
- telecardiology;
- expert systems for high resolution ECG;
- application of wavelet transform for echocardiographic images' quality improvement and for image data compression;
- algorithms for 3D brain imaging;
- dynamic tomographic studies (computer-aided method of early diagnosis of brain strokes);
- digital structural radiography;
- X-ray stereoscopy;
- optical tomography applications in medicine;
- high resolution capacitance tomography;
- algorithms for image reconstruction for electrical and process tomography;
- construction of capacitance tomographs and sensors for medical and industrial applications;
- measurement and analysis of human limb tremor;
- designing detectors and read-out systems for high energy physics experiments;
- modelling of radiographic imaging systems;
- application of predictive models in algorithms of medical diagnosis;
- applications of "soft-computing" methods (neural networks, genetic algorithms, etc.) for data processing

and optimization of the experimental setup in high energy physics experiments.

1.3.4. Radiocommunications Division

Head of Division

Józef Modelski, Ph.D., D.Sc., Tenured Professor
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Senior academic staff:

Jan Ebert, Ph.D., D.Sc.	Tenured Professor (0.4)
Jacek Wojciechowski, Ph.D., D.Sc.	Professor
Tomasz Buczkowski, Ph.D.	Assistant Professor
Henryk Chaciński, M.Sc.	Senior Lecturer
Jacek Cichocki, Ph.D.	Assistant Professor
Krzysztof Czerwiński, Ph.D.	Assistant Professor
Krzysztof Derzakowski, Ph.D.	Assistant Professor
Jacek Jarkowski, Ph.D.	Assistant Professor (0.5)
Wojciech Kazubski, Ph.D.	Assistant Professor
Tomasz Keller, Ph.D.	Assistant Professor (from 1.11.2004)
Jerzy Kołakowski, Ph.D.	Assistant Professor
Tomasz Kosio, Ph.D.	Assistant Professor
Krzysztof Kurek, Ph.D.	Assistant Professor
Stanisław Maszczyk, Ph.D.	Assistant Professor from (1.12.2004)
Mirosław Mikołajewski, Ph.D.	Assistant Professor
Juliusz Modzelewski, Ph.D.	Assistant Professor
Karol Radecki, Ph.D.	Assistant Professor
Kajetana Snopek, Ph.D.	Assistant Professor
Zbigniew Walczak, Ph.D.	Assistant Professor
Yevhen Yashchyshyn, Ph.D.	Assistant Professor

Ph.D. students

Paweł Bajurko, M.Sc.	from 1.10.2004
Grzegorz Bernatek, M.Sc.	from 1.10.2004
Piotr Bilski, M.Sc.	from 1.10.2001
Paweł Kącki, M.Sc.	to 30.06.2004
Damian Kolmas, M.Sc.	from 1.10.2004
Arkadiusz Kurek, M.Sc.	from 1.11.2002
Piotr Majchrzak, M.Sc.	from 1.10.2002
Marcin Piasecki, M.Sc.	graduated
Grzegorz Radzikowski, M.Sc.	to 30.06.2004
Rafał Szumny, M.Sc.	from 1.10.2002
Tomasz Szymański, M.Sc.	from 17.02.2003
Arkadiusz Trojanowski, M.Sc.	from 1.10.2002
Sebastian Wydra, M.Sc.	from 1.03.2002

Technical staff

Anna Czarnecka, M.Sc. (0.4 - from 15.04.2004)
 Jacek Jarkowski, Ph.D. (0.5)
 Marek Marcinkowski
 Stanisław Żmudzin, M.Sc. (0.25)

Retirements:

Stefan Hahn, Ph.D., D.Sc. Tenured Professor
 Waldemar Kielek, Ph.D., D.Sc. Associate Professor

The teaching activities of the Radiocommunications Division are related to radiocommunication systems, antennae, signal processing, measurement in radiocommunications, and networks.

Research is focused on digital radio transmission problems and advanced computer science applications, radio systems design, particularly cellular and short range systems, radio transmitting and receiving, as well as ecological, medical and EMC problems. Current research topics include:

- radio-communication systems and networks – 2G (GSM), 3G (UMTS) and 4G (MBS) mobile systems, short range ISM systems (e.g. Bluetooth), Radio Frequency Identity Devices (RFID), ad-hoc networks, satellite systems, radio navigation systems, broadband access networks (LMDS, WLAN) and ultra wideband systems (UWB);
- antennae and radio waves propagation – complex, intelligent antennae and control algorithms; scanning antennae, automatic measurements of near zone antenna characteristics, propagation channel modelling;
- radio communication measurements – radio spectrum monitoring methods and systems; radio devices testing methods and systems; measurements automation;
- radio frequency power devices – class D, DE, E and C resonant power amplifiers, linear wide-band short-wave amplifiers, low-noise amplifiers, microwave filters and phase shifters;
- a theory of signals and modulations – multidimensional Hilbert transform and its applications, using time-division to frequency division transformations for radio-frequency signal processing;
- advanced numerical methods – circuits and systems design and optimisation;
- environmental and biological problems – an influence of radio communication systems on a human's health and environment as well as on electronic equipment, protection zones planning.

1.3.5. Television Division

Head of Division

Władysław Skarbek, Ph.D., D.Sc., Professor
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Senior academic staff

Andrzej Buchowicz, Ph.D.	Assistant Professor
Grzegorz Galiński, Ph.D.	Assistant Professor
Krzysztof Ignasiak, Ph.D.	Assistant Professor
Tomasz Krzymień, M.Sc.	Senior Lecturer
Marek Rusin, Ph.D.	Assistant Professor (0.5)

Ph.D. students

Stanisław Badura, M.Sc.	from 1.10.2004
Krzysztof Kucharski, M.Sc.	from 1.03.2002
Grzegorz Pastuszek, M.Sc.	from 17.02.2003
Aneta Świercz, M.Sc.	from 1.10.2002
Michał Tomaszewski, M.Sc.	from 23.02.2004
Karol Wnukowicz, M.Sc.	to 29.02.2004

Technical staff.

Tomasz Smakuszewski, M.Sc. (0.5)

Television Division conducts scientific and applied research in multimedia technologies. The Division is also experienced in e-learning standards and platforms with a special emphasis on multimedia tools for collaborative e-learning using media streaming and searching techniques. The Division continues its efforts in the development of MPEG standards (MPEG-4 and MPEG-7) and Multimedia Technical Committee no. 288 at Polish National Committee for Standardization.

Specific research topics in 2004 included:

- video and audio compression;
- intelligent multimedia systems;

- networked audiovisual systems for immersive environments;
- 3D object modelling;
- image indexing, multimedia database indexing;
- object tracking and recognition;
- motion analysis;
- selected topics in the design of cable television networks.

1.3.6. Digital Processing of Measurement Signals Group

Head of Group

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Andrzej Podgórski, Ph.D.	Assistant Professor

The activities of the Division concern fundamental and applied research associated with metrology, instrumentation and measuring systems. They are focused on improving the quality of measurements using signal-processing techniques.

Current research topics include:

- software environment for computer-aided design of algorithms for reconstruction of measurands and for calibration of measuring systems;
- computer-aided spectrophotometry for applications in the monitoring of natural environment and telecommunication systems;
- portable signal analysers for technical diagnostics and the monitoring of natural environment.

1.4. Evening Studies and Continuing Education

1.4.1. M.Sc. Evening Studies on Radio-communications

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1.4.4. Studies on Radiocommunications, Multi-media Technologies and Biomedical Engineering "RADEM"

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Jacek Cichocki, Ph.D.,
Sławomir Kula, Ph.D.,
Marek Rusin, Ph.D.,
Maciej Konwicky, M.Sc.

1.4.5. Studies on Audiological Techniques

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1.5.4. Multimedia Technical Committee no. 288 at Polish Committee for Standardization

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M.Sc. ('72), Ph.D. ('79), D.Sc. ('90), Prof. Title ('01); measurement and instrumentation; Professor, Digital Processing of Measurement Signals Group, Head (2000-); Member of the Committee for Metrology and Instrumentation, Polish Academy of Sciences (1993-96, 1999-); Polish Representative in the IMEKO General Council ('98-); Chairman of IMEKO TC7 (2000-); Fellow Member of IEE ('94-); Senior Member of IEEE ('99-); Member of ASEE ('96-); Reviewer of the *IEEE Transactions on Instrumentation and Measurement* (89-) and Member of the Editorial Board of *Measurement - Journal of IMEKO* (1997-); Member of the Technical Program Committee of the *IEEE Instrumentation and Measurement Technology Conference* (2004); [Edu29], [Edu54]; [Pro5], [Pro32]; [Pub33], [Pub35], [Pub32], [Pub141], [Pub142]; [Rep27].

Tadeusz Morawski

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M.Sc. (electronics, '63), M.Sc. (mathematics, '66), Ph.D. ('70), D.Sc. ('73), Prof. Title ('80); microwave technique; Professor, Microwave and Radiolocation Engineering Division, Head ('81-); Member of the Technical Programme Committee of MIKON ('80-); Member of the Faculty Council Committee on Education (2002-); Member of the Committee on Electronics and Telecommunications KEiT, Polish Academy of Sciences PAN ('90-); Member of the Microwave Section of KEiT ('96-); Member of the Scientific Council of the Telecommunication Research Institute ('93 -); Member of the Scientific Council of Tele-Radiotechnique Institute ('99-); Senior Member of IEEE ('80-); [Edu23], [Edu60], [Edu100]; [Pro4], [Pro30]; [MSc9], [MSc34]; [Pub34], [Pub143], [Pub144]; [Rep28].

Krzysztof Mroczek

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MSc. ('95'), Ph.D. (2002); measurement and instrumentation; Assistant Professor, Electroacoustics Division; [Pro7], [Pro21]; [BSc15], [BSc51]; [Pub146]; [Rep38].

Tomasz Olszewski

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M.Sc. ('82); nuclear and medical electronics, capacitance tomography, digital electronics, programmable logic devices; Senior Lecturer, Nuclear and Medical Electronics Division; [Edu5], [Edu20], [Edu21]; [Pro1], [Pro28], [Pro53]; [BSc23]; [Pub69], [Pub135], [Pub148]; [Rep43].

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M.Sc. ('70), Ph.D. ('80); nuclear and medical electronics; Senior Lecturer (0.33), Nuclear and Medical Electronics Division; [Edu28], [Edu85]; [Pro1]; [Rep43].

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M.Sc. ('59), Ph.D. ('64), D.Sc. ('87), Prof. Title ('90); nuclear and medical electronics; Professor ('90-), Nuclear and Medical Electronics Division, Head ('87-2003); Member of the Faculty Council Committee on Education (2002-); Chairman of the Dean's Financial Committee ('90-2003); Member of the European Network for Medical Physics Engineering ('95-); Member of the Warsaw Scientific Society ('95-); Member of the Polish Nuclear Society ('90-); Member of Medical Physics and Radiology Society, Polish Academy of Sciences ('99-), Member of the Polish Medical Society ('70 -); Member of Scientific Council of Institute for Nuclear Studies ('99-2003); [Edu16], [Edu67]; [Pro1], [Pro19], [Pro31], [Pro55], [Pro56]; [BSc26], [BSc53]; [Pub19], [Pub213]

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M.Sc. ('78), Ph.D. (2001); medical and nuclear engineering; Assistant Professor, Nuclear and Medical Electronics Division; [Pro1], [Pro51], [Pro52]; [MSc16], [MSc17], [MSc68], [MSc81], [MSc79], [MSc83]; [BSc2], [BSc16], [BSc17]; [Rep43].

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M.Sc. ('69); microwave technique; Senior Lecturer (0.5), Microwave and Radiolocation Engineering Division; Faculty Coordinator for the Programme of Study ('94-); [Edu89]; [Pro41], [Pro47]; [Rep32], [Rep33].

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M.Sc. ('72), Ph.D. ('76), D.Sc. ('91); Prof. Title (2001); microwave technique; Professor, Microwave and Radiolocation Engineering Division; Member of the Faculty Council Committee on Scientific Research ('99-2002); Member of the Faculty Council Committee on Faculty Organisation (2002-); [Edu11], [Edu40], [Edu86], [Edu109]; [Pro18]; [Rep28], [Rep34].

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M.Sc. ('66), Ph.D. ('75); radiocommunications, television; Assistant Professor, Television Division; Term in Contract, half-time; [Edu12].

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M.Sc. ('72), Ph.D. ('77), D.Sc. ('94); Prof. Title ('2003); informatics; Professor, Television Division, Head (2000-); Head of the Multimedia Techniques Studies in the Television Division of the Institute of Radioelectronics ('97-); Member of the Faculty Council Committee on Academic Staff Development ('99-); Member of the Conference Programme Committee of: Computer Analysis of Images and Patterns CAIP ('93-04), Steering Committee Chair 2003; Head of Multimedia Technical Committee no.288 at Polish Committee for Standardization ('99-); ISO /S.C.29/WG11 (MPEG) expert (2000-); Member of Advisory Board of "Image Processing and Communications" ('95-); Member of the Scientific Committee of the Xth Symposium: "New Trends in Audio and Video Technology" (2004); Session Chairman of the National Conference on Radiocommunications, Broadcasting and Television (2004); [Edu1], [Edu7], [Edu39], [Edu80]; [Pro9], [Pro17], [Pro24], [Pro54], [Pro58]; [PhD1]; [PhD5]; [MSc41], [MSc54], [MSc74]; [BSc60]; [Pub43], [Pub44], [Pub67], [Pub90], [Pub167], [Pub168], [Pub170], [Pub171], [Pub172], [Pub173], [Pub174], [Pub175], [Pub203], [Pub212], [Pub218], [Pub219], [Pub220], [Pub221]; [Rep2], [Rep35], [Rep36].

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M.Sc. ('91), Ph.D. (2002); signal and system theory; Assistant Professor, Radiocommunications Division; [Edu121]; [Pro3], [Pro23], [Pro53]; [BSc14], [BSc27], [BSc57], [BSc65], [BSc78], [BSc83], [BSc104], [Pub100], [Pub101]; [Rep8], [Rep9], [Rep11].

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M.Sc. ('69), Ph.D. ('78); electroacoustics, acoustics measurements, architectural acoustics; Assistant Professor, Electroacoustics Division; Member of the Polish Acoustics Society ('70-), Member of the Audio Engineering Society ('91[Edu36]; [Pro2], [Pro33]; [MSc50]; [BSc49]; [Pub46], [Pub104], [Pub200], [Pub201]; [Rep15], [Rep37].

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M.Sc. ('98), Ph.D. (2002); radio networks, heuristics methods, radiocommunications; Assistant Professor, Radiocommunications Division; [Edu46]; [Pro3], [Pro11]; [MSc6]; [BSc44]; [Pub183], [Pub184]; [Rep11].

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M.Sc. ('70), Ph.D. ('80); microwaves, computer engineering, measurements; Assistant Professor ('80-), Microwave and Radiolocation Engineering Division; [Edu31], [Edu32]; [Pro4].

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POLSPAR (2001-); Member of the Scientific Committee of the National Conference SP (2001-) and International Conference IDAACS (2001-); Reviewer of the *IEEE Transactions on Instrumentation and Measurement* (2003-); Member of IEEE (2000-); [Edu26], [Edu27], [Edu58], [Edu81], [Edu92]; [Pro7], [Pro21]; [MSc1], [MSc45], [MSc82]; [BSc9]; [Pub1], [Pub29], [Pub47], [Pub48], [Pub49], [Pub62], [Pub63], [Pub155], [Pub185], [Pub214], [Pub222]; [Rep38].

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M.Sc. Electronics ('66), M.A. Mathematics ('75), Ph.D. ('76), D.Sc. ('89); Prof. Title (2002); signals and systems, radiocommunications, computer aided design, graphs and networks, mathematical methods in engineering; Professor, Radiocommunications Division; Head of the Faculty Council Committee on Scientific Research (2002-); Member of the University Council Committee on Scientific Research (2002-); Member of the Circuit Theory and Signal Processing Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('97-); Member of the Scientific Committee of: the International Conference on Signals and Electronics Systems ('97-), Conference on Evolutionary Algorithms and Global Optimization ('97-); Member of the Council of the Research and Promotion Center for Power Electronics ('97-), and of the Research Center for Automation and Information Technology (2000-), Coordinator of the cooperation agreement between WUT and University of Waterloo, Canada ('93-), and WUT and Ohio University, USA ('97-); Adviser of Wydawnictwo Komunikacji i Łączności - a publishing house ('97); [Edu35], [Edu37], [Edu46], [Edu49], [Edu63]; [Pro3], [Pro11], [Pro20]; [PhD3], [PhD6]; [Pub40], [Pub41], [Pub51], [Pub60], [Pub64], [Pub65], [Pub162], [Pub181], [Pub182]; [Rep11], [Rep39]; [Pat1].

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M.Sc. ('84), Ph.D. ('98); microwave technique; Assistant Professor, Microwave and Radiolocation Engineering Division; Member of IEEE ('97-); Head of Students' Laboratory of Microwave Technique and Laboratory of High Frequency Technique ('87-); Silver Order of Merit

(2004); [Edu3], [Edu69], [Edu70]; [Pro4], [Pro30], [Pro34], [Pro38], [Pro39], [Pro42], [Pro48], [Pro50], [Pro57]; [MSc42]; [BSc8], [BSc9]; [Pub190], [Pub191]; [Rep28], [Rep40], [Rep41], [Rep42].

Yevhen Yashchyn

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M.Sc. ('79), Ph.D. ('86); antennae and antenna array; Assistant Professor, Radiocommunications Division; Head of the Antenna Laboratory (2002-); Member of the Organizing Committee of the International Conference TCSET 2004 ('98-); Member of IEEE ('97-); Team award (I⁰) of the Rector (2004); [Edu65], [Edu84], [Edu128]; [Pro8], [Pro12], [Pro22]; [MSc3], [MSc65]; [Pub20], [Pub25], [Pro27]; [Pub52], [Pub154], [Pub176], [Pub177], [Pub196], [Pub197], [Pub198], [Pub201], [Pub202]; [Rep23], [Rep24], [Rep25].

Krzysztof Zaremba

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M.Sc. ('81), Ph.D. ('90), D.Sc. (2003); biomedical engineering; nuclear electronics; Professor (2004); Nuclear and Medical Electronics Division, Head (2003-); Head of the Digital Circuit Laboratory ('96-); Member of CERN ('89-); Head of the Warsaw Branch of Polish Society of Medical Physics (2001-); Deputy Director for Research of the Institute of Radioelectronics (2001-2003); Head of the Dean's Financial Committee (2002-); Member of the Dean's Committee on Faculty Development (2003-); Member of the Scientific Committee of the Xth Symposium: "New Trends in Audio and Video Technology" (2004); Individual award (I⁰) of the Rector (2004); [Edu17], [Edu34], [Edu42]; [Pro1], [Pro31], [Pro55], [Pro56]; [MSc25], [MSc27], [MSc39]; [BSc28], [BSc32]; [Pub2]; [Rep43].

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M.Sc. ('74), Ph.D. ('83); microwave technique; Assistant Professor, Microwave and Radiolocation Engineering Division; Head of the Student Laboratory of Fields and Waves; [Pro4], [Pro30]; [Pub34], [Pub143], [Pub144]; [Rep28].

2.2. Junior academic staff and graduate trainees

Piotr Bobiński, M.Sc.	Assistant (0.5 - (1.12.2003 - 30.09.2004) <i>phone: 660-7637</i>
Michał Dziewiecki	Assistant (0.5 - (1.10.2004 - 30.09.2005) <i>phone: 660-5476</i>
Aleksandra Kruś, M.Sc.	Assistant (0.5 - from 1.10.2004) <i>phone: 660-7637</i>
Robert Łukaszewski, M.Sc.	Assistant <i>phone: 660-7340</i>
Stanisław Maszczyk, M.Sc.	Assistant (0.5 - (1.12.2003 - 30.11.2004) <i>phone: 660-7635</i>
Katarzyna Skrajnowska	Assistant (0.5 - (1.10.2004 - 30.09.2005)

2.2.1. Ph.D. students (the third-level studies)

Stanisław Badura, M.Sc.
 Paweł Bajorko, M.Sc.
 Michał Baranowski, M.Sc.
 Paweł Bargieł, M.Sc.
 Grzegorz Bernatek, M.Sc.
 Piotr Bilski, M.Sc.
 Piotr Boniński, M.Sc.
 Marek Bury, M.Sc.
 Tomasz Ciamulski, M.Sc.
 Andrzej Dominik, M.Sc.
 Paweł Kącki, M.Sc. (to 30.06.2004)
 Tomasz Keller, M.Sc. (to 30.09.2004)
 Damian Kolmas, M.Sc.
 Paweł Kopyt, M.Sc.
 Michał Kostrzewa, M.Sc.
 Sebastian Kozłowski, M.Sc.
 Aleksandra Kruś, M.Sc.
 Michał Kowalski, M.Sc.
 Wojciech Kozerski, M.Sc.
 Krzysztof Kucharski, M.Sc.
 Arkadiusz Kurek, M.Sc.
 Robert Kurjata, M.Sc.
 Grzegorz Kustra, M.Sc.
 Piotr Majchrzak, M.Sc.
 Artur Moryc, M.Sc.
 Mariusz Mikołowicz, M.Sc.
 Michał Moraszczyk, M.Sc.
 Mateusz Orzechowski, M.Sc.
 Adam Padée, M.Sc.
 Wojciech Padée, M.Sc.
 Grzegorz Pastuszak, M.Sc.
 Marcin Piasecki, M.Sc., (to 30.04.2004)
 Grzegorz Radzikowski, M.Sc., (to 30.06.2004)
 Tymon Rubel, M.Sc.
 Janusz Rudnicki, M.Sc.
 Marcin Stolarski, M.Sc.
 Robert Sulej, M.Sc.
 Robert Szelenbaum, M.Sc.
 Rafał Szumny, M.Sc.
 Tomasz Szymański, M.Sc.
 Aneta Świercz, M.Sc.
 Michał Tomaszewski, M.Sc.
 Arkadiusz Trojanowski, M.Sc.
 Artur Trybuła, M.Sc.
 Karol Wnukowicz, M.Sc. (to 29.02.2004)
 Anna Wróblewska M.Sc.
 Sebastian Wydra, M.Sc.
 Marcin Ziembicki, M.Sc.

2.3. Technical and administrative staff

Aneta Bielska	Secretary <i>phone:660-7742,8253929</i>
Janina Chmielak	Senior Technician <i>phone: 660-7987</i>
Anna Czarnecka, M.Sc.	Senior Development Engineer (0.4 - from 15.04.2004) <i>phone: 660-7910</i>
Dariusz Ćwiek, M.Sc.	Senior Development Engineer (to 30.10.2004) <i>phone: 660-7577</i>
Tomasz Daniluk, M.Sc.	Development Engineer (0.5) <i>phone: 660-7340</i>
Janina Gałęcka	Senior Accountant <i>phone: 660-7645</i>
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Bogdan Kwiatkowski, M.Sc.	Senior R&D Engineer - 0.75 <i>phone: 660-5367</i>
Andrzej Laskowski	Worker <i>phone: 660-7957</i>
Mirosław Lubiejewski	Foreman <i>phone: 660-7633</i>
Marek Marcinkowski	Senior Foreman <i>phone: 660-7378</i>
Teresa Miąsek, M.Sc.	Curator of the Library <i>phone: 660-7627</i>
Ryszard Michnowski, M.Sc.	Development Engineer <i>phone:660-7638</i>
Anna Noińska	Secretary <i>phone:660-7829,8255248</i>
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Helena Oleksak	Section Manager (to 27.02.2004) <i>phone:660-7957,8253769</i>
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Krzysztof Robaczyński, M.Sc.	Senior R&D Engineer (0.5) <i>phone: 660-7622</i>
Andrzej Skrzypkowski	Foreman <i>phone: 660-7378</i>
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Hanna Szot	Accountant <i>phone: 660-7743</i>
Anna Tratkiewicz	Secretary <i>phone:660-7233,8253929</i>
Andrzej Wasilewski	Worker <i>phone: 660-7919</i>
Joanna Witkowska	Senior Technician <i>phone:660-7955,8251363</i>
Beata Zielińska	<i>phone:660-7742,8253929</i> (from 01.06.2004) Secretary
Jan Żera, Ph.D.	Senior R&D Engineer (0.5 - from 1.10.2004) <i>phone:660-7637</i>
Stanisław Żmudzin, M.Sc.	Senior R&D Engineer- 0.25; <i>phone: 660-7635</i>

3. TEACHING ACTIVITIES (academic year 2003/2004)

3.1. Regular studies:

Areas of Concentrations

• Radiocommunications and Multimedia Technologies

Head

Tadeusz Morawski, Ph.D., D.Sc., Tenured Professor
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• Biomedical Engineering

Head

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3.2. Basic courses

[Edu1] *Multimedia Standards and Algorithms* (Algorytmy i standardy multimedialne - ASM); 3h/week; semester 6; W. Skarbek.

[Edu2] *Basics of Electroacoustics* (Podstawy elektroakustyki - PEL); 3h/week; semester 6; A. Leszczyński, J. Narkiewicz-Jodko.

[Edu3] *Basics of High-Frequency Technique - Lab.* (Podstawy techniki w.cz. lab. - TWCZ); 2h/week; semester 4; W. Wojtasiak.

[Edu4] *Basics of Medical Imaging Techniques* (Podstawy technik obrazowania w medycynie - PTOM); 4h/week; elective; P. Brzeski.

[Edu5] *Basics of Microelectronics* (Podstawy Mikroelektroniki - PMK); 2h/week; semester 6; T. Olszewski.

[Edu6] *Basics of Microprocessor Technique* (Podstawy techniki mikroprocesorowej - TMIK); 4h/week; semester 5; K. Czerwiński, B. Konarzewski.

[Edu7] *Basics of Multimedia Techniques* (Podstawy technik multimedialnych - PTMU); 3h/week; elective; W. Skarbek.

[Edu8] *Basics of Programming* (Podstawy programowania - PRI); 4h/week; semester 1; A. Podgórski.

[Edu9] *Basics of Programming M* (Podstawy programowania - PRM); 4h/week; semester 1; A. Podgórski.

[Edu10] *Basics of Radiocommunications* (Podstawy radiokomunikacji - PR); 2h/week; semester 4; T. Kosiło.

[Edu11] *Basics of Radiolocation and Navigation* (Podstawy radiolokacji i radionawigacji - PRIR); 3h/week; elective; S. Rostoniec.

[Edu12] *Basics of Television* (Podstawy telewizji - POTE); 3h/week; semester 6; M. Rusin.

[Edu13] *Broadcasting Systems* (Systemy radiofoniczne - SYR); 3h/week; semester 4; H. Chaciński.

[Edu14] *Cable Television* (Telewizja przewodowa - TVP); 3h/week; elective; T. Krzymień.

[Edu15] *Computer Systems* (Systemy komputerowe - SYKO); 3h/week; elective; T. Jamrógie-wicz.

[Edu16] *Detection of Nuclear and Medical Signals* (Detekcja sygnałów biomedycznych i jądrowych - DSBJ); 4h/week; semester 6; Z. Pawłowski.

[Edu17] *Digital Circuits - Laboratory* (Układy logiczne; laboratorium - ULOGE); 2h/week; laboratory; semester 4; K. Zaremba.

[Edu18] *Digital Audio Systems* (Cyfrowe systemy foniczne - CSF); 3h/week; elective; Z. Kulka.

[Edu19] *Digital Cellular Systems* (Cyfrowe systemy komórkowe - CSK); 3h/week; semester 6; J. Cichocki, J. Kolakowski.

[Edu20] *Digital Systems* (Układy cyfrowe - UCYF); 1h/week; semester 4; T. Olszewski.

[Edu21] *Electronics III* (Elektronika III - ELKA III); 2h/week; semester 4; T. Olszewski.

[Edu22] *Event Driven Programming* (Programowanie zdarzeniowe - PZDT); 3h/week; semester 4; K. Ignasiak.

[Edu23] *Fields and Waves* (Pola i fale - POFAT); 3h/week; semester 4; T. Morawski, W. Gwarek.

[Edu24] *Introduction to Electronics, Informatics and Telecommunications* (Wstęp do elektroniki, informatyki i telekomunikacji - WEIT); 1h/week; semester 1; W. Gwarek.

[Edu25] *Materials, Components, and Designs* (Materiały, elementy i konstrukcje - MEIK); 1h/week; laboratory; semester 6; J. Cichocki.

[Edu26] *Measuring Systems* (Systemy pomiarowe - SPOM); 6h/week; semester 5; W. Winiecki.

[Edu27] *Measuring Systems I* (Systemy pomiarowe I - SPOM I); 4h/week; semester 5; W. Winiecki.

[Edu28] *Medical Electronic Instrumentation* (Elektroniczna aparatura medyczna - EAME); 4h/week; semester 5 - 6; L. Padée.

[Edu29] *Numerical Methods* (Metody numeryczne - MNM); 3h/week; semester 3; R. Z. Morawski.

[Edu30] *Object Oriented Programming (M)* (Programowanie obiektowe (M) - PROBI); 4h/week; semester 2; W. Smolik.

[Edu31] *Operating Systems E* (Systemy operacyjne E - SOP); 1h/week; semester 5; M. Sypniewski, A. Więckowski, L. Opalski.

- [Edu32] *Operating Systems 1* (Systemy operacyjne 1 - SOP); 1h/week; semester 5; M. Sypniewski, A. Więckowski, L. Opalski.
- [Edu33] *Radiocommunication Systems* (Systemy radiokomunikacyjne - SRKO); 3h/week; semester 5; T. Kosilo.
- [Edu34] *Radiology and Nucleonics* (Radiologia z nukleoniką - NK); 3h/week; semester 5; W. Scharf, K. Zaremba.
- [Edu35] *Signals and Systems* (Sygnały i Systemy - SYST); 4h/week; semester 3; J. Wojciechowski.
- [Edu36] *Sound Recording and Forming* (Odbiór i kształtowanie dźwięku - OKD); 3h/week; elective; M. Tajchert.
- [Edu37] *Signals and Modulations* (Sygnały i modulacje - SYGM); 3h/week; semester 4; J. Wojciechowski, K. Radecki.
- 3.3. Advanced courses**
- [Edu38] *Acoustic Protection of Environment* (Akustyczna ochrona środowiska - AOS); 3h/week; elective; E. Kotarbińska.
- [Edu39] *Adaptive Image Recognition - EADIR*; 4h/week; semester 6; W. Skarbek (English-medium studies).
- [Edu40] *Analysis and Synthesis of Microwave Circuits* (Analiza i synteza układów mikrofalowych - ASUM); 3h/week; elective; S. Rośliniec.
- [Edu41] *Antennae and Radiowave Propagation* (Anteny i propagacja fal - AIPF); 3h/week; elective; J. Jarkowski.
- [Edu42] *Artificial Neural Networks in Medicine* (Sztuczne sieci neuronowe w medycynie - SESN); 3h/week; elective; K. Zaremba.
- [Edu43] *Biomedical Accelerators* (Akceleratory biomedyczne - ABM); 2h/week; elective; W. Scharf.
- [Edu44] *Biomedical Signals Processing* (Cyfrowe przetwarzanie sygnałów biologicznych - CPSB); 4h/week; elective; A. Grzanka.
- [Edu45] *Computed Tomography* (Tomografia komputerowa - TOM); 4h/week; elective; W. Smolik.
- [Edu46] *Modern Heuristic Techniques* (Współczesne techniki heurystyczne - WMH); 4h/week; elective; Z. Walczak, J. Wojciechowski.
- [Edu47] *Data Compression* (Kompresja danych - KODA); 3h/week; elective; A. Przelaskowski.
- [Edu48] *Digital Audio Signal Processing* (Cyfrowe przetwarzanie sygnałów fonicznych - CPSF); 3h/week; elective; Z. Kulka.
- [Edu49] *Digital Communications A* - (EDICO); 4h/week; semester 5; J. Wojciechowski.
- [Edu50] *Digital Circuits* (EDC1); 2h/week; elective; P. Miazga (English-medium studies).
- [Edu51] *Digital Image Processing* (Cyfrowe przetwarzanie obrazów - CPOO); 4h/week; elective; M. Kazubek.
- [Edu52] *Digital and Interactive Television* (Telewizja cyfrowa i interaktywna - TCI); 4h/week; elective; A. Buchowicz.
- [Edu53] *Digital Information Transmission* (Cyfrowa transmisja informacji - CTIN); 3h/week; elective; T. Buczkowski.
- [Edu54] *Digital Processing of Measurement Signals* (Cyfrowe przetwarzanie sygnałów pomiarowych - CPSP); 3h/week; R. Z. Morawski.
- [Edu55] *Diploma Seminar for Undergraduate Students* (Seminarium dyplomowe inżynierskie - SDI); 2h/week; P. Brzeski.
- [Edu56] *Diploma Seminar for Graduate Students* (Seminarium dyplomowe magisterskie - SDM1); 2h/week; P. Brzeski.
- [Edu57] *Diploma Seminar for Graduate Students* (Seminarium dyplomowe magisterskie - SDM2); 2h/week; P. Brzeski.
- [Edu58] *Distributed Measurement and Control Systems* (Rozproszone systemy pomiarowo-kontrolne - RSPK); 3h/week; elective; W. Winiecki.
- [Edu59] *Electromagnetic Compatibility* (Kompatybilność elektromagnetyczna - KE); 2h/week; elective; W. Gwarek.
- [Edu60] *Electromagnetic Field Theory* (Teoria pola elektromagnetycznego - TPE); 4h/week; elective; T. Morawski.
- [Edu61] *Evolutionary Algorithms* (EEVAL); 4h/week; elective; P. Miazga (English-medium studies).
- [Edu62] *Fields, Waves and Antennae* (EFA); 4h/week; elective; M. Celuch-Marcysiak (English-medium-studies).
- [Edu63] *Graphs and Networks* (Grafy i Sieci - GIS); 2h/week; elective; J. Wojciechowski.
- [Edu64] *GSM and Third Generation Cellural Systems* (GSM i systemy komórkowe trzeciej generacji - GSMS); 4h/week; elective; J. Kołakowski.
- [Edu65] *Influence of Electromagnetic Waves on Living Organisms* (Oddziaływanie fal elektromagnetycznych na organizmy żywe - OFE); 2h/week; elective; Y. Yashchyshyn.
- [Edu66] *Magnetic Resonance Imaging* (Tomografia rezonansu magnetycznego - TRM); 3h/week; elective; P. Bogorodzki.
- [Edu67] *Measured Data Analysis in Medicine* (Analiza danych pomiarowych w medycynie - ADP); 3h/week; elective; Z. Pawłowski.
- [Edu68] *Methods and Algorithms for Processing of Measurement Signals* (Metody i algorytmy przetwarzania sygnałów pomiarowych - MAP); 3h/week; elective; A. Miękina.

- [Edu69] *Microwave Technique* (Technika mikrofalowa - TMO); 4h/week; elective; W. Wojtasiak.
- [Edu70] *Microwave Transmitters and Receivers* (Nadajniki i odbiorniki mikrofalowe - NOM); 2h/week; elective; W. Wojtasiak.
- [Edu71] *Mobile Radio Communications* (Radio-komunikacja ruchoma lądowa - RRL); 3h/week; elective; T. Kosiło.
- [Edu72] *Multi-service and Multimedia Networks* - EMSMN; 4h/week; elective; K. Puczko (English-medium-studies).
- [Edu73] *Noise Control* (Ochrona przed hałasem - OPH); 2h/week; E. Kotarbińska.
- [Edu74] *Nuclear Medicine Techniques* (Techniki medycyny nuklearnej - TMN); 4h/week; elective; R. Szabatin.
- [Edu75] *Object Oriented Programming of Distributed and Multimedia Applications in Java* (Java - obiektowe programowanie aplikacji rozproszonych i multimedialnych - OPA); 3h/week; elective; K. Ignasiak.
- [Edu76] *Radioelectronics Measurements* (Mier-nictwo radioelektroniczne - MR); 3h/week; elective; J. Cichocki.
- [Edu77] *Radio Transmitting Technique and its Applications* (Technika nadawania radiowego i jej aplikacje - TNR); 4h/week; elective; J. Modzelewski.
- [Edu78] *Radiological Apparatus in Diagnostics* (Aparatura radiologiczna w diagnostyce - ARDM); 2h/week; elective; G. Domański.
- [Edu79] *Satellite Communications* (Łączność satelitarna - ŁS); 3h/week; elective; J. Modelski.
- [Edu80] *Semantic Analysis of Images and Sounds* (Analiza semantyczna obrazu i dźwięku - ASOD); 3h/week; elective; W. Skarbek.
- [Edu81] *Software for Measuring Systems* (Oprogramowanie systemów pomiarowych - OSP); 4h/week; elective; W. Winięcki.
- [Edu82] *Software for Medical Systems* (Oprogramowanie systemów medycznych - OSM); 3h/week; elective; W. Smolik.
- [Edu83] *Technique of a Radio Signals Receiving* (Technika odbioru radiowego - TOR); 3h/week; elective; W. Kazubski.
- [Edu84] *Theory and Designing of Antennae* (Teoria i projektowanie anten - TPA); 4h/week; elective; Y. Yashchysyn.
- [Edu85] *Ultrasonography Instrumentation* (Aparatura ultrasonograficzna - AUS); 3h/week; elective; L. Padée.

3.4. Special courses

3.4.1. Engineering Evening Studies on Radiocommunications

- [Edu86] *Antennae* (Anteny - ANR); 34h/sem.; semester 4; S. Rosłonec.
- [Edu87] *Basics of Computer Techniques* (Podstawy techniki komputerowej - PTKR); 70h/sem.; semester 1; T. Jamrógiewicz, J. Marzec.
- [Edu88] *Basics of Digital Circuits and Microprocessing Technique* (Podstawy układów logicznych i techniki mikroprocesorowej - PULR); 55h/sem.; semester 4; K. Czerwiński.
- [Edu89] *Basics of High-Frequency Techniques* (Podstawy techniki w.cz. - PTWR); 65h/sem.; semester 3; K. Robaczyński.
- [Edu90] *Basics of Metrology* (Podstawy metrologii - PMER); 40h/sem.; semester 1; J. Olędzki.
- [Edu91] *Basics of Satellite Communications* (Podstawy łączności satelitarnej - SATR); 20h/sem.; semester 4; K. Kurek.
- [Edu92] *Computer-Aided Control and Data Processing* (Komputerowe sterowanie i przetwarzanie danych - KSTR); 41h/sem.; semester 5; W. Winięcki.
- [Edu93] *Circuits and Signals* (Obwody i sygnały - OSR); 45h/sem.; semester 2; K. Czerwiński.
- [Edu94] *Digital Signals Processing* (Cyfrowe przetwarzanie sygnałów - CPSR); 42h/sem.; semester 4; Z. Gajo.
- [Edu95] *Digital Signals Transmission* (Cyfrowa transmisja sygnałów - CTSR); 43h/sem.; semester 5; T. Kosiło.
- [Edu96] *Diploma Seminar* (Seminarium dyplomowe - SDR); 10h/sem.; semester 6; J. Ebert.
- [Edu97] *Diploma Seminar 2* (Seminarium dyplomowe 2 - S2R); 20h/sem.; semester 7; J. Ebert.
- [Edu98] *Economics and Accountancy* (Ekonomika i rachunkowość - ERR); 15h/sem.; semester 5; M. Holko.
- [Edu99] *Electronic Systems* (Układy elektroniczne - UER); 42h/sem.; semester 3; D. Gryglewski.
- [Edu100] *Fields and Waves* (Pola i fale - PFR); 72h/sem.; semester 2; T. Morawski.
- [Edu101] *Frequency Standards* (Wzorce częstotliwości - WCR); 32h/sem.; semester 7; K. Radecki.
- [Edu102] *Imaging Techniques* (Techniki obrazowe - TORR); 30h/sem.; semester 7; M. Kazubek.
- [Edu103] *Internet Techniques* (Techniki internetowe - TINR); 30h/sem.; semester 7; K. Ignasiak.
- [Edu104] *Law in Telecommunications* (Prawo w telekomunikacji - PTR); 15h/sem.; semester 4; C. Woźniak.

- [Edu105] *Mathematics I* (Matematyka I - MATIM); 90h/sem.; semester 1; E. Stankiewicz-Wiechno.
- [Edu106] *Mathematics II* (Matematyka II - MATIIM); 90h/sem.; semester 2; G. Decewicz.
- [Edu107] *Materials and Elements* (Materiały i elementy - MER); 16h/sem.; semester 4; K. Radecki.
- [Edu108] *Multimedia Techniques* (Techniki multimedialne - TMR); 20h/sem.; semester 6; K. Ignasiak.
- [Edu109] *Numerical Methods* (Metody numeryczne - MNR); 35h/sem.; semester 3; S. Rosłonec.
- [Edu110] *Physics of the Solid Body* (Fizyka ciała stałego - FCSM); 42h/sem.; semester 1; J. Szmidt.
- [Edu111] *Programmable Digital Devices* (Programowalne układy cyfrowe - PUCR); 32h/sem.; semester 5; T. Buczkowski.
- [Edu112] *Programming* (Programowanie - PMR); 32h/sem.; semester 3; R. Kurjata.
- [Edu113] *Project 1* (Projekt 1 - PJUR); 30h/sem.; semester 5; P. Brzeski.
- [Edu114] *Project 2* (Projekt 2 - PSR); 60h/sem.; semester 6; P. Brzeski.
- [Edu115] *Propagation of Waves* (Propagacja fal - PFR); 16h/sem.; semester 4; J. Jarkowski.
- [Edu116] *Psychology of Management* (Psychologia zarządzania - PZR); 15h/sem.; semester 7; T. Wojtowicz.
- [Edu117] *Radioelectronics Measurements* (Miernictwo radioelektroniczne - MRR); 42h/sem.; semester 5; J. Cichocki.
- [Edu118] *Radiocommunication Systems I* (Systemy radiokomunikacyjne I - SRK); 54h/sem.; semester 6; T. Kosilo.
- [Edu119] *Radiocommunication Systems II* (Systemy radiokomunikacyjne II - SRK); 32h/sem.; semester 7; T. Kosilo.
- [Edu120] *Radiodiffusion Systems* (Systemy radiodifuzyjne - SRDR); 67h/sem.; semester 6; A. Buchowicz, H. Chaciński.
- [Edu121] *Signals and Modulations* (Sygnały i modulacje - SM); 45h/sem.; semester 3; K. Snopek, K. Radecki.
- [Edu122] *Subscriber Access Systems* (Systemy dostępu abonenckiego - SDAR); 15h/sem.; semester 5; A. Kalinowski.
- [Edu123] *Technique of Emission and Receiving* (Technika emisji i odbioru - TER); 40h/sem.; semester 4; J. Modzelewski., W. Kazubski.
- [Edu124] *Teletransmission Systems* (Systemy teletransmisyjne - STR); 30h/sem.; semester 5; S. Kula.
- [Edu125] *Transmitters and Receivers Measurements* (Pomiary nadajników i odbiorników - PNOR); 32h/sem.; semester 7; J. Cichocki.

3.4.2. Studies on Radiocommunications, Multimedia Techniques and Biomedical Engineering "RADEM"

This year the Studies on Radiocommunications, Multimedia Techniques and Biomedical Engineering "RADEM" includes a series of lectures in the frame of subject titled: *Coding and Digital Modulations in Radiocommunications* (Kodowanie i modulacje cyfrowe w radiokomunikacji).

- [Edu126] *Architecture of Signalling Network no.7* (Architektura sieci sygnalizacji nr 7); 1x18h; once a year; M. Bromirski.
- [Edu127] *Lead-free Soldering Technology* (Technologia lutowania bezołowiowego); 1x12h; once a year; R. Kisiel.
- [Edu128] *Measurements of Antenna Parameters* (Pomiary parametrów anten); 1x8h; once a year; Y. Yashchyshyn.
- [Edu129] *Measurements of Signals and Devices for Digital Radiocommunications* (Pomiary sygnałów i urządzeń radiokomunikacji cyfrowej); once a year; 1x28h; J. Cichocki, J. Kołakowski.
- [Edu130] *Networking Management Systems* (Systemy zarządzania sieciowego); 3x18h; three times a year; M. Bromirski.
- [Edu131] *Services and Applications of NGN Network* (Usługi i aplikacje sieci NGN); 1x18h; once a year; M. Bromirski.
- [Edu132] *UMTS System* (System UMTS); 1x14h; once a year; J. Cichocki, J. Kołakowski

3.4.3. Studies on Audiological Techniques

The Studies on Audiological Techniques represent a series of courses; 187h; twice a year.

- [Edu133] *Anatomy and Physiology of Hearing* (Anatomia i fizjologia słyszenia); 12h.
- [Edu134] *Ear Pathology* (Patologia ucha); 9h.
- [Edu135] *Fundamentals of Acoustics* (Podstawy akustyki); 20h.
- [Edu136] *Audiometry* (Audiometria); 32h.
- [Edu137] *Hearing Aid Technology and Elements of Electronics* (Technika aparatów słuchowych i elementy elektroniki); 30h.
- [Edu138] *Hearing Aid Measurements* (Miernictwo aparatów słuchowych); 14h.
- [Edu139] *Earmold Technics* (Wkładki douszne); 8h.
- [Edu140] *Hearing Aid Fitting* (Dobór aparatów słuchowych); 41h.
- [Edu141] *Aural Rehabilitation* (Rehabilitacja); 7h.
- [Edu142] *Elements of Psychology* (Elementy psychologii); 6h.
- [Edu143] *Gesture Language* (Język gestów); 8h.
- [Edu144] *Sign Language* (Język gestów); 6h.

3.5. International co-operation

[Edu145] SOCRATES Programme: **Higher Education.**
T. Kosilo, Ph.D., T. Buczkowski, Ph.D.
1999-2004

In the frame of SOCRATES Institutional Contract two bilateral programmes were realized: between the Institute of Radioelectronics of the Warsaw University of Technology and:

- Katholieke Hogeschool Sint – Lieven, Gent, Belgium;
- Instituto Superior Tecnico, Universidade Tecnica de Lisboa, Lisboa, Portugal.

In both cases Student Mobility actions were realized in the frame of Electronics and Telecommunication Engineering (Socrates code 06.05). The objective of the programme is to realize a student project at the partner University. The Student Mobility programme was as follows:

- Poland-Portugal; two students for 6 months (Jarosław Antoniuk, Maciej Odzinkowski);
- Poland-Belgium; one student for 4 months (Piotr Zarobkiewicz);

- Portugal-Poland; two students for 6 months (Giovani Martins, Pedro Valervo).

[Edu146] European Student Earth Orbiter **ESEO**
K. Kurek, PhD,
Space Technology Student Group
2004-2006

ESEO (European Student Earth Orbiter) is educational project of SSETI (Student Space Exploration and Technology Initiative). ESEO is a micro-satellite to Earth observation, designed, built and operated by students from European Universities, and it will be launched in 2006. Students from Space Technology Student Group join to the project in beginning of 2004. Main task of our team in this project is to design and realize core of the on-board data handling (OBDH) subsystem that allow to monitor and control status and operations of all satellite subsystems. A PC/104 CPU board will be used as OBDH core computer that will communicate with other ESEO subsystems using Controller Area Network(CAN) bus. Software of the computer will be written in C++ and Linux with Real-Time Application Interface will be used as an operating system.

4. RESEARCH PROJECTS

4.1. Projects granted by the University

Statutory projects

[Pro1] **Modern Techniques in Nuclear and Medical Electronics** (Nowoczesne techniki elektroniki jądrowej i medycznej).

Krzysztof Zaremba, Prof., Ph.D., D.Sc.,
Z. Pawłowski, P. Bogorodzki, P. Brzeski,
G. Domański, T. Jamrógiewicz, M. Kazubek,
B. Konarzewski, J. Marzec, T. Olszewski,
L. Padée, E. Piątkowska-Janko, A. Przelaskowski, W. Smolik, R. Szabatin, P. Bargieł, P. Boniński, R. Kurjata, M. Orzechowski
A. Trybuła, T. Wolak, A. Wróblewska
10.07.2003 - 31.12.2004

- *Methods and instrumentation for investigation of tissue perfusion in optical tomography*

The main aim of the project is to improve the property of functional optical tomography by use of anatomical information from computer tomography or magnetic resonance tomography. This method is specially useful in the investigation of tissue perfusion.

In the first part of the work the elaborated conception of connection of two different modalities images - functional and anatomical- is described. The advantages of this method and examples of applications are given. In the second part of the work the Bayes method of functional images reconstruction with a priori knowledge from anatomical imaging are described and experimental results are presented.

- *An automatic activation localization algorithm based on high resolution T1 - weighted MR image*

The aim of the study was to determine and automatically measure the number of activated voxels in amygdala region. The proposed semi-automatic algorithm initially works on high resolution T1 weighted image.

- *Computer aided diagnosis in mammography: wavelet-based shape detection of microcalcifications and diagnostic accuracy estimation*

Optimization of CAD system for digital mammography was the main subject of this work. Basic topics of the research were: application of multiresolution analysis for the detection of clustered microcalcifications, which can also reliably mark their shapes (perception improvement), and initial clinical test-based verification. We proposed a three-stage technique which is a combination of wavelet-based methods for mammogram preprocessing (contrast enhancement in a domain of hexagonal transform, by adaptive thresholding and pattern modelling), convolutions with Laplacian filters of different scales for more accurate detection of microcalcifications and morphological methods for segmentation of microcalcifications boundaries.

- *Electrical tomography techniques in medicine and industry*

The aim of the project is to elaborate, test and verify new measuring methods for Capacitance Tomography. Static and dynamic phantoms were constructed and appropriate measurements have been conducted. Software created enables modelling and counting of

electric field distribution on the basis of finite elements technique.

[Pro2] **Design and Investigation of Electroacoustics Measuring Systems and Digital Audio Signal Processing Systems** (Projektowanie i badania systemów elektroakustycznych oraz systemów cyfrowego przetwarzania sygnałów fonicznych).
Zbigniew Kulka, Prof., Ph.D., D.Sc.,
A. Leszczyński, M. Tajchert, J. Narkiewicz-Jodko, E. Kotarbińska
10.07.2003 - 31.12.2004

Primary topics included in the statutory grant are as follows:

- design, computer simulation, implementation and measurements of the hybrid (valve - MOS transistor) audio amplifier,
- investigation of real world efficiency of the ear-muffs,
- design, computer simulation, implementation and measurements of the synchronous sampling rate converter based on the SHARC 21065 L digital signal processor.

[Pro3] **Modern Radiocommunication Systems – Selected Problems** (Współczesne systemy radiokomunikacyjne - wybrane problemy).

Tomasz Kosiło, Ph.D.,
T. Buczkowski, H. Chaciński, K. Czerwiński,
D. Janusek, J. Jarkowski, W. Kazubski, K. Snopek, Z. Walczak, J. Wojciechowski,
10.07.2003 - 31.12.2004

The study work "Modern radiocommunication system – selected problems" realized by the Radiocommunications Group of the Institute of Radioelectronics was concerned with threedifferent areas. The following subjects were analyzed:

1. Scheduling in packet radio networks

The project has dealt with a conflict - free scheduling and throughput maximization in packet radio networks. Several modes of network operation have been considered, e.g. conflict - free scheduling, broadcast scheduling, and point to point communication. A method for establishing communication channels between the given set of pairs of nodes, minimizing the number of conflicts, has been proposed. The delay for each channel is to be constant, and requested network resources to meet the demands are to be minimized.

It has been shown that for each of the considered scheduling scenarios the problem can be reduced to the vertex coloring of an appropriate graph model. For each channel a virtual path is determined and optimal scheduling found using DSTAUR coloring algorithm. Our approach combines the MAC and routing layers in a single algorithm, and we claim that such an approach leads to shorter communication time, compared to other published methods.

2. Selected problems of short radio links application.

The project was concerned with the indoor propagation analysis and modelling in the frequency range appropriate for the short radio links. The second area of interest covered the application of such radio links for handicapped people. In the frames of some diploma works the review of literature and short radio links

prototypes were made. The results of this part of the project were presented in two conference papers.

3. *Analysis of algorithms and assignment of basic parameters of scattering radar systems, based on correlation location principles.*

In the frame of this part of the project the scattering radar was analysed. In the past the scattering radar could not be applied for real time measurements with high precision because of complicated correlation calculations. Owing to today's technology development new ideas in that field are possible. The possibilities of building such radar as multiradars and radar networks were analysed. The accuracy of object localisation methods using correlation methodology in network multiradars was examined.

- [Pro4] **Designing, Modelling and Measuring of the Microwave Devices** (Projektowanie, modelowanie i pomiary układów mikrofalowych).
Tadeusz Morawski, Prof., Ph.D., D.Sc.,
 W. Gwarek, M. Celuch-Marcysiak, D. Gryglewski, M. Sypniewski, A. Więckowski, W. Wojtasiak, J. Zborowska, R. Michnowski, T. Ciamulski, P. Kopyt, J. Rudnicki
 10.07.2003 - 31.12.2004

In the course of this work, methods of electromagnetic simulation on non-uniform spatial meshes have been enhanced and validated. Furthermore, methods of designing selected microwave components, such as linear power amplifiers and phase shifters, have been proposed.

- [Pro5] **Implementation and Investigation of Selected Algorithms for Interpretation of Measurement Data** (Realizacja i badanie wybranych algorytmów interpretacji danych pomiarowych).
Roman Z. Morawski, Prof., Ph.D., D.Sc.,
 A. Miękina, A. Podgórski
 10.07.2003 - 31.12.2004

The main objectives of the project are related to the design and implementation of new algorithms for calibration of measurement channels and reconstruction of measurands (i.e. generalised quantities to be measured), as well as to the upgrading of the corresponding research infrastructure. The systematic approach to the related research problems has been enhanced with linguistic considerations. A new family of rational-filter-based algorithms for reconstruction of spectrum on the basis of data acquired by means of a mini-spectrophotometer has been developed. Some new algorithms and procedures for frequency-domain analysis of acoustic-range signals have been developed and studied as well.

- [Pro6] **Analysis, Optimisation and Methods of Designing High-Efficiency Key Tuned Power Amplifiers** (Analiza, optymalizacja i metody projektowania wysokosprawnych kluczowych rezonansowych wzmacniaczy wielkiej częstotliwości).
Jan Ebert, Prof., Ph.D., D.Sc.,
 M. Mikołajewski, J. Modzelewski, K. Puczko
 10.07.2003 - 31.12.2004

The aim of the project to analyse losses in switch-mode high-frequency tuned power amplifiers, particularly to analyse of switching losses in Class-DE power amplifiers. The Class DE (and Class E) amplifiers are

based on the soft switching of power transistors which are turned on at zero output voltage (ZVS) and even at zero output voltage and at zero output current (ZVS and ZCS). Therefore the turn-on switching losses are eliminated or highly reduced. In contrast, the transistors are turned off at a high current level but the turn-off switching losses are also reduced because the rate of rise of drain-source voltage is limited. Unfortunately, when the impedance of driving voltage source is too high the turn-off time of the transistor is increased by Miller's effect causing considerable turn-off switching losses. The conditions of increased turn-off switching losses in the Class DE amplifiers are determined in the project.

- [Pro7] **Modern Methods of Computer Measuring Systems Designing** (Nowoczesne metody projektowania rozproszonych systemów pomiarowych).
Wiesław Winięcki, Ph.D., D.Sc.,
 K. Mroczek, R. Łukaszewski, P. Biłski, T. Daniluk
 10.07.2003 - 31.12.2004

The work concerns distributed measurement systems (DMS). It contains a review of modern software and communication technologies that can be used in DMS development. Basic DMS's structures, wired systems and wireless systems are described. Within the wired system's section there are industrial systems, systems with bus extenders, systems with phone line modems and network systems. Within the wireless system's section there are systems using radiomodems, systems using GSM infrastructure (also practical implementation with WAP and ASP technology) and possibilities of Bluetooth/WLAN/UMTS technology usage. The results of this work were published as a chapter in a monograph concerning modern metrology.

- [Pro8] **New Services for GSM Systems** (Nowe usługi w systemach GSM).
Józef Modelski, Prof., Ph.D., D.Sc.,
 K. Kurek, T. Keller, Y. Yashchynshyn, R. Szumny, R. Paćzkowski
 10.07.2003 - 31.12.2004

The main aim of the work is implementation possibilities for analysis of two services designed for GSM networks. First part of work was dedicated to the subject of terminal localisation in GSM network. The localisation can be used for different types of services (information, trunking and alarm services) and the process should be done with an exact precision. In the work there have been comparison of different localisation methods and the methods of improving their performance. The other part of work was dedicated to introducing the concept of system for mobile access to student's information. During the work some general assumptions, functionality issues and architectural aspects of application was proposed.

- [Pro9] **MPEG-7 Application based on Web Services Technology** (Aplikacja MPEG-7 z wykorzystaniem serwisów sieciowych).
Andrzej Buchowicz, Ph.D.,
 K. Ignasiak, W. Skarbek, G. Galiński, P. Bobiński, T. Keller
 10.07.2003 - 31.12.2004

The main objective of the project was to create a distributed application for MPEG-7 descriptors extraction from the submitted pattern image and searching of images similar, in the sense of MPEG-7

descriptors, to the pattern. The standard MPEG-7 descriptors: DominantColor and ColorTemperature and proposed by one of the authors DominantColorTemperature have been implemented in the application. The application conforms to the J2EE specification and has been deployed on the JBoss application server. The application is available through any web browser or with the use of the standalone client application written in Java. The web service technology is used to exchange data between server and the standalone client application.

[Pro10] **Radio Resource Management in UMTS** (Zarządzanie zasobami radiowymi w systemie UMTS).
Jacek Cichocki, Ph.D.,
J. Kołakowski, K. Radecki, S. Maszczyk,
S. Żmudzin
10.07.2003 - 31.12.2004

The project concerned the management of radio resources in UMTS cellular system. The procedures for RR management are more difficult than those used in second generation systems because of implementation of services requiring various QoS profiles. The project covered the analysis of management procedures proposed in UMTS standard as well as analysis of non-standard procedures described in other publications. The project resulted in the development of software procedures for modelling of power management procedures implemented in UMTS base and mobile stations.

[Pro11] **Methods of Analysis, Design and Diagnosis of Units and Radioelectronic Networks** (Metody analizy, projektowania i diagnostyki układów i sieci radioelektronicznych).
Jacek Wojciechowski, Prof., Ph.D., D.Sc.,
Z. Walczak, G. Radzikowski, P. Bilski,
A. Trojanowski
10.07.2003 - 31.12.2004

The aim of this project was to elaborate specified problems such as: analysis of digital money and micropayment in mobile radio networks, modelling decay in radio channel using of line prediction method, diagnosis of systems.

Projects granted by the Rector

[Pro12] **Determination of technical parameters of Environmental and Disaster Monitoring Satellite System EDMSS** (Opracowanie założeń technicznych satelitarne systemu monitorowania środowiska i katastrof EDMSS).
Józef Modelski, Prof., Ph.D., D.Sc.,
Y. Yaschyshyn, K. Kurek, R. Szumny
15.07 - 31.12.2004

EDMSS will be Earth observation satellite system, proposed by China National Space Administration – CNSA, used to monitor natural and man made disasters (i.e. flooding, storms, earthquakes). System will use a constellation of LEO satellites to Earth observation in different bands (optical, infrared, microwave – SAR), and will be realized in international cooperation. In this work requirements and specification of EDMSS has been determined, considering: technical parameters of synthetic aperture radar SAR system, (bandwidth, transmitted power, bit rate of data

acquisition) to obtain assumed resolution; analysis of signal link budget between satellites and the ground station (required transmitted power, bandwidth, antenna size); preliminary project of the ground station (requirements, structure, estimation of costs and schedule of work).

[Pro13] **Project of Location System for YES2 Capsule - Phase 2** (Projekt systemu lokalizacji kapsuły satelitarnej YES-faza 2)
Krzysztof Kurek, Ph.D.
M. Tymięski
11.05 - 31.12.2004

YES2 (Young Engineers Satellite 2) „Space Mail” is an educational project for students, supported by European Space Agency, that demonstrates the possibility of using a tether system with inflatable capsule to return from space to Earth. In this work project and realization of a system to locate YES2 capsule after its landing on Earth have been done. The system uses a GPS receiver in the capsule and transmits its position to the earth station using ISM 433 MHz frequency band. The project is realized in cooperation with Space Research Centre, Polish Academy of Sciences.

[Pro14] **Effective Methods of Image Compression and Analysis** (Efektywne metody kompresji i analizy obrazów).
Artur Przelaskowski, Ph.D., D.Sc.
11.05 - 31.12.2004

The main purpose of the project was to develop and consolidate of image compression, analysis and interpretation group. Two research directions were investigated: computer aided diagnosis (CAD) of medical images and compression of image data sets for archiving and communication. Aided diagnosis of digital mammograms and compression of diversified class of natural and medical images were general application area. The results are applied in teaching with respect to corresponding subjects (courses). Final report includes description of several procedures and algorithms of: a) microcalcification detection in multiresolution domain; b) perception enhancement of diagnostically important image features (2-D wavelet-based decomposition followed by adaptive thresholding and pattern modeling); c) simulation of mammogram acquisition process and normalization applied for automatic detection efficiency improvement and medical data retrieval. Moreover, a monograph entitled ‘Lossless image compression: selected problems’ was prepared and compression tools were realized.

[Pro15] **Elaboration of Textbook "Signals and Systems"** (Opracowanie materiałów dydaktycznych wspomagających kształcenie studentów w zakresie teorii sygnałów i systemów).
Dariusz Radomski, Ph.D.,
A. Jakubiak
11.05 - 31.12.2004

The goal of the realized project was to prepare a textbook for the lecture “Signals and systems”. The printed textbook covers basic and advanced problems in the analysis of signals and systems. The original chapters of the book are devoted to time-frequency representations of signals, theory of signal detection and problems in mathematical modeling of signals and systems.

Projects granted by the Dean

[Pro16] **Digital Audio Workstation Based on Linux System for Recording and Processing of the Sound Signals** (Cyfrowa stacja robocza do zapisu i obróbki dźwięku oparta na systemie Linux).

Zbigniew Kulka, Prof., Ph.D., D.Sc.,
 Michał Kostrzewa, Piotr Nykiel
 05.07 - 31.12.2004

The project was focused on development of the driver for the 192 kHz multichannel AES/EBU interface type Lynx AES16. The AES16 in form of a single PCI card turns the PC computer into a powerful digital audio workstation (DAW). The driver has been written for the DAW based on Linux system for the ALSA architecture.

[Pro17] **Image Indexing Using Color Temperature Technique** (Indeksowanie obrazów techniką temperatury barwowej).

Władysław Skarbek, Prof., Ph.D., D.Sc.
 K. Wnukowicz
 05.07 - 31.12.2004

As the result of the work a new descriptor for image indexing/retrieval based on dominant color temperatures has been designed and evaluated. A syntax for the descriptor was designed, which comply with the MPEG-7 standard specification, given as a DDL description (Description Definition Language), and in a binary form. Experiments were carried out, which proved that the new descriptor allows enhanced functionalities of image searching based on color temperature feature in comparison with the MPEG-7 Color Temperature Descriptor, namely query by example and query by value searches. The Dominant Color Temperature Descriptor was proposed as a new descriptor to the MPEG-7 standard, and the work has been continued in Core Experiments of MPEG Video Group. Additionally, index structure for storing the descriptor based on M-trees was designed to accelerate the search. By using this structure, the search is up to 20 times faster (regarding distance computations) in comparison with the full sequential search.

[Pro18] **The Preparation of a Monograph Aimed to Facilitate the Lecture: Fundamentals of Modern Antenna Techniques** (Przygotowanie monografii naukowej wspomagającej proces dydaktyczny "Podstawy techniki antenowej").

Stanisław Rosłoniec, Prof., Ph.D., D.Sc.
 05.07 - 31.12.2004

The main aim of the research project is completion of a monograph entitled "Fundamentals of modern antenna techniques". The object of the above monography is basic properties, design methods and technology related solutions for the following antenna devices: linear wire antennae nonlinear wire antennae (also rectangular and magnetic antennae), uniformly spaced wire antenna arrays, travelling wave (rhombic and spiral) antennae, reflector antennae (reflectors: corner, parabolic cylinder, parabolic and offset parabolic), dual reflector antennae (Cassegrain and Gregorian installations), aperture antennae (sectorial horn H, pyramidal horn E - H and horn - parabolic antenna) resonator and waveguide slotted antennae, delaying and accelerating lens antennae and special antennae with electronically adjusted radiation patterns and multi

- beams radiation patterns. In most cases the presented design methods are illustrated step by step from end to end by appropriate, important for practice, calculations and constructional solutions. Considering the didactic approach the completed monography may be also useful as a handbook for students in electronic and telecommunication engineering.

[Pro19] **Optimization of the Measurement Apparatus, Recording Methods and T Wave Alternans Detection in ECG** (Optymalizacja aparatury, metod rejestracji i wykrywania zmienności załamka T w elektrokardiogramach).

Zdzisław Pawłowski, Prof., Ph.D., D.Sc.,
 D. Janusek
 05.07 - 31.12.2004

At present time, there is no commonly accepted noninvasive indicator of the vulnerability to sudden cardiac death. Recent research works indicate a substantial meaning of the prognostic value of the T wave alternans (TWA) testing.

The aim of the study was to select optimal methods for ECG data analysis for TWA detection, and choice of the measurement apparatus and recording methods. The basic optimization criterion is obtaining maximum information describing disturbance of the repolarization process associated with TWA phenomenon.

[Pro20] **Elaboration of Academic Textbook: "Signals and Systems"** (Opracowanie podręcznika akademickiego "Sygnały i systemy").

Jacek Wojciechowski, Prof., Ph.D., D.Sc.
 05.07 - 31.12.2004

The main goal of this project was to prepare the academic book "Signals and systems". This book contains the most important problems devoted to analysis of signals and systems, mathematical methods in theory of signals and systems.

4.2. Projects granted by the State Committee for Scientific Research (KBN)

[Pro21] **The Use of Modern IT Technologies in Designing of Distributed Measurement Systems (DMS)** (Wykorzystanie nowoczesnych technologii komunikacyjnych i programowych w projektowaniu przewodowych i bezprzewodowych rozproszonych systemów pomiarowych).

Wiesław Winiecki, Ph.D., D.Sc.,
 P. Bilski, P. Bobiński, H. Chaciński,
 T. Daniluk, R. Łukaszewski, M. Karkowski,
 T. Mielcarz, K. Mroczek.
 07.04.2004 - 06.07.2006

The project concerns the use of modern IT technologies in metrology. Main objects of interest are distributed measurement systems (DMS). The main topics of this project are methods of network and wireless DMS designing, allowing to resolve such hardware and software problems as:

- making network measurement systems' software independent of hardware platform and allowing it to access the system from any computer with a standard web browser, without the need of

- installation of dedicated measurement application on the client computer,
- expansion of measurement systems' application as resulting from the usage of wireless communication,
- improvement of DMS reliability resulting from the correction of timing parameters specific to network and wireless systems.

Scientific target of this project is to develop a network/wireless DMS' new design and to analyze methods taking advantage of modern wired and wireless communication technologies as well as software technologies. Engineering target of this project is to develop software tools and libraries for DMS' software development, which can be used in industry, environment and radiocommunication monitoring as well as scientific and R&D laboratories.

- [Pro22] **New Kinds of Steerable Microwave Antennae with Multilayer Substrate** (Nowe rodzaje sterowanych anten mikrofalowych na podłożu wielowarstwowym).
Józef Modelski, Prof., Ph.D., D.Sc.,
 Y. Yashchyshyn, M. Szafran, K. Derzawski, E. Bobryk, H. Chaciński, M. Piasecki, A. Mędrzak, A. Tomaszewska-Grzęda
 01.03.2002 - 28.02.2004

New kinds of steerable microwave antennae with multilayer substrate have been investigated. The multilayer substrate consists of thin ferroelectric tape sandwiched between dielectric slabs. Ferroelectric tape is made up of ferroelectric material, permittivity of which can be changed by applying and varying the dc electric field. The permittivity change enables to create different radiation patterns of microstrip antenna. This permits to use such a substrate in several applications.

- [Pro23] **Double - Dimensional Cohen's Class Distributions. Studies of Properties and Applications** (Podwójnie wymiarowe rozkłady klasy Cohena. Badania własności oraz zastosowań).
Stefan L. Hahn, Prof., Ph.D., D.Sc.,
 J. Jarkowski, K. Snopek, G. Hahn
 06.05.2002 - 31.12.2004

The double-dimensional Cohen's class was defined in the paper of Hahn and Snopek (IEEE Transactions on Signal Processing, November 2002). Further research contains studies of properties of chosen double-dimensional distributions, especially double dimensional pseudo-Wigner distributions. The studies are focused on applications of double-dimensional spectrograms and signograms.

- [Pro24] **Optimisation Methods in Video Sequence Coders** (Metody optymalizacyjne w kodach sekwencji wideo). Ph.D. Grant.
Władysław Skarbek, Prof., Ph.D., D.Sc.,
 Piotr Bobiński
 17.04.2003 - 16.04.2004

The work is about efficient coding of video sequences using video encoders utilizing the most advanced compression techniques, i.e. general prediction, both in time and spatial domain. The key issue in video compression is the optimal coder control; that is the selection of appropriate set of coding parameters that will guarantee the demanded bitrate, calculated on the basis of actual transmission channel parameters, with minimal loss in fidelity of the reconstructed video sequence. In this work this problem is solved using the

developed linear model for bitrate as a function of percentage of insignificant transform coefficients. It is shown experimentally that the model is feasible for AVC video encoder. Using this model in the reference AVC codec leads to the increased coding efficiency (about 1dB for PSNR measure) and a more stable bitrate control (38% gain for bitrate deviation).

- [Pro25] **Analysis of Application and Coexistence Conditions for Communication Systems in ISM Band** (Analiza możliwości stosowania oraz warunków współistnienia systemów łączności w paśmie ISM). Ph.D. Grant.
Józef Modelski, Prof., Ph.D., D.Sc.,
 Tomasz Keller
 17.04.2003 - 16.07.2004

The main subject of the work were interoperability possibilities and coexistence ideas of two main wireless communication systems sharing ISM 2.4 GHz band: Bluetooth and IEEE 802.11b. The aim was to introduce negative effect of Bluetooth interference on IEEE 802.11b system performance and to propose methods of system throughput optimization in time and space varying radio channel and in presence of interference. During the work complex propagation model of the IEEE 802.11b was designed and the method of system throughput optimization was proposed. For the optimization joined mechanism of the frame length adaptation and automatic rate fallback was applied. The presented method allows for maximizing system throughput in an environment with interferences from alien devices.

- [Pro26] **Methods and Algorithms for Interpretation of Signals Spectrum, Dedicated to Applications in Technological and Ecological Monitoring** (Metody i algorytmy interpretacji widma sygnałów do zastosowań w monitoringu procesów technicznych i ekologicznych).
Roman Z. Morawski, Prof., Ph.D., D.Sc.,
 A. Miękina, T. Woliński, A. Podgórski, N. Obarski
 17.04.2003 - 16.04.2006

New methods and algorithms of digital signal processing of measurement data have been developed. They are designed for solving some fundamental problems related to the development of information infrastructure of technological and ecological monitoring.

- [Pro27] **Analysis and Project of Data Transmission and Processing System of Mini-satellite** (Analiza i projekt systemu transmisji i przetwarzania danych z mini-satelity).
Tomasz Kosiło, Ph.D.,
 K. Kurek, T. Keller, Y. Yashchyshyn, A. Abramowicz, D. Gryglewski
 29.04.2003 - 28.12.2004

The aim of this work was project of system of data transmission and processing for mini-satellite, which can be used to Earth observation i.e. in satellite disaster monitoring system.

In the project following aspects had been considered:

- determination of earth observation satellite system parameters and structure of communication payload of mini-satellite
- analysis of bandwidth effective modulation and coding techniques (8PSK, OFDM)

analysis of possibility of use of new subsystems: antenna arrays with steerable radiation pattern, dielectric resonator filters, high power microwave amplifiers.

- [Pro28] **Capacitance Process Tomograph** (Pojemnościowy tomograf procesowy).
Roman Szabatin, Ph.D.,
 P. Brzeski, J. Mirkowski, T. Olszewski,
 W. Smolik
 15.10.2003 - 14.10.2005

The aim of the project is to elaborate, construct and verify an Electrical Capacitance Tomograph, of very high position resolution, which will be working in real time. As a result, images (2D or 3D) of gas and liquid flow will be presented.

- [Pro29] **Improved Model of Adaptive Antenna Controlled by Means of Genetic Algorithm** (Badanie systemu anteny inteligentnej sterowanej z wykorzystaniem algorytmu genetycznego). Ph.D. Grant.
Józef Modelski, Prof., D.Sc.,
 Marcin Piasecki
 28.10.2003 - 27.10.2004

This project presents results of research on the influence of real antenna parameters like mutual couplings on the overall antenna radiation pattern. Two different approaches to adaptation of such an antenna simulated with the use of genetic algorithm were also presented. The first one was a standard phase adaptation while in the second one radiation characteristic of each element is modified with a new hardwareless technique.

- [Pro30] **Electrical-Thermal Modelling of Microwave Power Transistors** (Elektryczno-termiczne modelowanie mikrofalowych tranzystorów mocy).
Wojciech Wojtasiak, Ph.D.,
 D. Gryglewski, T. Morawski, J. Zborowska,
 J. Kraśniewski, M. Oleksy, M. Kraśniewski,
 S. Łuczak, M. Lubiejewski
 05.11.2003 - 04.02.2006

The topic of the project is the electro-thermal modeling of modern, microwave high power FET's such as MESFET, HJFET and LDMOSFET. The thermal problem described by heat conducting equation is solved by means of 3D - FDTD method for arbitrary pulsed thermal excitation. In result, the transient temperature distribution in the active area of transistor is substituted into electrical model. The second aspect of this project focuses on the new method of determination methods and measurements of thermal impedance of high power microwave FETs.

- [Pro31] **New Methods of Imaging Quality Improvement in Applications of Optical Tomography for Anatomical and Functional Examinations** (Nowe metody poprawy jakości obrazowania w zastosowaniach tomografii optycznej do badań anatomicznych i czynnościowych).
Grzegorz Domański, Ph.D.,
 Z. Pawłowski, K. Zaremba, J. Marzec,
 B. Konarzewski, A. Trybuła, R. Kurjata
 22.10.2003 - 21.10.2005

The goal of the project is to elaborate the new methods of imaging quality improvement in medical applications of optical tomography. The methods of improvement

are based on using anatomical and morphological a-priori information taken from other modalities (MRI, CT, USG). The further research contains designing of an model of optical tomograph dedicated to small organs and tissue perfusion examination.

- [Pro32] **Hierarchical Statistic Modelling of Disease Process with Multiple Etiology** (Hierarchiczne modelowanie statyczne procesu chorobowego o złożonej etiologii).
Dariusz Radomski, Ph.D.,
 05.11.2003 - 04.05.2006

The goal of the realized grant is preparing methodology for the statistical modelling of a disease with multifactorial etiology. One of the new elements is a concept of hierarchical model, which describes a disease process at levels of time-space resolution. The example of a disease used in this project is endometrioid cysts being the one of the more frequent ovarian tumors. At the moment, the authors elaborated the model at the epidemiological level which allowed to identify risk factors associated with such cysts. Knowledge of these factors could be used in the diagnostic model of the disease. Moreover, the general methodology of mathematical modeling in gynecology and obstetrics was elaborated.

4.3 Other projects

- [Pro33] **Acoustic Measurements of Large Concert Studio named W. Lutosławski** (Wykonanie pomiarów akustycznych w studiu koncertowym im. Witolda Lutosławskiego Polskiego Radia S.A.).
Maria Tajchert, Ph.D.,
 08.06 - 10.09.2004
 T. Fidecki, R. Smoliński
 Funded by the Polish Radio Stock Company (Polskie Radio S.A).

Measurements of the acoustic parameters (reverberation time, early decay time, the delay of early strong reflections and others) of the studio before and after modernization has been done. Steady state and impulse methods have been used. Results were compared.

- [Pro34] **Elaboration and Construction of Multi-state Model of Phase Shifter on Varactor Diodes** (Opracowanie i wykonanie wielostanowego modelu przesuwnika fazy na diodach waraktorowych).
Daniel Gryglewski, Ph.D.,
 W. Wojtasiak, M. Lubiejewski
 31.05 - 01.11.2004
 Funded by the Industrial Institute of Telecommunications (Przemysłowy Instytut Telekomunikacji).

The new version of a multi-state phase shifter has been elaborated. The device was elaborated on varactor diodes. The goal of the work is to develop the main electronics modules of the shifter.

- [Pro35] **Verification of the Noise Level Measurement** (Weryfikacja wyników pomiarowych hałasu).
Zbigniew Kulka, Prof., Ph.D., D.Sc.,
 R. Smoliński
 01.01 - 31.01.2004

Funded by SONAURA - Acoustic Engineering (SONAURA - Inżynieria Akustyczna).

Results of radio emission sources tests as well as users opinions have been gathered and thoroughly analysed. The concept of new improved software version was proposed, discussed and implemented.

- [Pro36] **Acoustic and Electroacoustic Measurements of Noise Emitted by Computer Systems** (Pomiary akustyczne i elektroakustyczne dźwiękowych urządzeń komputerowych).
01.01 - 31.07.2004
Zbigniew Kulka, Prof., Ph.D., D.Sc.,
R. Smoliński
Funded by Axel-Springer Ltd.

The aim of the work was to use advanced electroacoustic measuring systems to the evaluation of the noise level, which was emitted by different computer systems.

- [Pro37] **Recordings and Processing of Sound in ED Studio** (Przeprowadzenie nagrań oraz wykorzystanie urządzeń i aparatury do obróbki nagrań w studiu ZEA).
Zbigniew Kulka, Prof., Ph.D., D.Sc.,
P. Nykiel, R. Smoliński
02.11 - 31.11.2004
Funded by Central Examination Commission (Centralna Komisja Egzaminacyjna).

The sound materials in a very high level of speech intelligibility (foreign languages) were recorded, processed and edited in the Electroacoustics Division (ZEA) studio and the anechoic chamber.

- [Pro38] **Assembly and Investigations of 915 MHz Measuring Modules** (Montaż i przeprowadzenie badań modułów pomiarowych na 915 MHz).
Wojciech Wojtasiak, Ph.D.,
16 - 19.02.2004
Funded by QWED Ltd.

The goal of this project was to design 915 MHz measuring modules. Application of new components required establishing a method for project designing. It was the main subject of this work.

- [Pro39] **Construction of Two Converters** (Wykonanie dwóch konwerterów).
Wojciech Wojtasiak, Ph.D.
10.10.2003 - 17.02.2004
Funded by the Regional Telecommunication Networks (Regionalne Sieci Telekomunikacyjne "EL-NET" S.A.)

The Institute of Radioelectronics has no responsibility for obtaining any intellectual property rights of issued results to be performed for the Regional Telecommunication Networks.

- [Pro40] **Equipment and Software for Modernisation of RAMES-6 Measuring System** (Sprzęt i oprogramowanie do modernizacji systemu pomiarowego RAMES-6).
Jacek Cichocki, Ph.D.,
J. Kołakowski, S. Maszczyk, S. Żmudzin, J. Guterman, D. Kolmas
16.03 - 15.12.2004

Funded by European Union (PHARE Fund)
The project has been worked out within the framework of PHARE programme "Supply of IT equipment and

equipment for testing electro-magnetic compatibility, conformity assessment, toys, construction and high pressure products - PL0102.01.01 Conformity Assessment and Standardisation". The system modernisation allowed to use RAMES-6 measuring systems in the Central Technical Testing Laboratory of OTRP (the Office of Telecommunications and Post Regulation) for activities connected with market surveillance

- [Pro41] **Investigations of the Board Military Equipment** (Badania aparatury pokładowej sprzętu wojskowego)
Krzysztof Robaczyński, M.Sc.,
11.08-11.09.2004
Funded by the Military Institute of Armament Technology (Wojskowy Instytut Techniczny Uzbrojenia).

The main aim of this project has been to investigate the specialised units taking into regard their durability in specific conditions.

- [Pro42] **Designing and Construction of 3 Converters** (Opracowanie i wykonanie 3 sztuk konwerterów).
Wojciech Wojtasiak, Ph.D.,
15.09-30.12.2004
Funded by the Military Institute of Communications (Wojskowy Instytut Łączności).
Three specialised units have been developed, designed and constructed.

- [Pro43] **Elaboration of the Control Methods for Emission of the Broadcasting Digital Systems** (Opracowanie metod kontroli emisji radiofonicznych systemów cyfrowych).
Tomasz Kosiło, Ph.D.,
H. Chaciński, W. Kazubski
06.09 - 10.12.2004
Funded by the Office of Telecommunications and Post Regulation (Urząd Regulacji Poczty i Telekomunikacji).

The main subject of the study is to elaborate methods that allow controlling emission of the broadcasting digital systems. The implementation works have been manufactured as well.

- [Pro44] **Project of the System for Control of Broadcasting Parameters Emission** (Projekt systemu do kontroli parametrów emisji radiofonicznych sieci cyfrowych).
Tomasz Kosiło, Ph.D.,
H. Chaciński, W. Kazubski
28.09 - 10.12.2004
Funded by the Office of Telecommunications and Post Regulation (Urząd Regulacji Telekomunikacji i Poczty)

The work is concerned with a system for the control of broadcasting parameters of emission. These systems are able to write and process data inside the tag's microcontroller as well.

- [Pro45] **Basics and Introduction Conditions of the DRM System on Medium Frequencies in Poland** (Podstawy teoretyczne i warunki wdrożenia w Polsce systemu DRM na falach średnich).
Jacek Jarkowski, Ph.D.
08.10 - 15.12.2004
T. Keller, K. Kurek

Funded by the Office of Telecommunications and Post Regulation (Urząd Regulacji Telekomunikacji i Poczty).

During last years the great interest in digital modulation broadcasting systems is observed. The Digital Radio Mondiale (DRM) System is designated to be widely introduced in Europe on the frequencies below 30MHz. In the work basics of the System and propagation properties of digital signals on Medium Frequencies are described. General conditions of introduction and target to be achieved by adapting the DRM system in Poland are discussed.

[Pro46] **A Wireless Module Dedicated for the ECG Acquisition** (Moduł akwizycji elektrokardiogramu z radiową transmisją danych).
Piotr Bogorodzki, Ph.D.

15.10.2004 - 30.06.2006

Funded by the Institute of Medical Technology and Apparatus (Instytut Techniki i Aparatury Medycznej, Zabrze).

[Pro47] **Functional Investigations and Analyses of Obtained Results of Military Equipment and Works Aimed at Their Reconstruction** (Przeprowadzenie badań funkcjonalnych i analiz uzyskanych wyników badań sprzętu wojskowego oraz wykonanie prac odzwierciedlających ich właściwy stan techniczny).
Krzysztof Robaczyński, M.Sc.

08.11 - 31.12.2004

Funded by the Military Institute of Armament Technology (Wojskowy Instytut Techniczny Uzbrojenia).

The main goal of this project was to perform functional investigations, analyses of results concerning specialised military units.

4.4. International co-operation

[Pro48] **Enhanced Optimisation of Microwave Thawing and Heating Processes** (Opracowanie oprogramowania do optymalizacji procesu mikrofalowego rozmrażania i grzania żywności pod kątem poprawy jakości i bezpieczeństwa mikrobiologicznego).

Wojciech Gwarek, Prof., Ph.D., D.Sc.,

W. Wojtasiak, R. Michnowski, D. Gryglewski, P. Kopyt

EUREKA - MICRODEFROSTMODEL Project No. 2602

01.01.2001 - 01.01.2004

The overall objective of the project is to develop innovative, industrially evaluated software tools for real-time simulation and optimization of micro-wave thawing and heating of frozen convenience food and methods - based on this unique software - for finding the optimal design of such food products.

[Pro49] **Characterisation of Microwave Cavities with Closely Spaced Modes** (Problem wielokrotnego rezonansu w czasie grzania mikrofalowego małych pakietów żywności)

Małgorzata Celuch-Marcysiak, Ph.D.,

M. Żukociński, E. Mielniczek

22.11.2003 - 31.12.2004

Funded by Industrial Partner, USA

The Institute of Radioelectronics has no responsibility for obtaining any intellectual property rights of issued results to be performed.

[Pro50] **Development of a New Microprocessor - Controlled Microwave Device** (Opracowanie nowego typu urządzenia mikrofalowego sterowanego mikroprocesowo).

Wojciech Gwarek, Prof., Ph.D., D.Sc.,

W. Wojtasiak, R. Michnowski, D. Gryglewski, P. Kopyt

28.08.2003 - 7.01.2004

Funded by Industrial Partner, Sweden.

The Institute of Radioelectronics has not responsibility for obtaining any intellectual property rights of issued research results to be performed.

[Pro51] **Optimisation of Image Flow Geometry Based on 3D Blood Vessels Image** (Optymalizacja geometrii obrazowania przepływu krwi na podstawie obrazu 3D naczyń krwionośnych).

Ewa Piątkowska-Janko, Ph.D.,

P. Bogorodzki, M. Orzechowski, P. Bargieł

POLONIUM 2003

Polish - French Integrated Activities (Polsko - Francuskie Działania Zintegrowane)

01.01.2003 - 01.01.2005

The purpose of this scientific project was to study the feasibility of automated 3D image-based determination of a plane perpendicular to one or several blood vessels. (Cooperation with group from CREATIS, CNRS 5515 and INSERM U630 Research Unit, Lyon, France)

[Pro52] **Screening of Cardiovascular Systems Based on Multi-Parameter Analysis** (System do badań przesiewowych układu sercowo-naczyniowego bazujący na wieloparametrowej analizie hemodynamiki serca i perfuzji naczyniowej w wybranych obszarach ciała).

Ewa Piątkowska-Janko, Ph.D.

P. Bogorodzki, T. Wolak, M. Orzechowski

EUREKA - CAVASCREEN

Project No. 2939 - SPUB

(Partially funded by KBN)

01.01.2003 - 01.01.2006

The project includes a description, comparison with clinical data and clinical exploitations of a non-invasive and relatively inexpensive method for screening cardiovascular systems based on multi-parameter analysis of heart haemodynamics and vascular perfusion in selected areas of the body.

[Pro53] **Electrical Tomography for Biotechnological Applications**

Roman Szabatin, Ph.D.,

A. Płaśkowski, P. Brzeski, J. Mirkowski, W. Smolik, T. Olszewski, D. Radomski, A. Przelaskowski

British-Polish Research Partnership Programme

(Partially funded by KBN)

01.01.2003 - 01.01.2005

Collaboration between UMIST (University of Manchester, Institute of Science and Technology) and the Institute of Radioelectronics of the Warsaw University of Technology has been established on the basis of common interest in biotechnological

applications of Electrical Tomography. Results of research projects conducted separately have been presented. The exchange of young scientists between two centers, as well as the main thesis of the common project were suggested.

- [Pro54] **Networked Audiovisual Media Technologies** (Audiowizualne sieciowe systemy hybrydowe)
Władysław Skarbek, Prof., Ph.D., D.Sc.,
 K. Ignasiak, A. Buchowicz, G. Galiński,
 P. Bobiński, K. Kucharski, K. Wnukowicz
 Network of Excellence, VISNET
 6th Framework Programme
 (Partially funded by KBN)
 01.12.2003 - 30.11.2005

The aim of the project is the creation and coding of audiovisual material taking into regard hybrid character of the mentioned material, as well as to their storage and transmission in heterogenic networks.

- [Pro55] **Design and Construction of a Prototype of a Transition Radiation Detector for the Compressed Baryonic Matter Experiment at GSI Darmstadt** (Projekt i konstrukcja prototypu detektora promieniowania przejścia dla eksperymentu Compressed Baryonic Matter w GSI Darmstadt)
Krzysztof Zaremba, Prof., Ph.D., D.Sc.,
 J. Marzec, Z. Pawłowski, G. Domański, B. Konarzewski, W. Padèe, M. Ziembicki
 INTAS - SPUB
 01.01 - 31.12.2004

The main objectives of the project are related to the design of the detector for the Transition Radiation Tracker for the CBM (Compressed Baryonic Matter) experiment, which is being prepared in the frames of the challenging FUTURE project in GSI (Gesellschaft für Schwerionenforschung): an international accelerator facility for beams of ions and antiprotons. The team from the Institute of Radioelectronics has prepared and submitted, together with few other laboratories from Russia and Germany, a proposal of the detector based on the straw tubes, as well as the appropriate read-out electronics.

- [Pro56] **COMPASS Experiment at CERN - Development of the Spectrometer and the Data Acquisition and Analysis** (Rozbudowa spektrometru oraz zbieranie i analiza danych doświadczalnych)
Krzysztof Zaremba, Prof., Ph.D., D.Sc.,
 J. Marzec, Z. Pawłowski, G. Domański,
 B. Konarzewski, A. Padèe, R. Sulej,
 M. Ziembicki

Funded by CERN
 (Partially funded by KBN)
 01.01.2004 - 31.12.2006

The project is a part of the long-term collaboration between the Institute of Radioelectronics and the international high-energy physics experiment COMPASS (Na58) at CERN (Genewa). In the present stage the spectrometer of the experiment is being developed and upgraded for the measurements of the hadrons interactions with a matter. In the frames of a new programme the team from the Institute of Radioelectronics is responsible (together with the Soltan Institute of Nuclear Studies) for the design and production of a new plane, based on the scintillating fibres, for the Beam Momentum Station. The Institute is also involved in the applications of the „soft computing” methods (neural networks, genetic algorithms etc.) in the experimental data analysis.

- [Pro57] **Integrating and Strengthening the European Research Area**
Jacek Jarkowski, Ph.D.,
 W. Wojtasiak, D. Gryglewski, R. Michnowski
 Network of Excellence, TARGET
 6th Framework Programme
 (Partially funded by KBN)
 01.01.2004 - 01.01.2008

The aim of TARGET is to overcome the fragmentation of European research in the field of microwave power amplifiers for broadband wireless access by creating a progressive and durable integration of research capacities of the network partners. Ultimately, European technology and research in the fields of active power devices beyond CMOS, of the characterisation and simulation of materials and devices, of amplifier design and linearisation, and in the field of broadband transmitter system design shall attain a leading role in the world.

- [Pro58] **Development and Implementation of Advanced Face Recognition and Certain Image Processing Techniques**
Władysław Skarbek, Prof., Ph.D., D.Sc.,
 G. Galiński, S. Badura, K. Kucharski,
 K. Wnukowicz
 Mitsubishi Electric Information Technology
 Centre Europe
 01.12.2004 - 25.03.2005

The key objective of the project that started on 1st December 2004 is to develop and implement a set of tools and algorithms in the fields of face recognition and image processing.

5. TITLES AND DEGREES AWARDED

5.1. D.Sc. Degree

- [DSc1] Artur Przelaskowski: *"Falkowe metody kompresji danych obrazowych"* (Wavelet methods of image data compression), Warsaw, Mar. 2, 2004.
- [DSc2] Jan Żera: *"Percepcja niesynchroniczności składowych widmowych wielotonów"* (Non-synchronous perception of multitones spectrum components), Warsaw, Dec. 7, 2004.

- [MSc3] Paweł Rafał Bajurko: *"Badanie anteny z falą bieżącą na niesymetrycznej linii paskowej z wyższym rodzajem pola"* (A study of the travelling-wave antenna in an unsymmetrical microstrip line with the higher order mode), Assist. Prof. **Y. Yashchyshyn** (tutor), (4).
- [MSc4] Michał Baranowski: *"Wizualizacja pola elektromagnetycznego w przestrzeni trójwymiarowej"* (Visualization of electromagnetic field in 3D space), Assist. Prof. **M. Sypniewski** (tutor), (5).

5.2. Ph.D. Degrees

- [PhD1] Piotr Bobiński: *"Metody optymalizacyjne w koderach sekwencji wideo"* (Optimization methods for video encoders), Prof. **W. Skarbak** (tutor), Warsaw, Jun. 1, 2004.
- [PhD2] Tomasz Keller: *"Analiza możliwości stosowania oraz warunków współistnienia radio-wych systemów łączności pracujących w pasmie ISM"* (Analysis of application possibilities and coexistence conditions for communication systems in ISM band), Prof. **J. Modelski** (tutor), Warsaw, Sept. 21, 2004.
- [PhD3] Stanisław Maszczyk: *"Wykorzystanie transformacji falkowej do eliminacji zakłóceń wąskopasmowych w systemach CDMA"* (Application of the wavelet transformation for reduction of narrowband interference in CDMA systems), Prof. **J. Wojciechowski** (tutor), Warsaw, Oct. 19, 2004.
- [PhD4] Nguyen Nguyen Minh: *"Doppler-rake reception in fast fading environments"*, Prof. **J. Modelski** (tutor), Warsaw, Jun. 15, 2004.
- [PhD5] Adam Pietrowcew: *"Detekcja i rozpoznanie twarzy w obrazach cyfrowych"* (Face detection and recognition in the digital images), Prof. **W. Skarbak** (tutor), Sept. 21, 2004.
- [PhD6] Grzegorz Radzikowski: *"Model pieniądza cyfrowego i protokół płatności w heterogenicznych sieciach bezprzewodowych"* (Digital money model and the payment protocol in wireless networks), Prof. **J. Wojciechowski** (tutor), Warsaw, Nov. 16, 2004.

- [MSc5] Konrad Adam Bożek: *"Cyfrowe łącze radiowe dla systemów mobilnych"* (Digital radio link for mobile systems), Assist. Prof. **W. Kazubski** (tutor), (5).
- [MSc6] Wioletta Brodowska: *"Badanie protokołu routingu ZRP w sieciach bezprzewodowych"* (Examination of routing ZRP protocol in wireless networks), Assist. Prof. **Z. Walczak** (tutor), (5).
- [MSc7] Sebastian Brzeziński: *"Badania skuteczności i redukcji hałasu zagłówek aktywnego i układu do realizacji stref ciszy w kabinach przemysłowych"* (Investigation of efficiency of active noise control systems: active headrest and system to achieve zones of silence in industrial cabins), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4,5).
- [MSc8] Dawid Bujalski: *"Projekt wzmacniacza - dyskryminatora do detektorów słomkowych"* (Project of amplifier - discriminator for straw detectors), Assoc. Prof. **J. Marzec** (tutor), (4,5).
- [MSc9] Marek Bury (co-author: Sebastian Kozłowski): *"Mikrofalowy przełączany system do pomiaru macierzy rozproszenia dwuwrotnika"* (Microwave switched system for measuring two-port S-matrix), Prof. **T. Morawski** (tutor), (5).
- [MSc10] Paweł Chiliński: *"Systemy zarządzania procesami biznesowymi - kierunki rozwoju"* (Business process management systems - trends), Assist. Prof. **K. Ignasiak** (tutor), (5).
- [MSc11] Piotr Chodkiewicz: *"Zastosowanie statystycznych metod klasyfikacji danych do analizy sygnału HR ECG"* (Statistical methods of data classification in HR ECG signal analysis), Assist. Prof. **B. Konarzewski** (tutor), (5).

5.3. M.Sc. Degrees

- [MSc1] Piotr Abramczyk (co-author: Krzysztof Michalik): *"Rozproszony system pomiarowo-kontrolny czasu rzeczywistego sterowany zdalnie"* (Remotely controlled real-time distributed measurement system), Assoc. Prof. **W. Winiecki** (tutor), (5 / 5).
- [MSc2] Monika Antoniak: *"A microcontroller-based device for a power management of an autonomous solar system"*, Assist. Prof. **T. Kościło** (tutor), (5).

- [MSc12] Karol Dobek: *"Teletransmisja sygnału EKG z wykorzystaniem technologii Bluetooth"* (Teletransmission of ECG signal by means of Bluetooth technology), Assist. Prof. **P. Bogorodzki** (tutor), (5).
- [MSc13] Konrad Durasiewicz: *"Indeksowanie medycznych danych obrazowych w dziedzinie falkowej"* (Medical image data indexing in wavelet domain), Assoc. Prof. **A. Przelaskowski** (tutor), (5).
- [MSc14] Michał Dylewski: *"Porównanie architektur aplikacji internetowych na platformie J2EE"* (Comparison of internet application

- architectures on J2EE platform), Assist. Prof. **A. Buchowicz** (tutor), (4.5).
- [MSc15] Artur Frycze: *"Zdalny pomiar sygnałów bioelektrycznych za pośrednictwem sieci Internet"* (Remotly-controlled measurement of biological signals by means of Internet network), Assist. Prof. **T. Jamrógiewicz** (tutor), (5).
- [MSc16] Andrzej Gaładyk: *"Metoda alternansowa do analizy niestabilności elektrycznej serca"* (Alternans method for the analysis heart's electrical instability), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [MSc17] Adam Gaładzka: *"Optyczny system detekcji ruchów oka"* (Optical eye movement detection system), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [MSc18] Tomasz Gąsowski: *"Dwuzakresowa antena paskowa: 2,45 i 5,8 GHz"* (Dual-band microstrip antenna: 2.45 and 5.8 GHz), Prof. **W. Gwarek** (tutor), (5).
- [MSc19] Marek Górecki: *"Modelowanie łącza radio-wego UMTS. Segment satelitarny"* (UMTS radio link modelling. Satellite segment), Assist. Prof. **T. Kosilo** (tutor), (4).
- [MSc20] Sławomir Górski: *"Implementacja interfejsu USB w przyrządzie pomiarowym SVAN G12AE"* (USB interface implementation in the SVAN G12AE), Assist. Prof. **A. Podgórski** (tutor), (5).
- [MSc21] Jerzy Guterman: *"Drukowane anteny fraktalne dla terminali przenośnych"* (Study of fractal type printed antennae for mobile terminals), Assist. Prof. **J. Kołakowski** (tutor), (5).
- [MSc22] Michał Halicki: *"Zastosowanie anten rezonatorowych w szyku antenowym o formowanej charakterystyce promieniowania"* (Application of resonant antennae in antennae array with formated characterisation of radiation), Assist. Prof. **J. Jarkowski** (tutor), (3.5).
- [MSc23] Adam Janicki: *"Creating an intelligent user interface for QW - optimizer package"*, Assist. Prof. **P. Miazga** (tutor), (5). **English-medium -studies.**
- [MSc24] Krzysztof Kacprzak: *"Indeksowanie i wyszukiwanie utworów muzycznych w oparciu o deskryptory Audio w standardzie MPEG-7"* (Indexing and searching of music compositions using MPEG-7 audio descriptors), Assist. Prof. **K. Ignasiak** (tutor), (5).
- [MSc25] Michał Kalinowski: *"Kompresja obrazów medycznych z zastosowaniem sieci neuronowych"* (Medical image compression using neural networks), Prof. **K. Zaremba** (tutor), (4.5).
- [MSc26] Robert Kietliński: *"Rozpraszacze Schroedera"* (Schroeder's scatterers), Assist. Prof. **A. Leszczyński** (tutor), (4.5).
- [MSc27] Mariusz Kobus: *"Weryfikacja mówcy z wykorzystaniem sieci neuronowych"* (Artificial neural networks for speaker verification), Prof. **K. Zaremba** (tutor), (5).
- [MSc28] Damian Kolmas: *"Źródło sygnału ultraszerokopasmowego w technice DSP/FPGA"* (The source of ultra wideband signal based on DSP/FPGA technology), Assist. Prof. **J. Kołakowski** (tutor), (5).
- [MSc29] Adam Kondrat: *"Rozwiązanie typu Content Management System jako platforma zarządzania serwisami internetowymi"* (An impelementation of Content Management System as a platform for web managing sites), Assist. Prof. **M. Kazubek** (tutor), (5).
- [MSc30] Maciej Kosiński: *"Modernizacja systemu akwizycji danych tomografu rentgenowskiego Somatom DR"* (Modernisation of data acquisition system for Somatom DR X-ray tomograph), Assist. Prof. **W. Smolik** (tutor), (5).
- [MSc31] Jarosław Koszewski: *"System prezentacji i archiwizacji danych obrazowych w formacie DSR-TIFF"* (System for data presentation and storage in DSR-TIFF format), Assist. **T. Jamrógiewicz** (tutor), (5).
- [MSc32] Michał Kowalski: *"Układ do generacji sygnału zgodnego ze standardem EDGE z wykorzystaniem technik DSP/FPGA"* (Test setup for generation EDGE signals using DSP/FPGA technique), Assist. Prof. **J. Kołakowski** (tutor), (5).
- [MSc33] Wojciech Kozerski: *"Teletransmisja sygnału EKG z wykorzystaniem technologii Blue-tooth"* (Teletransmission of ECG signal using Bluetooth technology), Assist. Prof. **P. Bogorodzki** (tutor), (5).
- [MSc34] Sebastian Kozłowski: (co-autor: Marek Bury): *"Mikrofalowy przełączany system do pomiaru macierzy rozproszenia dwuwrotnika"* (Microwave switched system for scattering matrix measurement), Prof. **T. Morawski** (tutor), (5).
- [MSc35] Piotr Kropielnicki: *"UTRA TDD - ochrona danych przed błędami"* (UTRA TDD - data protection), Assist. Prof. **T. Kosilo** (tutor), (5).
- [MSc36] Marek Krok: *"Układ do pomiaru stosunku amplitud i przesunięcia fazowego sygnałów mikrofalowych"* (System for amplitude ratio and phase displacement measurement for microwave signals), Prof. **W. Gwarek** (tutor), (5).
- [MSc37] Aleksandra Kruś: *"Metody pomiaru i oceny hałasu w obszarach chronionych"* (Measurements and assessment of environmental noise), Assist. Prof. **E. Kotarbińska** (tutor), (5).
- [MSc38] Michał Kuciej: *"Wysokosprawny układ zasilania lampy fluorescencyjnej prądem wielkiej częstotliwości"* (High-efficiency electronic ballast for fluorescent lamp), Assist. Prof. **M. Mikołajewski** (tutor), (4).
- [MSc39] Piotr Kwas: *"Program do analizy ilościowej widm spektrometrycznych uzyskiwanych w badaniach próbek biologicznych metodą"*

- EDXRF* (The computer programme for quantitative analysis of biological samples spectra by means of EDXRF method), Prof. **K. Zaremba** (tutor), (5).
- [MSc40] Adam Zygmunt Laskowski: *"Zastosowanie podpisu elektronicznego i naturalnych metod identyfikacji w systemach informatycznych w ochronie zdrowia"* (Application of the electronic signature and natural methods of identification in the health care informatic systems), Assist. **T. Jamrógiwicz** (tutor), (4.5).
- [MSc41] Mariusz Leszczyński: *"Analiza formatu DjVu"* (DjVu format analysis), Prof. **W. Skarbek** (tutor), (5).
- [MSc42] Jarosław Majewski: *"Projektowanie wysokosprawnych wzmacniaczy mikrofalowych"* (The design of microwave high-efficiency power amplifiers), Assist. Prof. **W. Wojtasiak** (tutor), (5).
- [MSc43] Robert Makulec (co-autor: Gustaw Mazurek): *"System RFID zgodny z ISO 14443"* (RFID system compliant to ISO 14443), Assist. **H. Chaciński** (tutor), (5).
- [MSc44] Gustaw Mazurek (co-autor: Robert Makulec): *"System RFID zgodny z ISO 14443"* (RFID system compliant to ISO 14443), Assist. **H. Chaciński** (tutor), (5).
- [MSc45] Krzysztof Michalik (co-autor: Piotr Abramczyk): *"Rozproszony system pomiarowo-kontrolny czasu rzeczywistego sterowany zdalnie"* (Distributed real-time measurement system remotely controlled), Assoc. Prof. **W. Winiecki** (tutor), (5).
- [MSc46] Piotr Minodzki: *"Aktywny system sygnalizatora akustycznego"* (Active system of acoustic signalling device), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4.5).
- [MSc47] Rafał Młyński: *"Opracowanie metodyki obiektywnych badań akustycznych wkładek przeciwhałasowych"* (The elaboration of subjective methodology of acoustic research for ear-phones), Assist. Prof. **E. Kotarbińska** (tutor), (5).
- [MSc48] Cezary Mróz: *"System ultrasonografii trójwymiarowej z wolnej ręki"* (Free-hand three dimensional ultrasound system), Assist. Prof. **M. Kazubek** (tutor), (5).
- [MSc49] Dariusz Niedziewski: *"Digital Audio Broadcasting - stan obecny, perspektywy rozwoju, symulacja cyfrowych technik modulacyjnych"* (Digital Audio Broadcasting - present state of affairs, development prospects, and simulation of digital modulation schemes), Assist. Prof. **J. Jarkowski** (tutor), (5).
- [MSc50] Przemysław Niżyński: *"Korekcja brzmienia dźwięku realizowana za pomocą cyfrowych filtrów adaptacyjnych"* (Correction of sound by means of digital adaptation filters), Assist. Prof. **M. Tajchert** (tutor), (5).
- [MSc51] Marcin Nosarzewski: *"Algorytmy rekonstrukcji obrazu w tomografii pojemnościowej"* (Image reconstruction algorithms in capacitance tomography), Assist. Prof. **R. Szabatin** (tutor), (4.5).
- [MSc52] Jakub Nyckowski: *"System do pomiaru wysycenia krwi tętniczej z interfejsem USB"* (System with USB interface for noninvasive determination of oxygen saturation in blood), Assist. Prof. **G. Domański** (tutor), (5).
- [MSc53] Michał Otroszczenko: *"System medycyny nuklearnej"* (System for nuclear medicine), Assist. Prof. **R. Szabatin** (tutor), (5).
- [MSc54] Marcin Parka: *"Analiza i porównanie standardów kompresji opartych na transformacji DCT oraz wavelet w zastosowaniach archiwizacji i strumieniowania"* (Analysis and comparison of video compression standards based on DCT and wavelet transforms in archiving and streaming applications), Prof. **W. Skarbek** (tutor), (4).
- [MSc55] Krzysztof Pawlak: *"Odbiornik FSK radiowego toru transmisji danych w paśmie VHF/UHF"* (Radio track FSK data receiver at VHF/UHF band), Assist. Prof. **W. Kazubski** (tutor), (4.5).
- [MSc56] Konard Piekutowski: *"Badanie obciążenia serwera bazodanowego i prognozowanie wykorzystania jego zasobów na przykładzie SQL serwera"* (Research load of database server and look-ahead of utilization of its stock in future on the example of SQL server), Assist. Prof. **K. Ignasiak** (tutor), (4).
- [MSc57] Paweł Pilarczyk: *"Modelowanie kanału radiowego dla systemu UMTS trybu FDD"* (Radio channel modelling for UMTS FDD system), Assist. Prof. **T. Kosiło** (tutor), (5).
- [MSc58] Paweł Pogorzelski: *"Metody kryptograficzne dla transmisji danych biomedycznych"* (Cryptographic methods for biomedical data transmission), Assist. Prof. **M. Kazubek** (tutor), (5).
- [MSc59] Damian Edwin Przetacki: *"Zestaw doświadczalny do pomiaru ciśnienia tętniczego krwi metodą nieinwazyjną"* (Experimental kit for measurement of blood pressure using non-invasive method), Assist. **T. Jamrógiwicz** (tutor), (5).
- [MSc60] Michał Ratajski: *"Pojemnościowy tomograf procesowy z szybkim interfejsem komunikacyjnym"* (Capacitive process tomography with the quick communication interface), Assist. Prof. **R. Szabatin** (tutor), (4).
- [MSc61] Dominik Rives: *"Optymalizacja stopnia zniekształceń progresywnej kompresji w standardzie JPEG 2000"* (Distortion optimization of progressive compression in the JPEG 2000 standard), Assoc. Prof. **A. Przelaskowski** (tutor), (5).
- [MSc62] Piotr Sawicki: *"Oprogramowanie do prezentacji i analizy obrazów scyntygraficznych"* (Software for presentation and analysis of scintigraphic images), Assist. Prof. **R. Szabatin** (tutor), (4.5).

- [MSc63] Janusz Skonieczny: *"Multi-objective evolutionary algorithm"*, Assist. Prof. **P. Miazga** (tutor), (5), **English-medium-studies**.
- [MSc64] Maciej Sosnowski: *"Control module for three phase AC induction motors using space vector modulation and flux estimation"* Assist. Prof. **T. Kosiło** (tutor), (5), **English-medium-studies**.
- [MSc65] Grzegorz Starszuk: *"Sterowanie zerem charakterystyki kierunkowej szyku anteno-wego przez kontrolę amplitudy kombinacji sygnałów"* (Null of radiation pattern steering by the signal combination amplitude control), Assist. Prof. **Y. Yashchyshyn** (tutor), (5).
- [MSc66] Tomasz Szebesta: *"Eksperymentalny system telemedyczny"* (Experimental telemedicine system), Assist. **T. Jamrógiewicz** (tutor), (5).
- [MSc67] Sebastian Szklarz (co-autor: Mariusz Witulski): *"Łącze Bluetooth, projekt, realizacja i pomiary"* (Bluetooth link, project, realisation and measurements), Assist. **H. Chaciński** (tutor), (4).
- [MSc68] Wojciech Szostak: *"System domowej opieki medycznej. Miernik ciśnienia krwi z interfejsem USB"* (Home medical care. Blood pressure meter with USB interface), Assist. Prof. **E. Piątkowska-Janko** (tutor), (4.5).
- [MSc69] Maciej Cezary Świętkowski: *"Realizacja wzmacniacza akustycznego metodami cyfrowymi z zastosowaniem modułu DS. P56002EVM"* (Realisation of acoustic amplifier by means of digital methods using DS.P56002EVM module), Assist. **H. Chaciński** (tutor), (4.5).
- [MSc70] Przemysław Trojańczyk: *"Wybrane zagadnienie elastycznej rejestracji obrazów medycznych"* (Selected problems of non-strict registration of medical images), Assist. Prof. **P. Brzeski** (tutor), (5).
- [MSc71] Piotr Urbański: *"Zastosowanie języka XML do prezentacji danych wektorowych w serwisie udostępniającym mapy"* (XML language as geographic vector data representation for map delivering service), Assist. Prof. **A. Buchowicz** (tutor), (5).
- [MSc72] Mariusz Wachowski: *"Opracowanie części cyfrowej nadajnika i odbiornika sygnałów UWB z wykorzystaniem techniki FPGA"* (The development of digital modules of UWB transmitter and receiver using FPGA technology), Assist. Prof. **J. Kołakowski** (tutor), (5).
- [MSc73] Sławomir Węgrzyn: *"Wyznaczanie parametrów akustycznych pomieszczeń na podstawie pomiarów poziomu dźwięku"* (Computing the acoustical parameters of the rooms with a measured acoustical pressure level), Asist. Prof. **A. Podgórski** (tutor), (5).
- [MSc74] Maciej Węgrzynek: *"Detekcja scen wideo z klasyfikacją treści w strumieniu MPEG-1"* (Scenes detection with classification in MPEG-1 video stream), Prof. **W. Skarbek** (tutor), (5).
- [MSc75] Paweł Węgrzyniak: *"Analiza i optymalizacja struktur wyjściowych lamp mikrofalowych"* (Analysis and optimization of outputs of high power microwave tubes), Prof. **W. Gwarek**, (tutor), (5).
- [MSc76] Łukasz Wierzbicki: *"Modelowanie propagacji światła w tkance metodą Monte Carlo na potrzeby tomografii optycznej"* (Light propagation in tissue modelling by means of Monte Carlo method for optical tomography), Asist. Prof. **G. Domański** (tutor), (5).
- [MSc77] Mariusz Witulski (co-autor: Sebastian Szklarz): *"Łącze Bluetooth, projekt, realizacja i pomiary"* (Bluetooth link, project, realisation and measurements), Assist. **H. Chaciński** (tutor), (4).
- [MSc78] Michał Wnuk: *"Graficzny interfejs do komunikacji alternatywnej"* (Graphical inter-face for alternative communication), Assist. Prof. **T. Buczkowski** (tutor), (4).
- [MSc79] Łukasz Wolczański: *"Filtry cyfrowe w wysokorozdzielczej elektrokardiografii"* (Digital filters in high-resolution electrocardiography), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [MSc80] Krzysztof Wójcik: *"Urządzenie do nagrzewania indukcyjnego z wysokosprawnym wzmacniaczem klasy DE"* (Induction heater device with high efficiency class DE amplifier), Assist. Prof. **M. Mikołajewski** (tutor), (5).
- [MSc81] Andrzej Zaorski: *"System do wykrywania, uśredniania i archiwizacji załamków R, P, T z sygnału HR ECG w czasie rzeczywistym"* (The system for detection, averaging and archiving of R, P, T wave with the HR ECG signal in a real-time), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [MSc82] Marcin Zawadzki: *"System elektronicznego przetwarzania dokumentów"* (Electronic form processing system), Assoc. Prof. **W. Winiecki** / Assist. **R. Łukaszewski** (tutors), (4.5).
- [MSc83] Krzysztof Zieliński: *"Optymalizacja algorytmu do wyznaczenia parametrów przepływu w badaniach dynamicznych"* (Optimisation of algorithm for flow parameters indication in dynamic investigations), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [MSc84] Marcin Ziółkowski: *"Wzmacniacz rezonansowy klasy E z sumowaniem mocy"* (Resonance E class amplifier with power summation), Assist. Prof. **M. Mikołajewski** (tutor), (4).

5.4. B.Sc. Degrees

- [BSc1] Karol Baca: *"Minireograf z transmisją bezprzewodową"* (Minireograph with a wireless transmission), Assist. Prof. **M. Kazubek** (tutor), (3.5).
- [BSc2] Anna Barwińska: *"Analiza zmiany rytmu serca"* (Heart rate variability analysis), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).

- [BSc3] Marcin Bronowski: *"Koder standardu poprawek korekcyjnych RTCM-SC104"* (Coder of differential corrections of standard RTCM - SC104), Assist. Prof. **K. Czerwiński** (tutor), (5).
- [BSc4] Jakub Chatkowski: *"Weryfikacja graficznej metody projektowania rezonansowych wzmacniaczy mocy z tranzystorami MOSFET"* (Verification of the graphic design method of the MOSFET transistor high frequency resonant power amplifiers), Assist. Prof. **J. Modzelewski** (tutor), (5).
- [BSc5] Wojciech Czekański: *"Mikroprocesorowy miernik widma lampy rentgenowskiej"* (Microprocessor meter for Röntgen lamp spectrum), Asssit. Prof. **G. Domański** (tutor), (4.5).
- [BSc6] Michał Daras: *"Monitor mocy mikrofalowej na pasmo ISM-2.4 GHz"* (An ISM-2.4 GHz microwave power monitor), Assist. Prof. **D. Gryglewski** (tutor), (5).
- [BSc7] Damian Deja: *"Projekt i realizacja oprogramowania rotora"* (Project and realisation of rotor software), Assist. **H. Chaciński** (tutor), (5).
- [BSc8] Tomasz Filipek: *"Wysokosprawny wzmacniacz mocy na pasmo ISM-2.4"* (High-efficiency power amplifier on ISM-2.4 band), Assist. Prof. **W. Wojtasiak** (tutor), (4.5).
- [BSc9] Igor Góralczuk: *"Wirtualny analizator widma"* (Virtual spectrum analyzer), Assoc. Prof. **W. Winiecki** (tutor), (4.5).
- [BSc10] Wojciech Gradkowski: *"Paradigm Designer - oprogramowanie wspomagające projektowanie badań w funkcjonalnym rezonansie magnetycznym (fMRI)"* ("Paradigm Designer" - application for designing experiments in functional magnetic resonance imaging), Assist. Prof. **P. Bogorodzki** (tutor), (5).
- [BSc11] Paweł Hałasa: *"Progresywny internetowy kodek falkowy"* (Progressive internet wavelet codec), Assoc. Prof. **A. Przelaskowski** (tutor), (5).
- [BSc12] Krzysztof Horodeński: *"Aplikacja do zarządzania projektami"* (Application for projects management), Asist. Prof. **A. Buchowicz** (tutor), (4.5).
- [BSc13] Miłosz Marian Hulbój: *"Some aspects and importance of physics detector construction database"*, Assist. Prof. **W. Peryt** (tutor), (5), **English-medium-studies**.
- [BSc14] Przemysław Iskrzak: *"Modulacja quasi-jednowstęgowa sygnałów analogowych i cyfrowych"* (The compatible single-sideband modulation for analog and digital signals), Assist. Prof. **K. Snopek** (tutor), (5).
- [BSc15] Tomasz Jakubowski: *"Kreator filtrów cyfrowych realizowanych w układach programowalnych"* (A wizard program for designing filters in FPGAs), Assist. Prof. **K. Mroczek** (tutor), (5).
- [BSc16] Albert Kaim: *"Oprogramowanie do planowania rozkładu dawki w oparciu o naświetlanie wiązką akceleratora"* (Software for dose distribution planning in radiation therapy treatment), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [BSc17] Krzysztof Kamiński: *"Internetowa baza danych anesteziologicznych"* (Internet base for anesthesiological data), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).
- [BSc18] Piotr Kleczyński: *"System pomiaru amplitudy i częstotliwości drgań kończyn pacjenta Tremor Met V 1.0"* (System for the measurement of amplitude and frequency of patient's limbs trembling Tremor Met V 1.0), Assist. Prof. **R. Szabatin** (tutor), (4.5).
- [BSc19] Piotr Kobziakowski: *"Internetowy katalog publikacji"* (Internet catalogue of publications), Assist. Prof. **A. Buchowicz** (tutor), (5).
- [BSc20] Dominik Koszykowski: *"System do generacji bodźców wzrokowych do badań funkcjonalnych z wykorzystaniem techniki fMRI"* (Development of visual stimulation device for functional MRI), Assist. Prof. **P. Bogorodzki** (tutor), (5).
- [BSc21] Mirosław Kowieski: *"Sterowanie komputerami poprzez sieć lokalną na przykładzie kawiarenki internetowej"* (Computer controlling via a local area network on the example of an internet café), Assist. Prof. **K. Ignasiak** (tutor), (4).
- [BSc22] Beata Kozłowska (co-autor: Zdzisław Noga): *"Rozbudowa sieci dostępowej z wykorzystaniem jednostki wyniesionej ONU"* (The project of extension of the access network with the use of ONU unit", Assist. Prof. **S. Kula** (tutor), (5 / 5).
- [BSc23] Michał Krasnodębski: *"Densytmeter jedno-kanalowy na detektorze półprzewodnikowym"* (One-channel densitometer with semiconductor detector), Assist. Prof. **G. Domański** (tutor), (3).
- [BSc24] Tomasz Kuran: *"Interfejs komunikacyjny tomografu impedacyjnego"* (Communication interface for capacitance tomograph), Assist. **T. Olszewski** (tutor), (4.5).
- [BSc25] Agata Latała: *"Pomiar i analiza drżenia kończyn górnych"* (The measurement and analysis of the upper limbs' tremor), Assist. Prof. **R. Szabatin** (tutor), (5).
- [BSc26] Waldemar Latoszek: *"System wspomagania diagnoz kardiologicznych"* (System for the cardiological diagnosis supporting), Prof. **Z. Pawłowski** (tutor), (4.5).
- [BSc27] Michał Lipiński: *"Metody tłumienia składowych skrośnych w rozkładzie Wignera sygnałów akustycznych"* (Techniques of cross terms reducing in the Wigner distribution of acoustic signals), Assist. Prof. **K. Snopek** (tutor), (4).
- [BSc28] Michał Lis: *"Klasyfikacja sygnałów EKG z wykorzystaniem sztucznych sieci neuronowych i funkcji falkowych"* (ECG signals classification using the artificial neural networks and wavelet functions), Prof. **K. Zaremba** (tutor), (4.5).
- [BSc29] Piotr Łuczka: *"Skalowanie systemu pozycjonowania USG 3D"* (3D 'free-hand' ultrasound system calibration), Assist. Prof. **M. Kazubek** (tutor), (4.5).

- [BSc30] Patryk Mierzejewski: *"Mobile ad hoc networks on the example of Bluetooth Standard"*, Prof. **J. Modelski** (tutor), (4), **English-medium-studies**. 1-1.2 GHz band), Assist. Prof. **D. Gryglewski** (tutor), (5).
- [BSc31] Wojciech Młynarczyk: *"Odtwarzacz plików multimedialnych w J2ME (J2ME multimedia files recorder)"*, Assist. Prof. **A. Buchowicz** (tutor), (5). [BSc43] Rafał Rybak: *"Internetowa wyszukiwarka obrazów"* (Internet image search engine), Assist. Prof. **K. Ignasiak** (tutor), (5).
- [BSc32] Magdalena Muniowska: *"Wspomaganie diagnozy wybranych przypadków kardiologicznych za pomocą sieci neuronowych"* (Using neural network for diagnosis of selected cardiological cases), Prof. **K. Zaremba** (tutor), (5). [BSc44] Wojciech Ryczer: *"Analiza funkcjonalności protokołu DSR przy użyciu symulatora NS-2"* (A performance analysis of Dynamic Source Routing protocol (DSR) with NS-2 network simulator), Assist. Prof. **Z. Walczak** (tutor), (4).
- [BSc33] Dariusz Niedzielski: *"Digital Audio Broadcasting - stan obecny, perspektywy rozwoju, symulacja cyfrowych technik modulacyjnych"* (Digital Audio Broadcasting - present state of affairs, development prospects, simulation of digital modulation schemes), Assist. Prof. **J. Jarkowski** (tutor), (4). [BSc45] Paweł Sadowski: *"Uniwersalny generator formularzowy dla serwisów sieciowych na przykładzie serwisu sieciowego małej księgarni wysyłkowej"* (Universal form generator for webservices for the small on-line bookshop), Assist. Prof. **K. Ignasiak** (tutor), (5).
- [BSc34] Tomasz Odyniec: *"Odbiornik EKG w minireografie z bezprzewodową transmisją danych"* (ECG receiver in the minireograph with wireless data transmission), Assist. Prof. **M. Kazubek** (tutor), (4). [BSc46] Szczepan Sakowicz: *"Protokół sieciowy do przesyłania danych medycznych w czasie rzeczywistym"* (Network protocol for medical data sending in real time), Assist. Prof. **P. Bogorodzki** (tutor), (4.5).
- [BSc35] Rafał Palmowski: *"Laboratoryjny system edycji dźwięku"* (Laboratory audio system), Assist. Prof. **A. Leszczyński** (tutor), (5). [BSc47] Piotr Siedlecki: *"Mikroprocesorowe urządzenie czasowo-startowe"* (Microprocessor time-start device), Assist. Prof. **K. Derzakowski** (tutor), (5).
- [BSc36] Konrad Perkowski: *"Oprogramowanie do analizy badań dynamicznych gammakamery. Regiony zainteresowania"* (Software for analysis of gamma-camera dynamical examination. Regions of interest), Assist. Prof. **P. Brzeski** (tutor), (4.5). [BSc48] Piotr Sitek: *"Opracowanie prototypu odbiornika naziemnego systemu lokalizacji kapsuły kosmicznej YES2"* (The project of prototype of ground receiver for location system of the YES2 capsule), Assist. Prof. **K. Kurek** (tutor), (5).
- [BSc37] Rafał Piróg: *"Miernik rozkładu natężenia promieniowania lampy rengenowskiej"* (Microprocessor-gauge for measuring the intensity of the X-ray radiation lamp), Assist. Prof. **G. Domański** (tutor), (5). [BSc49] Anna Maria Sitkiewicz: *"Subiektywna ocena wybranych algorytmów kompresji dźwięku"* (Subjective assessment of selected audio compression methods), Assist. Prof. **M. Tajchert / R. Smoliński** (tutors), (5).
- [BSc38] Leszek Prokopczuk: *"Opracowanie procedury pomiaru rzeczywistej skuteczności akustycznej nauszników przeciwhałasowych w warunkach rzeczywistych"* (Elaboration of the procedure for measuring the real acoustic efficiency of earmuffs in the real world conditions), Assist. Prof. **E. Kotarbińska** (tutor), (5). [BSc50] Piotr Skorek: *"Stanowisko pomiarowe do symulacji i obrazowania przepływów krwi metodami ultrasonograficznymi"* (Measuring stand for simulation and visualization of blood flows by ultrasound methods), Assist. **T. Jamrógielwicz** (tutor), (5).
- [BSc39] Krzysztof Ramuk: *"Face image normalization tool"*, Assist. Prof. **G. Galiński** (tutor), (4), **English-medium-studies**. [BSc51] Marcin Stryczak: *"Moduł szybkiej akwizycji danych oparty na standardzie Bluetooth"* (Bluetooth based fast data acquisition module), Assist. Prof. **K. Mroczek** (tutor), (4.5).
- [BSc40] Dawid Wihelm Rosołowski: *"Podręczny analizator widma na pasmo 45-1000 MHz"* (Handy spectrum analyzer on 45-1000 MHz frequency), Assist. Prof. **D. Gryglewski** (tutor), (5). [BSc52] Rafał Szczepanik: *"Internetowy system telemedyczny "lekarz domowy"* (Internet telemedicine system "home doctor"), Assist. Prof. **R. Szabatin** (tutor), (5).
- [BSc41] Marcin Rupniewski: *"Analysis of direction of arrivals algorithms used in uniformly spaced linear array antennae"*, Assist. Prof. **K. Kurek** (tutor), (4), **English-medium-studies**. [BSc53] Kamila Szczotka: *"Analiza zmienności załamka T w elektrokardiogramach"* (T wave alternans analysis in electrocardiograms), Prof. **Z. Pawłowski** (tutor), (5).
- [BSc42] Łukasz Rutkowski: *"Syntezer częstotliwości na pasmo 1-1,2 GHz"* (Frequency synthesizer on [BSc54] Tomasz Sztokinier: *"Oprogramowanie do analizy gammakamerowych badań dynamicznych. Krzywe dynamiczne"* (Software for analysis of gamma-camera dynamical examination. Dynamical curves), Assist. Prof. **P. Brzeski** (tutor), (4.5).
- [BSc55] Marcin Trościańczyk: *"Projekt cyfrowego przedwzmacniacza fonicznego"* (Project of

- digital audio preamplifier), Prof. **Z. Kulka** (tutor), (4.5).
- [BSc56] Łukasz Trzos (co-autor: Mariusz Walczuk): "Projekt sieci operatora usług telekomunikacyjnych transmisji danych z wykorzystaniem systemu radiowego dostępu szerokopasmowego" (The design of the network of data transmission service provider based on broad-band wireless access radio system), Prof. **J. Modelski** (tutor), (5).
- [BSc57] Jacek Tymicki: "Analiza sygnałów jednowymiarowych w oparciu o rozkłady czas-częstotliwość i rozkłady podwójnie wymiarowe" (Analysis of one-dimensional signals by means of time-frequency and double-dimensional distributions), Assist. Prof. **K. Snopek** (tutor), (4).
- [BSc58] Marcin Tymiński: "Opracowanie prototypu nadajnika naziemnego systemu lokalizacji kapsuły kosmicznej YES2" (The project of prototype of ground transmitter for the location system of YES2 capsule), Assist. Prof. **K. Kurek** (tutor), (5).
- [BSc59] Mariusz Walczuk (co-autor: Łukasz Trzos): "Projekt sieci operatora usług telekomunikacyjnych transmisji danych z wykorzystaniem systemu radiowego dostępu szerokopasmowego" (The design of the network of data transmission service provider based on broadband wireless access radio system), Prof. **J. Modelski** (tutor), (5).
- [BSc60] Grzegorz Wrzosek: "Metoda kosztorysowania i optymalnego planowania druku offsetowego arkusowego oraz jej aplikacja w architekturze klient-serwer" (A cost calculation and optimum planning method of offset sheet printing), Prof. **W. Skarbek** (tutor), (5).
- [BSc61] Piotr Zastawski: "Bezpieczna aplikacja dla służby zdrowia na platformie Microsoft.Net" (Safe application for health service on Microsoft.Net platform), Assist. Prof. **M. Kazubek** (tutor), (4.5).
- [BSc62] Andrzej Zieliński: "Synteza ułamkowa. Syntezator z ułamkową pętlą fazową typu delta-sigma na pasmo ISM" (Fractional synthesis. Delta-sigma fractional ISM frequency synthesizer), Assist. Prof. **D. Gryglewski** (tutor), (4.5).
- [BSc63] Tomasz Żołnierzak: "Aplikacja internetowa wspomagająca zarządzanie skokami spadochronowymi w areoklubach" (Internet application supporting the management of parachute jumping in aviation clubs), Assist. Prof. **K. Ignasiak** (tutor), (5).
- [BSc64] Leszek Anders: "Nadajnik do przemiennika ultrakrótkofalowego" (Transmitter for a VHF repeater), Assist. Prof. **W. Kazubski** (tutor), (5).
- [BSc65] Mariusz Błądek: "Porównanie właściwości nadajników radiotelefonów na pasmo 27 MHz (CB) na podstawie pomiaru ich parametrów" (Transceivers' transmitters on the 27 MHz band properties comparison on the basis of their parameters measurement), Assist. Prof. **K. Snopek** (tutor), (5).
- [BSc66] Łukasz Błogowski: "Analityzator ramki PCM 30" (The analyzer of frame PCM 30), Assist. **A. Kalinowski** (tutor), (5).
- [BSc67] Marcin Brzeski: "Nasłuch zdalny pomieszczeń przez linię telefoniczną komutowaną" (Remote monitoring the enclosed spaces by comutated telephone line), Assist. **A. Kalinowski** (tutor), (4).
- [BSc68] Krzysztof Budny: "Symulacja pomiarów i oprogramowanie układu pomiarowego linii telekomunikacyjnych w środowisku HP VEE" (Measurements simulation and software for the telecommunication lines measuring system in HP VEE environment), Assist. Prof. **K. Radecki** (tutor), (5).
- [BSc69] Jacek Częścik: "Układ pomiarowy do badania bitowej stopy błędu (BER)" (The measuring arrangement for investigation of bite error rate (BER)), Assist. **H. Chaciński** (tutor), (4.5).
- [BSc70] Jakub Durołek: "Układ sterujący pracą kolektorów słonecznych" (System for solar collector steering), Assist. Prof. **K. Czerwiński** (4.5).
- [BSc71] Maciej Dziadecki: "Mikroprocesorowy system pomiaru czasu w amatorskich rajdach samochodowych" (Microprocessor system designed for the use in the sport car railing), Assist. Prof. **K. Czerwiński** (tutor), (4).
- [BSc72] Włodzimierz Gajdur: "Analiza jakości wybranego fragmentu sieci systemu telefonii komórkowej GSM/DCS" (The analysis of quality for a chosen fragment of GSM/DCS cellular telephony), Assist. Prof. **T. Kosiło** (tutor), (5).
- [BSc73] Jerzy Gajoszek: "System zarządzania siecią sygnalizacyjną SS7 (Obszar telekomunikacyjny Kraków, Tarnów, Rzeszów)" (SS7 signalling management system (telecommunication areas: Kraków, Tarnów, Rzeszów), Assist. **A. Kalinowski** (5).
- [BSc74] Grzegorz Głodowski (co-autor: Leszek Żelaziński): "Rozbudowa systemu SRDA - stacja bazowa Blichowo" (Extension of SRDA system - base station Blichowo), Assist. Prof. **J. Jarkowski** (tutor), (4.5).
- [BSc75] Bartłomiej Grudny (co-autor: Michał Rejchel): "Dopplerowski namiernik radiowy" (Doppler radio direction finder), Assist. Prof. **T. Kosiło** (tutor), (5).
- [BSc76] Sławomir Hetmanowski: "Regenerator stacyjny" (Station regenerator), Assist. **A. Kalinowski** (tutor), (4).
- [BSc77] Krzysztof Hoffer (co-autor: Radosław Szczukocki): "Projekt światłowodowej linii kablowej dla systemu radiowego dostępu abonenckiego" (Project of fiber optic access network), Assist. Prof. **S. Kula** (tutor), (4).

5.5. Engineering Evening Studies on Radiocommunications - B.Sc. Degrees

- [BSc64] Leszek Anders: "Nadajnik do przemiennika ultrakrótkofalowego" (Transmitter for a VHF repeater), Assist. Prof. **W. Kazubski** (tutor), (5).
- [BSc65] Mariusz Błądek: "Porównanie właściwości nadajników radiotelefonów na pasmo 27 MHz

- [BSc78] Bogusław Kania: *"Analiza niezawodności zasilania urządzeń telekomunikacyjnych za pomocą systemu zdalnego nadzoru nad obiektami telekomunikacyjnymi"* (Telecommunication supply devices reliability analyses using remote supervision system for telecommunication objects), Assist. Prof. **K. Snopek** (tutor), (3.5).
- [BSc79] Janusz Karpel: *"Odbiornik do przemiennika ultrakrótkofalowego"* (Receiver for a VHF repeater), Assist. Prof. **W. Kazubski** (tutor), (5).
- [BSc80] Michał Kobierzycki: *"Bezprzewodowy mikroprocesorowy system monitoringu temperatury"* (Remote temperature measuring system), Assist. Prof. **G. Domański** (4.5).
- [BSc81] Andrzej Koch: *"Modernizacja odbiornika radiowego stacji EFR"* (Redesign of EFR radio station receiver), Assist. Prof. **T. Buczkowski** (tutor), (4).
- [BSc82] Sławomir Komarowski: *"Odbiornik radiowy na pasmo 88-108 MHz"* (Radio receiver on 88-108 MHz band), Assist. Prof. **W. Kazubski** (tutor), (4.5).
- [BSc83] Andrzej Korejba: *"Projekt sieci teletechnicznej dla kompleksu mieszkalno-usługowego"* (Telecommunication network project for a habitable-service complex), Assist. Prof. **K. Snopek** (tutor), (4.5).
- [BSc84] Emilia Kowalczyk: *"Konstrukcja i badanie nadajnika łącza radiowego pracującego w pasmie ISM na częstotliwości 868 MHz"* (Designing and construction of radio transmitter working on a frequency 868 MHz), Assist. **H. Chaciński** (tutor), (3.5).
- [BSc85] Beata Kozłowska (co-autor: Zdzisław Noga): *"Rozbudowa sieci dostępowej z wykorzystaniem jednostki wyniesionej ONU"* (The project of extension of the access network with the use of ONU unit", Assist. Prof. **S. Kula** (tutor), (5 / 5).
- [BSc86] Adrian Krawczyk: *"Adaptacja generatora GFM-3 nadajnika radiofonicznego UKF-FM do laboratorium studenckiego"* (Adaptation of GFM-3 generator for UKF-FM broadcasting transmitter used in students' laboratory), Assist. Prof. **J. Modzelewski** (tutor), (4).
- [BSc87] Robert Krawiecki: *"Zagadnienia synchronizacji sieci SDH - projekt sieci synchronizacyjnej dla operatora o zasięgu krajowym"* (Aspects of SDH network synchronization - a project on a synchronizing network of a country-wide operator), Assist. Prof. **S. Kula** (tutor).
- [BSc88] Sławomir Kruczek: *"Układ bezpośrednio syntezy cyfrowej dla potrzeb studenckiego laboratorium radiokomunikacji"* (The direct digital synthesis circuit for students' radio-communication laboratory), Assist. Prof. **W. Kazubski** (tutor), (5).
- [BSc89] Wojciech Kucharski: *"Komputerowy system zdalnego sterowania krótkiego zasięgu"* (Wireless short range computer remote control system), Assist. Prof. **W. Kazubski** (tutor), (4).
- [BSc90] Roman Marciniak (co-autor: Rajmund Pazderski): *"Sieci DWDM - uruchamianie i eksploatacja"* (DWDM networks - starting up and exploitation), Assist. Prof. **S. Kula** (tutor), (5).
- [BSc91] Robert Marcjanek: *"Kwarcowy wzorzec częstotliwości stabilizowany radiostacją Warszawa I"* (Quartz frequency standard stabilized with Warsaw I radio station), Assist. Prof. **R. Nowak** (tutor), (5).
- [BSc92] Adrian Markowski: *"Generator ciągu pseudolosowego PRBS 2¹⁵-1, 2²³-1 w kodzie AMI, HDB3"* (Pseudorandom binary sequence generator PRBS 2¹⁵-1, 2²³-1 in codes AMI, HDB3), Assist. **A. Kalinowski** (tutor), (5).
- [BSc93] Jarosław Marski: *"Nadajnik i odbiornik z modulacją FSK do systemu informacji dla osób niewidomych"* (FSK transmitter and receiver for radio information system for blind persons), Assist. Prof. **K. Radecki** (tutor), (5).
- [BSc94] Łukasz Napierski: *"Aplikacja internetowa do gromadzenia, przetwarzania i analizy wyników w systemach badania poprawności transmisji danych sterowania"* (Web based acquisition, visualization and analysis software for data transmission system), Assist. Prof. **T. Buczkowski** (tutor), (4).
- [BSc95] Zdzisław Noga (co-autor: Beata Kozłowska): *"Rozbudowa sieci dostępowej z wykorzystaniem jednostki wyniesionej ONU"* (The project of extension of the access network with the use of ONU unit", Assist. Prof. **S. Kula** (tutor), (5 / 5).
- [BSc96] Przemysław Oleszczuk: *"Bezprzewodowe łącze radiowe wykorzystujące pasmo 868 MHz - część odbiorcza"* (Wireless radio link working on a carrier frequency 868 MHz), Assist. **H. Chaciński**, (tutor), (5).
- [BSc97] Maciej Paszkowski (co-autor: Tomasz Szpunar): *"Wariantowość systemu anten nadawczych 10 kanału TV w RTCN Chorągiewca"* (The variety of broadcasting antennae system on channel 10 TV in RTBC Chorągiewca), Assist. Prof. **J. Jarkowski** (tutor), (5).
- [BSc98] Rajmund Pazderski (co-autor: Roman Marciniak): *"Sieci DWDM - uruchamianie i eksploatacja"* (DWDM networks - starting up and exploitation), Assist. Prof. **S. Kula** (tutor), (5).
- [BSc99] Piotr Pryt: *"Licznik binarnej stopy błędów"* (Digital communications analyzer), Assist. **A. Kalinowski** (tutor), (5).
- [BSc100] Michał Rejchel (co-autor: Bartłomiej Grudny): *"Dopplerowski namiernik radiowy"* (Doppler radio direction finder), Assist. Prof. **T. Kosiło** (tutor), (5).
- [BSc101] Sergiusz Roszczyk: *"Terminal szeregowy z wyświetlaczem LCD i klawiaturą"* (Serial terminal with LCD display and keyboard), Assist. Prof. **G. Domański** (tutor), (5).

- [BSc102] Michał Rzepecki: *"Interfejs pętla prądowa 4-20 mA/RS-232"* (Current loop 4-20 mA/RS-232 interface), Assist. Prof. **K. Czerwiński** (4).
dla systemu radiowego dostępu abonenckiego (Project of fiber optic access network), Assist. Prof. **S. Kula** (tutor), (4).
- [BSc103] Maciej Siembab: *"Bariera BHP w podczerwieni"* (Infrared protective barrier), Assist. Prof. **R. Nowak** (tutor), (4).
 [BSc112] Tomasz Szpunar (co-autor Maciej Paszkowski): *"Wariantowość systemu anten nadawczych 10 kanału TV w RTCN Chorągiewca"* (The variety of broadcasting antennae system on channel 10 TV in RTBC Chorągiewca), Assist. Prof. **J. Jarkowski** (tutor), (5).
- [BSc104] Norbert Siębor: *"Wizualizacja rozkładów "czas-częstotliwość" sygnałów akustycznych"* (Visualization of time-frequency distributions of acoustic signals), Assist. Prof. **K. Snopek** (tutor), (5).
 [BSc113] Dariusz Śmietanka: *"Zarządzanie siecią radiolinii firmy SAF TECHNIKA w oparciu o protokół komunikacyjny SNMP"* (SAF TECHNIKA radio link network management based on SNMP communication protocol), Assist. Prof. **J. Brożyna** (tutor), (3,5).
- [BSc105] Elżbieta Sierant: *"Rozbudowa infrastruktury telekomunikacyjnej w obrębie miasta z przejęciem abonentów radiowych"* (The expansion of telecommunication infrastructure in town area with taking over subscribers' line), Assist. Prof. **S. Kula** (tutor), (5).
 [BSc114] Dominik Teperek: *"Mikroprocesorowy moduł rejestracji danych do zastosowań w systemach badania poprawności transmisji danych sterowania"* (Microprocessor - controlled data logger module for data transmission testing system), Assist. Prof. **T. Buczkowski** (tutor), (5).
- [BSc106] Marek Skarzyński: *"Krótkie łącze radiowe do celów alarmowych"* (Short radio link for alarm applications), Assist. Prof. **K. Czerwiński** (5).
 [BSc115] Andrzej Ustymowicz: *"Projekt i realizacja modułu zabezpieczającego linie aparatu typu TSP91 przed nieuprawnionym dostępem"* (Project and realisation of the electronic system protecting telephone lines from unauthorised access to telecommunication services), Assist. **H. Chaciński** (tutor), (5).
- [BSc107] Andrzej Stasieczek: *"Cyfrowe łącze radiowe"* (Digital radio link), Assist. Prof. **K. Czerwiński** (tutor), (4).
 [BSc116] Leszek Żelaziński (co-autor: Grzegorz Głodowski): *"Rozbudowa systemu SRDA - stacja bazowa Blichowo"* (Extension of SRDA system - base station Blichowo), Assist. Prof. **J. Jarkowski** (tutor), (4.5).
- [BSc108] Daniel Stołowski: *"Architektura światłowodowych sieci dostępowych. Projekt sieci SDA FITL dla wybranej gminy"* (The architecture of the optical-fibre access networks. The project of the FITL access network for chosen communal), Assist. Prof. **R. Nowak** (tutor), (5).
 [BSc117] Piotr Żurad: *"Laboratoryjny układ syntezy częstotliwości z pętlą synchronizacji fazowej"* (PLL frequency synthesizer for laboratory use), Assist. Prof. **W. Kazubski** (tutor), (5).
- [BSc109] Łukasz Szamota-Nagy: *"Transmisja danych w standardzie RS-232 łączem radiowym"* (Bidirectional data transmission over radio using RS-232), Assist. Prof. **W. Kazubski** (tutor), (5).
 [BSc110] Paweł Szczepski: *"Barometr mikroprocesorowy"* (Microprocessor barometer), Assist. Prof. **G. Domański** (tutor), (5).
- [BSc111] Radosław Szczukocki (co-autor: Krzysztof Hoffer): *"Projekt światłowodowej linii kablowej"*

6. PUBLICATIONS

6.1. Scientific and technical books, chapters in books

- [Pub1] W. Tlaga, W. Winiecki: „Systemy Pomiarowe” (Measuring Systems), Chapter 7 (pp. 436-568) In: J. Barzykowski (Ed.), „Współczesna metrologia” (Contemporary Metrology), ISBN 83-204-2888-2, WNT, (2004), 576 pp.

6.2. Scientific and technical papers in journals

- [Pub2] B. Adeva, K. Zaremba, et al.: "Spin Asymmetries for Event with High p_T Hadrons in DIS and an Evaluation of the Gluon Polarization", *Physical Review D*, 70 (2004).
- [Pub3] S. Amerio, R. Sulej, et al.: "Design, Construction and Tests of the ICARUS T 600 Detector", *Nuclear Instruments and Methods in Physics Research*, Vol. 527, Issue 3 (2004), pp. 329-410.
- [Pub4] P. Bogorodzki, W. Smolik: "Usługi tele-radiologiczne w telemedycynie" (Tele-radiological Services in Telemedicine), *Przegląd Telekomunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 35-38.
- [Pub5] P. Boniński, M. Kazubek: "Comparison of the Effectiveness of Some Objective Quality Measures for Digital Mammograms", *Biocybernetics and Biomedical Engineering*, Vol. 24, No. 3 (2004), pp. 51-60.
- [Pub6] A. Buchowicz, K. Ignasiak: "Zastosowanie techniki serwisów sieciowych w monitoringu cyfrowym" (Monitoring and Surveillance based on Web Services Technology), *Przegląd Telekomunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 26-30.
- [Pub7] M. Celuch-Marcysiak: "Extended Study of Poynting Theorem and Reciprocity on Non-uniform FDTD Meshes", *IEE Science, Measurement & Technology* (Dec. 2004).
- [Pub8] T. Ciamulski, W. K. Gwarek: "On eliminating Crosstalk within Multiconductor Transmission Lines", *IEEE Microwave Wireless Comp. Lett.*, Vol. 14, No. 6 (2004), pp. 298-300.
- [Pub9] M. Czarkowski, A. Oręziak, G. Opolski, D. Radomski: "Czas trwania uśrednionego sygnału przedśionkowego koreluje ze stopniem nadczynności tarczycy u osób z chorobą Graves-Basedowa" (The Course Time of the Atrial Signal Correlates with a Grade of Hyperthyrosis in Graves' Patients), *Polski Przegląd Kardiologiczny*, No. 6, Supl. 1 (2004), pp. 72-73.
- [Pub10] T. Daniluk: "Aplikacje radiowe małej mocy", (Low Power Radio Applications), *Elektronik*, (2004), ISSN 1248-4030, pp. 46-52.
- [Pub11] T. Daniluk: "Niskonapięciowe tranzystory MOSFET w aplikacjach wysokoprądowych", (Low-power MOSFETs in High-current Applications), *Elektronik*, No. 6 (2004), ISSN 1248-4030, pp. 41-46.
- [Pub12] T. Daniluk: "Parametry i zastosowania współczesnych wzmacniaczy operacyjnych", (Parameters and Applications of Modern Operational Amplifiers), *Elektronik*, No. 7 (2004), ISSN 1248-4030, pp. 44-48.
- [Pub13] T. Daniluk: "Poprawianie parametrów przetworników A/C dużej rozdzielczości", (Improvement of the Technical Parameters of High-resolution A/C Converters), *Elektronik*, No. 1 (2004), ISSN 1248-4030, pp. 46-50.
- [Pub14] E. Eves, P. Kopyt, V. V. Yakovlev: "Determination of Complex Permittivity with Neural Networks and FDTD Modeling", *Microwave and Optical Technology Letters*, Vol. 40, No. 3 (2004), pp. 183-185.
- [Pub15] J. Gomes, A. Padèe, et al.: "First Prototype of the CrossGrid Testbed", *Lecture Notes in Computer Science*, 2970 (2004), pp. 67-77.
- [Pub16] W. K. Gwarek, A. Moryc: "An Alternative Approach to FD-TD Analysis of Magnetized Ferrites", *Microwave and Optical Technology Letters*, Vol. 14 (2004), pp. 331-333.
- [Pub17] J. Guterman, A. A. Moreira: "Microstrip Fractal Antennas for Multistandard Terminals", *IEEE Antennas and Wireless Propagation Letters*, Vol. 3 (2004), pp. 351-354.
- [Pub18] T. Jamrógiewicz: "Norma IEEE 1394" (1394 IEEE Standard), *Centralny Ośrodek Szkolenia i Wydawnictwo*, (2004), 15 pp.
- [Pub19] D. Janusek, Z. Pawłowski, S. Karczmarewicz, A. Przybylski: "Comparison of T-wave Alternans Detection Methods", *Biocybernetics and Biomedical Engineering*, Vol. 24, No. 4 (2004), pp. 31-41.
- [Pub20] E. Jaszczyszyn (Y. Yashchyshyn), J. Modelski: "Anteny inteligentne we współczesnej radiokomunikacji" (Smart Antennae in Modern Radiocommunication), *Przegląd Telekomunikacyjny*, No. 1 (2004), pp. 18-26.
- [Pub21] T. Kosiło, K. Płatek: "Rozwój radiowych systemów szerokopasmowych oraz usług i aplikacji" (Development of Broadband Radio, Services and Applications), *Przegląd Telekomunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 5-10.
- [Pub22] T. Kosiło, K. Płatek: "Profesjonalne systemy radiowe w aplikacjach monitoringu wizyjnego" (Professional Radio Systems in Vision Monitoring Applications), *Twierdza*, No. 5 (30) (2004), ISSN 1507-6474, pp. 18-23.
- [Pub23] E. Kotarbińska: "Zmiany tłumienia nauszników przeciwhałasowych w funkcji czasu" (Changes in the Attenuation of Ear-muffs due to Time),

- Hałas-Profilaktyka-Zdrowie*, (2004), ISBN 83-91-78-44-9-5, pp. 26-32.
- [Pub24] J. Krupka, A. Abramowicz, K. Derzakowski: "Magnetically Tunable Dielectric Resonators Operating at Frequencies of about 2GHz", *Journal of Physics D. Appl. Phys.*, No. 37 (2004), pp. 379-384.
- [Pub25] N. Kryvinska, E. Jaszczyszyn (Y. Yashchychyn): "Model kolejkowy dla analizy Sieci Inteligentnej" (Railway Model for Intelligent Network Analysis), *Kwartalnik Elektroniki i Telekomunikacji*, No. 50, z. 1 (2004), pp. 25-32.
- [Pub26] Z. Kulka: "Nowa generacja fonicznych przetworników a/c i c/a delta-sigma" (New Generation of A/D and D/A Multilevel Delta-Sigma Converters), *Radioelektronik Audio hi-fi Video*, No. 1 (2004), pp. 18-19.
- [Pub27] Z. Kulka: "Konwertery szybkości próbkowania do zastosowań fonicznych" (Sampling Rate Converters for Digital Audio Applications), *Radioelektronik Audio HiFi Video*, part 1, No. 11 (2004), pp. 20-21, part 2, No. 12, pp. 20-22.
- [Pub28] A. Kurek: "Wykorzystanie łączy radiowych i systemu GPS w urządzeniach dla osób niewidomych" (Using Radio Lines and GPS in Building New Equipment for Facilitating Spatial Orientation of Visually Impaired People), *Przegląd Telekomunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 31-34.
- [Pub29] R. Łukaszewski., M. Prus, W. Winięcki: „Rozproszony system pomiarowy z transmisją bezprzewodową z wykorzystaniem modułu FieldPoint” (Distributed Measuring System with Wireless Transmission with the Use of FieldPoint Module), *PAR*, No. 7-8 (2004), pp. 85-89.
- [Pub30] J. Modelski: "Radiokomunikacja i techniki multimedialne w Instytucie Radioelektroniki Politechniki Warszawskiej" (Radiocommunication and Multimedia Technologies in Institute of Radioelectronics of the Warsaw University of Technology), *Przegląd Tele-komunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 3-4.
- [Pub31] J. Modelski: "Krajowa Konferencja Radiokomunikacji, Radiofonii i Telewizji" (National Conference on Radiocommunications, Broadcasting and Television), *Przegląd Telekomunikacyjny*, No. 10 (2004), pp. 389-392.
- [Pub32] R. Z. Morawski: "Digital Signal Processing in Measurement Microsystems", *IEEE Instrum. & Meas. Magazine*, Vol. 7, No. 2 (2004), pp. 43-50.
- [Pub33] R. Z. Morawski: "Etičeskije aspikty naučnych issliedovanij i inženiernoj praktyki, osnovannyh ma izmierienijach ili zavisjaščich ot izmierienij", *Pribory*, No. 8 (50), (2004), pp. 1-16.
- [Pub34] T. Morawski, J. Zborowska: "Wielostanowe mikrofalowe przesuwniki fazy z diodami półprzewodnikowymi" (Multi-state Microwave Phase Shifters), *Elektronika*, No. 1, (2004), pp. 7-11.
- [Pub35] C. Niedziński, R. Z. Morawski: "Estimation of Low Concentrations in the Presence of High Concentrations Using Bayesian Algorithms for Interpretation of Spectrophotometric Data", *Journal of Chemometrics*, Issue 18 2004, pp. 217-230.
- [Pub36] A. Przelaskowski, A. Kukuła, P. Surowski: „Subiektywna ocena jakości diagnostycznej kompresowanych stratnie obrazów” (Subjective Estimation of Diagnostic Quality for Losslessly Compressed Images), *Acta Bio-Optica et Informatica Medica*, Vol. 9 (1-2) (2004), pp. 27-37.
- [Pub37] A. Przelaskowski: „Irreversible Medical Image Compression: Conditions of Acceptability”, *Task Quarterly*, Vol. 8 (2), (2004), pp. 303-316.
- [Pub38] A. Przelaskowski: „The Standard JPEG2000 for Medical Image Applications”, *Task Quarterly*, Vol. 8 (2) (2004) pp.147-158.
- [Pub39] A. Przelaskowski: „Vector Quality Measure of Lossy Compressed Medical Images”, *Computers in Biology and Medicine*, Vol. 34 (3), (2004), pp.193-207.
- [Pub40] G. Radzikowski, J. Wojciechowski: "Protokół mikropłatności i makropłatności w sieciach bezprzewodowych" (Micro- and Macropayment Protocol in Wireless Networks), *Kwartalnik Elektroniki i Telekomunikacji*, No. 50, z. 1 (2004), pp. 109-130.
- [Pub41] G. Radzikowski, J. Wojciechowski, G. Bernatek: "Pieniądz cyfrowy w społeczeństwie informacyjnym", *Przegląd Telekomunikacyjny*, No. 5, (2004), pp. 228-232.
- [Pub42] J. Rudnicki, M. Celuch-Marcysiak: "A Study of FDTD Solutions on Variable and Subgridded Meshes", *Kwartalnik Elektroniki i Telekomunikacji*, No. 50, z. 4 (2004), pp. 663-674.
- [Pub43] W. Skarbek, K. Kucharski, M. Bober: "Dual LDA for Face Recognition", *Fundamenta Informaticae*, No. 61 (2004), pp. 303-334.
- [Pub44] W. Skarbek, T. Sikora, G. Galiński: "Fast Index Filtering in Vector Approximation File", *Fundamenta Informaticae*, No. 61 (2004), pp. 335-349.
- [Pub45] R. Szumny: "Bezpieczeństwo informacji w systemach komórkowych" (Security in Cellular Systems), *Przegląd Telekomunikacyjny*, No. 1 (2004), ISSN 1230-3496, pp. 11-17.
- [Pub46] M. Tajchert, F. Kulpa: "Akustyka wnętrza" (Room Acoustics), *Audio Video*, No. 4, (2004), pp. 64-68.
- [Pub47] W. Winięcki: „Ocena parametrów wirtualnych przyrządów pomiarowych” (Estimation of the Virtual Measuring Instruments Parameters), *PAR*, No. 7-8 (2004), pp. 51-55.
- [Pub48] W. Winięcki, P. Bilski: "Time Analysis of Virtual Spectrum Analyzer", *International Scientific Journal of Computing*, (2004), Issue 2 Vol. 3, (ISSN 1727-6209), pp. 31-38.

- [Pub49] W. Winięcki, T. Knyziak: "Pierspiektyvy razvitiya raspredeľnykh sistem izmereniya sispol'zovaniem mobil'nykh telefonov s platformoj JAVA 2 MICRO EDITION", *Datčiki i sistemy*, No. 11 (2004), pp. 6-11.
- [Pub50] K. Wnukowicz: "Image Indexing by Distributed Color Temperature Descriptions", *Fundamenta Informaticae*, No. 61 (2004), pp. 369-378.
- [Pub51] J. Wojciechowski, L. Opalski, K. Zamłyński: "Design Centering Based on a Approximation to the Constraint Region", *IEEE Trans. Circuits and Systems*, Vol. 51, (2004), pp. 598-607.
- [Pub52] Y. Yashchysyn, (E. Jaszczyszyn): "Analiza pełnofalowa anteny skanującej na podłożu ferroelektrycznym" (Full-wave Analysis of Scan Antenna on Ferroelectric Layer), *Kwartalnik Elektroniki i Telekomunikacji*, No. 50, z. 2 (2004), pp. 287-311.
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- [Pub54] J. Antoniuk: "Integracja anten mikro-paskowych w komputerach przenośnych" (Integration of Microstrip Antennae in Mobile Computers), *Mat. V Seminarium Stypendystów Fundacji Wspierania Rozwoju Radiokomunikacji i Techniki Multimedialnych* (Proc. Vth Scholarship Holders Seminar of Foundation for the Development of Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 1, 2004), ISBN 83-920008-2-X, pp. 47-54.
- [Pub55] J. Antoniuk, M. Żukociński, A. Abramowicz, W. K. Gwarek: "Resonant Frequencies of Helical Resonators", *Proc. 15th IEEE International Conference on Microwaves MIKON 2004*, (Warsaw, Poland, May 17-19, 2004), pp. 1044-1047.
- [Pub56] J. Antoszewski, Z. Kulka: "Implementacja wybranych cyfrowych efektów dźwiękowych na procesorze sygnałowym" (DSP Implementation of Chosen Sound Effects), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji KKRRiT 2004*, (Proc. National Conference on Radiocommunications and Broadcasting), (Warsaw, Poland, Jun. 16-18, 2004), pp. 107-110.
- [Pub57] P. Bajurko: "Badanie anteny z falą bieżącą na niesymetrycznej linii paskowej z wyższym rodzajem pola" (Investigation of Antenna with the Flowing Wave on Non-symmetric Strip Line with the Higher Kind of Field), *Mat. XXVII Krajowej Konferencji Elektroniki i Telekomunikacji Studentów i Młodych Pracowników Nauki* (Proc. XXVII National Conference on Electronic and Telecommunications for Students and Young Scientists), (Warsaw, Poland, Nov. 4-5, 2004), pp. 13-14.
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- [Pub59] P. Bargieł, A. Wróblewska, A. Przelaskowski: „Falkowe metody poprawy percepcji zmian patologicznych w mammogramach” (Wavelet Methods of Better Perception of Pathological Changes in Mammograms), *Mat. X Sympozjum Nowości w Technice Audio i Wideo*, (Proc. Xth Symposium New Trends in Audio and Video), (Wrocław, Poland, Sept. 16-18, 2004), pp. 221-229.
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- [Pub216] P. Roszkowski, D. Radomski: "Reproductive Risk Factors Associated with Pelvic Endometriosis - Results from Meta-Analysis", *Proc. the French Society of Gynaecology Conference* (Paris, France, Oct. 7-9, 2004), 1 p.
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- [Pub218] Y. Sheng, K. Kucharski, A. M. Sadka, W. Skarbek: "Automatic Face Synthesis and Analysis. A Quick Survey", *Proc. International Conference on Computer Vision and Graphics: ICCVG 2004*, (Warsaw, Poland, Sept. 22-24, 2004), 1 p.
- [Pub219] W. Skarbek, A. Buchowicz, A. Pietrowcew, F. Pereina: "Bit-rate Control for Compression of Video with ROI", *Proc. International Conference on Computer Vision and Graphics: ICCVG 2004*, (Warsaw, Poland, Sept. 22-24, 2004), 1 p.
- [Pub220] W. Skarbek, K. Kucharski, M. Bober: "Cascade of Operators for Facial Image Recognition and Indexing", *Proc. International Conference on Computer Vision and Graphics: ICCVG 2004*, (Warsaw, Poland, Sept. 22-24, 2004), 1 p.
- [Pub221] W. Skarbek, K. Kucharski, M. Bober: "Cascade of Dual LDA Operators for Face Recognition", *Proc. Seminar on Geometric Properties from Incomplete Data*, (Gagstul, Germany, Mar. 21-26, 2004), 1 p.
- [Pub222] W. Winiecki: „Ocena parametrów wirtualnych przyrządów pomiarowych”, (Estimation of the Virtual Measuring Instruments Parameters), *Mat. Konf. Systemy Pomiarowe w Badaniach Naukowych i w Przemysle*, (Łagów, Poland, Jun. 15-17, 2004), 1 p.

6.7. Poster presentation

- [Pub223] M. Celuch-Marcysiak: "On the Relationships between FD, FI, FV and TLM Formulations in Time Domain", *Proc. East-West Workshop: Advanced Techniques in Electromagnetics*, (Warsaw, Poland, May 20-21, 2004).

6.8. Conference and post-conference proceedings

- [Pub224] J. Cichocki, J. Modelski (Editors): *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji KKRRiT 2004*, (Proc. National Conference on Radiocommunications and Broadcasting), (Warsaw, Poland, Jun. 16-18, 2004), Ed. Fundacja Wspierania Rozwoju Radiokomunikacji i Technik Multimedialnych (The Foundation for Development of Radiocommunications and Multimedia Technologies), Warsaw 2004, (ISBN83-920008-1-1), 542 pp.
- [Pub225] J. Modelski (Guest Editor): *Kwartalnik Elektroniki i Telekomunikacji – MIKON 2004* (Electronics and Telecommunication Quarterly PAN), Ed. Polska Akademia Nauk (Polish Academy of Science), Warsaw 2004, (ISBN 0867-6747), pp. 503-701.

7. RESEARCH REPORTS

- [Rep1] P. Bogorodzki: *"Moduł akwizycji elektrokardiogramu z radiową transmisją danych"* (A Wireless Module Dedicated for the ECG Acquisition), Final report for the Institute of the Medical Technology and Apparatus (Instytut Techniki i Aparatury Medycznej), (No. 501E/1381), Warsaw, Jun. 2004, 16 pp.
- [Rep2] A. Buchowicz, K. Ignasiak, W. Skarbek, G. Galiński, P. Bobiński, T. Keller: *"Aplikacja MPEG-7 z wykorzystaniem serwisów sieciowych"* (MPEG-7 Application Based on Web Services), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004, 18 pp.
- [Rep3] M. Celuch-Marcysiak: *"Problem wielokrotnego rezonansu czasu grzania mikrofalowego małych pakietów żywności"* (Characterisation of Microwave Cavities with Closely Spaced Modes), Final report for Industrial Partner, USA, (No. 501M/1376), Warsaw, Dec. 2004, 15 pp.
- [Rep4] J. Cichocki, J. Kołakowski, K. Radecki, S. Maszczyk, S. Żmudzin: *"Zarządzanie zasobami radiowymi w systemie UMTS"* (Management of the Radio Resources in UMTS System), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004, 35 pp.
- [Rep5] D. Gryglewski: *"Opracowanie i wykonanie wielostanowego modelu przesuwnika fazy na diodach waraktorowych"* (Elaboration and Construction of Multi-state Model of Phase Shifter on Varactor Diodes), Final report for Telecommunications Research Institute (Przemysłowy Instytut Telekomunikacji), (No. 501H/1372), Warsaw, Nov. 2004, 10 pp.
- [Rep6] W. Gwarek: *"Opracowanie oprogramowania do optymalizacji procesu mikrofalowego rozmrażania i grzania żywności pod kątem poprawy jakości i bezpieczeństwa mikrobiologicznego"* (Enhanced Optimisation of Microwave Thawing and Heating Processes), Final report for EUREKA - MICRO-DEFROSTMODEL grant (No. 2602), Warsaw, Jan. 2004, 15 pp.
- [Rep7] W. Gwarek: *"Opracowanie nowego typu urządzenia mikrofalowego sterowanego mikroprocesorowo"* (Development of a New Microprocessor - Controlled Microwave Device), Final report for Industrial Partner, Sweden, (No. 501M/1368), Warsaw, Jan. 2004, 20 pp.
- [Rep8] S. Hahn, J. Jarkowski, K. Snopek, G. Hahn: *"Podwójnie wymiarowe rozkłady klasy Cohena. Badania własności oraz zastosowań"* (Double-dimensional Cohen's Class Distributions. Studies of Properties and Applications), Final report for the KBN grant, Institute of Radioelectronics, WUT, (No. 4T11D1222), Warsaw, Dec. 2004, 26 pp.
- [Rep9] S. L. Hahn, K. M. Snopek: *"On the Frequency-domain Definition of the Monogenic Signal"*, Internal report (No. 1), Institute of Radioelectronics, WUT, Warsaw, Jan. 2004, 6 pp.
- [Rep10] J. Jarkowski, T. Keller, K. Kurek: *"Podstawy teoretyczne i warunki wdrożenia w Polsce systemu DRM na falach średnich"* (Basics and Introduction Conditions of the DRM System on Medium Frequencies in Poland), Final report for the Office of Telecommunications and Post Regulation (Urząd Regulacji Poczty i Telekomunikacji), (No. 501E/1380), Warsaw, Dec. 2004, 12 pp.
- [Rep11] T. Kosiło, T. Buczkowski, H. Chaciński, K. Czerwiński, F. Alwafie, D. Janusek, J. Jarkowski, W. Kazubski, K. Snopek, Z. Walczak, J. Wojciechowski, *"Wybrane problemy sieci krótkiego zasięgu"* (Selected Problems of the Short Range Network), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep12] T. Kosiło, T. Keller, K. Kurek, Y. Yashchishyn, A. Abramowicz, D. Gryglewski: *"Analiza i projekt systemu transmisji i przetwarzania danych mini-satelity"* (Analysis and Project of System for Transmission and Data Transmission from Mini-Satellite), Final report for the KBN grant, Institute of Radioelectronics, WUT, (No. 5T12D02524), Warsaw, Dec. 2004, 36 pp.
- [Rep13] T. Kosiło, H. Chaciński, W. Kazubski: *"Opracowanie metod kontroli emisji radiofonicznych systemów cyfrowych"* (Elaboration of the Control Methods for Emission of the Broadcasting Digital Systems), Final report for the Office of Telecommunications and Post Regulation (Urząd Regulacji Poczty i Telekomunikacji), (No. 501E/1378), Warsaw, Dec. 2004, 38 pp.
- [Rep14] T. Kosiło, H. Chaciński, W. Kazubski: *"Projekt systemu do kontroli parametrów emisji radiofonicznych sieci cyfrowych"* (Project of the System for Control of Broadcasting Parameters Emission), Final report for the Office of Telecommunications and Post Regulation (Urząd Regulacji Poczty i Telekomunikacji), (No. 501E/1379), Warsaw, Dec. 2004, 41 pp.
- [Rep15] Z. Kulka, A. Leszczyński, M. Tajchert, J. Narkiewicz-Jodko, E. Kotarbińska: *"Projektowanie i badania systemów elektroakustycznych oraz systemów cyfrowego przetwarzania sygnałów fonicznych"*, (Design and Investigation of Electroacoustics Measuring Systems and Digital Audio Signal Processing Systems), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004, 127 pp.
- [Rep16] Z. Kulka, M. Kostrzewa, P. Nykiel: *"Cyfrowa stacja robocza do zapisu i obróbki dźwięku"*

- oparta na systemie Linux" (Digital Audio Workstation Based on Linux System for Recording and Processing of the Sound Signals), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4059), Warsaw, Dec. 2004, 20 pp.
- [Rep17] Z. Kulka: "Pomiary akustyczne i elektroakustyczne dźwiękowych urządzeń komputerowych" (Acoustic and Electroacoustic Measurements of Noise Emitted by Computer Systems), Final report for Axel, Springer Ltd., (No. 501H/1374), Warsaw, Jul. 2004, 16 pp.
- [Rep18] Z. Kulka: "Weryfikacja wyników pomiarowych hałasu" (Verification of Noise Measuring Results), Final report for SONAURA - Acoustic Engineering, (No. 501H/1373), Warsaw, Jul. 2004, 10 pp.
- [Rep19] Z. Kulka, P. Nykiel, R. Smoliński: "Przeprowadzenie nagrań oraz wykorzystanie urządzeń i aparatury do obróbki nagrań w studiu ZEA" (Recordings and Processing of Sound in ZEA Studio), Final report for the Central Examination Commission, (No. 501H/1034/1384), Warsaw, Nov. 2004, 10 pp.
- [Rep20] K. Kurek, P. Sitek, M. Tymiński: "Projekt systemu lokalizacji kapsuły satelitarnej YES - faza 2", (Project of Location System for YES2 Capsule - Phase 2), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503R/1034/4057), Warsaw, Dec. 2004.
- [Rep21] J. Modelski, M. Piasecki: "Badanie systemu anteny inteligentnej sterowanej z wykorzystaniem algorytmu genetycznego" (Improved Model of Adaptive Antenna Controlled by Means of Genetic Algorithm), Final report for the KBN grant, Institute of Radioelectronics, WUT, (No. 5T12D02524), Warsaw, Dec. 2004, 40 pp.
- [Rep22] J. Modelski, T. Keller: "Analiza możliwości stosowania oraz warunków współistnienia systemów łączności w paśmie ISM" (Analysis of Application and Coexistence Conditions for Communication Systems in ISM Band), Final report for the KBN Ph.D. grant, Institute of Radioelectronics, WUT, (No. 1256T11), Warsaw, Apr. 2004, 43 pp.
- [Rep23] J. Modelski, Y. Yashchysyn, M. Szafran, K. Derzakowski, E. Bobryk, H. Chaciński, M. Piasecki, A. Mędrzak, A. Tomaszewska-Grzęda: "Nowe rodzaje sterowanych anten mikrofalowych na podłożu wielowarstwowym" (New Kinds of Steerable Microwave Antennae with Multilayer Substrate), Final report for the KBN grant, Institute of Radioelectronics, WUT, (No. 4T11 B07322), Warsaw, Feb. 2004, 38 pp.
- [Rep24] J. Modelski, T. Keller, K. Kurek, Y. Yashchysyn, R. Szumny, R. Pączkowski: "Nowe usługi w systemach GSM" (New Services in GSM Systems), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep25] J. Modelski, K. Kurek, Y. Yashchysyn, R. Szumny: "Opracowanie założeń technicznych satelitarne systemu monitorowania środowiska i katastrof EDMSS" (Environmental and Disaster Monitoring Satellite System), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503R/1034/4063), Warsaw, Dec. 2004.
- [Rep26] J. Modzelewski, M. Mikołajewski, A. Wajs: "Optymalizacja rezonansowego wzmacniacza mocy wielkiej częstotliwości klasy DE do pracy w nagrzewnicy indukcyjnej" (Analysis, Optimisation and Methods of Designing High-Efficiency Key Tuned Power Amplifiers), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep27] R. Z. Morawski, A. Miękina, A. Podgórski: "Realizacja i badanie wybranych algorytmów interpretacji danych pomiarowych" (Implementation and Investigation of Selected Algorithms for Interpretation of Measurement Data), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep28] T. Morawski, J. Zborowska, S. Rostłonec, W. Gwarek, W. Wojtasiak: "Projektowanie, modelowanie i pomiary układów mikrofalowych" (Designing, Modelling and Measuring of the Microwave Devices), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep29] Z. Pawłowski: "Optymalizacja aparatury, metod rejestracji i wykrywania zmienności załamka T w elektrokardiogramach" (Optimization of the Measurement Apparatus, Recording Methods and T Wave Alternans Detection in ECG), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4058), Warsaw, Dec. 2004.
- [Rep30] A. Przelaskowski: "Efektywne metody kompresji i analizy obrazów" (Effective Methods of Image Compression and Analysis), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503R/1034/4055), Warsaw, Dec. 2004, 50 pp.
- [Rep31] D. Radomski: "Opracowanie materiałów dydaktycznych wspomagających kształcenie studentów w zakresie teorii sygnałów i systemów" (Preparing and Editing of Textbook "Signals and Systems"), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4056), Warsaw, Dec. 2004.
- [Rep32] K. Robaczyński: "Badania aparatury pokładowej sprzętu wojskowego" (Investigations of the Board Military Equipment), Final report for Military Institute of Armament Technology (Wojskowy Instytut Techniczny Uzbrojenia), (No. 501E/1375), Warsaw, Sept. 2004, 10 pp.
- [Rep33] K. Robaczyński: "Przeprowadzenie badań funkcjonalnych i analiz uzyskanych wyników badań sprzętu wojskowego oraz wykonanie prac odtwarzających ich właściwy stan

- techniczny*" (Functional Investigations and Analyses of Obtained Results of Military Equipment and Works Aimed at Their Reconstruction), Final report for Military Institute of Armament Technology (Wojskowy Instytut Techniczny Uzbrojenia), (No. 501E /1382), Warsaw, Dec. 2004, 15 pp.
- [Rep34] S. Rostoniec: *"Przygotowanie monografii naukowej wspomagającej proces dydaktyczny "Podstawy techniki antenowej"* (The Preparation of a Monograph Aimed to Facilitate the Lecture: Fundamentals of Modern Antenna Techniques), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G /1034 /4060), Warsaw, Dec. 2004.
- [Rep35] W. Skarbek, P. Bobiński: *"Metody optymalizacyjne w koderach sekwencji wideo"* (Optimisation Methods in Video Sequence Coders), Final report for the KBN Ph.D. grant, Institute of Radioelectronics, WUT, (No. 7511E03920), Warsaw, Dec. 2004.
- [Rep36] W. Skarbek: *"Indeksowanie obrazów techniką temperatury barwowej"* (Image Indexing Using Color Temperature Technique), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4062), Warsaw, Dec. 2004.
- [Rep37] M. Tajchert: *"Wykonanie pomiarów akustycznych w studiu koncertowym im. Witolda Lutosławskiego Polskiego Radia S.A."* (Acoustic Measurements of Large Concert Studio named W. Lutosławski), Final report for the Polish Radio Stock Company, (Polskie Radio S.A.), (No. 501H/1371), Warsaw, Sept. 2004, 24 pp.
- [Rep38] W. Winiecki, K. Mroczek, P. Bilski, T. Daniluk, R. Łukaszewski: *"Nowoczesne metody projektowania rozproszonych systemów pomiarowych"* (Modern Methods of Computer Measuring Systems Designing), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep39] J. Wojciechowski: *"Opracowanie podręcznika akademickiego "Sygnały i Systemy"* (Elaboration of Academic Textbook: "Signals and Systems"), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4061), Warsaw, Dec. 2004.
- [Rep40] W. Wojtasiak: *"Montaż i przeprowadzenie badań modułów pomiarowych na 915 MHz"* (Assembly and Investigations of 915 MHz Measuring Modules), Final report for QWED Ltd., (No. 501H/1369), Warsaw, Feb. 2004, 8 pp.
- [Rep41] W. Wojtasiak: *"Opracowanie i wykonanie 3 sztuk konwerterów"* (Elaboration and Construction of 3 Converters), Final report for Military Institute of Communications (Wojskowy Instytut Łączności), (No. 501E /1377), Warsaw, Sept. 2004, 10 pp.
- [Rep42] W. Wojtasiak: *"Wykonanie dwóch konwerterów"* (Construction of Two Converters), Final report for Regional Telecommunication Networks Stock Company (Regionalne Sieci Telekomunikacyjne "EL-NET" S.A.), (No. 501H/1365), Warsaw, Feb. 2004, 12 pp.
- [Rep43] K. Zaremba, Z. Pawłowski, P. Bogorodzki, P. Brzeski, G. Domański, T. Jamrógiewicz, M. Kazubek, B. Konarzewski, J. Marzec, T. Olszewski, L. Padée, E. Piątkowska-Janko, A. Przelaskowski, W. Smolik, R. Szabatın, P. Bargieł, P. Boniński, R. Kurjata, M. Orzechowski A. Trybuła, T. Wolak, A. Wróblewska: *"Nowoczesne techniki elektroniki jądrowej i medycznej"* (Modern Techniques in Nuclear and Medicine Electronics), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0403), Warsaw, Dec. 2004.
- [Rep44a] G. Hahn: "A Survey of Properties of Ambiguity Functions of Analytic, Quaternionic and Monogenic Signals", Internal report (No. 2), Institute of Radioelectronics, WUT, Warsaw, Dec. 2004, 6 pp.

8. PATENT APPLICATION

- [Pat1] J. Wojciechowski, G. Radzikowski: *"Sposób realizacji płatności pieniądzem cyfrowym przy wykorzystaniu karty mikroprocesorowej"* (The way of digital money payment by means of microprocessor card), Patent Application, Oct. 15, 2004.

9. CONFERENCES, SEMINARS AND MEETINGS

9.1. International conferences

- [Con1] *IEEE MTT-S* (Austin, USA, Jan. 9-17, 2004), J. Modelski (member of the Technical Programme Committee), M. Celuch-Marcysiak, W. Gwarek (speakers).
- [Con2] *ISPRA 2004: 3rd WSEAS International Conference on Signal Processing, Robotics and Automation* (Salsburg, Austria, Feb. 12-16, 2004), K. Snopek (speaker).
- [Con3] *IEE Conference: Computation in Electromagnetics* (Stradfort-on-Avon, Great Britain, Apr. 19-25, 2004), M. Celuch-Marcysiak (speaker).
- [Con4] *WIAMIS 2004* (Lisbona, Portugal, 20-24 Apr. 2004), P. Bobiński (speaker).
- [Con5] *European Microwave Conference* (Amsterdam, Netherlands, Apr. 24, 2004), J. Modelski (member of the Programme Committee, and Management Committee of the European Microwave Association).
- [Con6] *IEEE IMTC Conference* (Como, Italy May 16-21, 2004), W. Winięcki (member of the IPC, speaker).
- [Con7] *15th International Conference on Microwaves, Radar and Wireless Communications: MIKON 2004* (Warsaw, Poland, May 17-19, 2004), J. Modelski (chair of the Technical Programme Committee), W. Gwarek, T. Morawski (members of the Technical Programme Committee), J. Antoniuk, M. Celuch-Marcysiak, K. Derzakowski, D. Gryglewski, W. Gwarek, J. Gutermań, J. Jarkowski, T. Keller, N. Minh, J. Modzelewski, T. Morawski, M. Piasecki, J. Rudnicki, R. Urban, W. Wojtasiak, Y. Yashchysyn, P. Zajęczkowski, M. Żukociński (speakers).
- [Con8] *International Microwave Symposium* (Fort North, USA, Jun. 5-11, 2004), J. Modelski (member of the Programme Committee, and Management Committee), M. Celuch-Marcysiak (member of the Jury, speaker).
- [Con9] *CISA 2004 International Conference on Computer Information Systems and Applications*, (Ełk, Poland, Jun. 10-12, 2004), W. Skarbek (speaker).
- [Con10] *Human Brain Mapping Conference* (Budapest, Hungary, Jun. 12-17, 2004), P. Bogorodzki, M. Orzechowski, E. Piątkowska-Janko, T. Wolak, (speakers).
- [Con11] *ICME 2004 Conference* (Tajwan, Jun. 25-Jul. 1, 2004), G. Pastuszek (speaker).
- [Con12] *International IMEKO-TC7 Symposium* (St. Petersburg, Russia, Jun. 30-Jul. 2, 2004), R. Z. Morawski (chairman of the International Programme Committee, chairman of the TC7 Technical Committee), speaker.
- [Con13] *Modern Problems of Computational Electrodynamics* (Russia, St. Petersburg, Jun. 30 - Jul. 5, 2004), M. Celuch-Marcysiak, W. Gwarek, (speakers).
- [Con14] *International Conference on E-Business and Telecommunication Networks* (Setubal, Portugal, Aug. 24-30, 2004), G. Pastuszek (speaker).
- [Con15] *PARELEC 2004 Conference* (Dresden, Germany, Sept. 7-10, 2004), G. Pastuszek (speaker).
- [Con16] *IMTCI 2004: International Workshop on Intelligent Media Technology for Communicative Intelligence*, (Warsaw, Poland, Sept. 13-14, 2004), K. Ignasiak, M. Tomaszewski, W. Skarbek (speakers).
- [Con17] *ICCVG 2004 International Conference on Computer Vision and Graphics 2004*, (Warsaw, Poland, Sept. 22-24, 2004), M. Kazubek, K. Ignasiak, A. Przelaskowski, W. Skarbek (speakers).
- [Con18] *17th International Wrocław Symposium and Exhibition on EMC* (Wrocław, Poland, Sept. 24-26, 2004), T. Ciamulski, T. Keller, J. Rudnicki (participants), J. Kołakowski, S. Maszczyk. (speakers).
- [Con19] *International Conference on Image Analysis and Recognition: ICIAR 2004* (Porto, Portugal, Sept. 29-Oct. 1, 2004), G. Galiński, K. Kucharski (speaker).
- [Con20] *European Microwave Conference* (Amsterdam, Netherland, Oct. 11-12, 2004), K. Derzakowski (speakers).
- [Con21] *3rd International Symposium on Process Tomography in Poland* (Łódź, Poland, Sept. 8-12, 2004), T. Olszewski, R. Szabatin, W. Smolik (speakers).
- [Con22] *International Workshop on Systems, Signals and Image Processing* (Poznań, Poland, Sept. 13-15, 2004), A. Buchowicz, G. Galiński, K. Kucharski, G. Pastuszek, W. Skarbek, K. Wnukowicz (speakers).
- [Con23] *NATO Regional Conference on Military Communications and Information Systems: RCMCIS'2004* (Zegrze, Poland, Oct. 8-10, 2004), J. Modelski (the TPC member), A. Trojanowski (speakers).
- [Con24] *TETRA World Congress* (Vien, Austria, Nov. 21-24, 2004), J. Modelski (speaker).

9.2. Local conferences

- [Con25] *V Konferencja: Systemy Pomiarowe w Badaniach Naukowych i w Przemysle* (Vth Conference on Measuring Systems in Research and Industry), (Zielona Góra, Poland, Jun. 15-17, 2004), R. Łukaszewski (speaker), W. Winiński (invited speaker, member of the Scientific Committee).
- [Con26] *III Krajowa Konferencja Elektroniki* (IIIrd National Conference on Electronics), (Koszalin, Poland, Jun. 16-18, 2004), T. Morawski, J. Modzelewski, J. Zborowska (speakers).
- [Con27] *Krajowa Konferencja Radiokomunikacji, Radiofonii i Telewizji KKRRiT 2004* (National Conference on Radiocommunications, and Broadcasting), (Jun. 16-18, 2004), J. Cichocki (chair of the Organizing Committee), J. Modelski (chair of the Programme Committee), W. Skarbek (session chairman), G. Galiński, K. Ignasiak, K. Snopek, (members of the Organizing Committee), J. Ebert, A. Buchowicz, H. Chaciński, D. Gryglewski, J. Guterman, S. Hahn, J. Jarkowski, W. Kazubski, T. Keller, J. Kołakowski, T. Kosito, M. Kostrzewa, M. Kowalski, A. Kurek, K. Kurek, M. Konwicki, Z. Kulka, A. Leszczyński, S. Maszczyk, G. Pastuszak, M. Piasecki, K. Radecki, R. Szumny, A. Trojanowski, K. Wnukowicz, S. Wydra, Y. Yashchyshyn (speakers).
- [Con28] *Kongres Metrologii: KM 2004* (Congress on Metrology), (Wrocław, Poland, Sept. 6-9, 2004), W. Winiński, K. Mroczek (speakers).
- [Con29] *ICSES'2004* (Poznań, Sept. 7-10, 2004), P. Biłski, J. Wojciechowski (participant).
- [Con30] *Krajowe Sympozjum Telekomunikacji: KST'2004* (National Symposium on Telecommunications), (Bydgoszcz, Poland, Sept. 8-10, 2004), J. Modelski (TPC and MC member), J. Wojciechowski, G. Bernatek (speakers).
- [Con31] *IV Krajowa Konferencja: Multimedialne i Sieciowe Systemy Informacyjne* (IVth National Conference: Multimedia and Network Information Systems), (Wrocław, Poland, Sept. 16-17, 2004), W. Skarbek, G. Galiński, K. Wnukowicz (speakers).
- [Con32] *X Sympozjum "Nowości w Technice Audio i Wideo"* (Xth Symposium: "New Trends in Audio and Video Technology"), (Wrocław, Poland, Sept. 16-18, 2004), Z. Kulka, W. Skarbek, K. Zaremba (members of the Scientific Committee), P. Bargieł (speaker), M. Kostrzewa, M. Tajchert, M. Mikołowicz, M. Moraszczyk, A. Przelaskowski (participants).
- [Con33] *Signal Processing 2004* (Poznań, Poland, Sept. 24, 2004), Z. Kulka (speaker).
- [Con34] *XXVII Krajowa Konferencja Elektroniki i Telekomunikacji Studentów i Młodych Pracowników Nauki* (XXVII National Conference on Electronic and Telecommunications for Students' and Young Scientists), (Warsaw, Poland, Nov. 4-5, 2004), P. Bajurko, D. Kolmas, S. Wydra (participants).
- [Con35] *V Seminarium Stypendystów Fundacji Wspierania Rozwoju Radiokomunikacji i Techniki Multimedialnych* (Vth Scholarship Holders Seminar of Foundation for the Development of Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 1, 2004), M. Celuch-Marcysiak, J. Antoniuk, P. Bajurko, M. Bochyński, M. Bury, D. Kolmas, M. Kowalski, S. Kozłowski, A. Kruś, K. Kucharski, P. Nykiel, G. Starszuk, S. Roszczyk, P. Szczepski (speakers).

9.3. Schools, seminars and meetings

- [Con36] *Geometria Properties from Incomplete Data Workshops* (Schloss Dagstuhl Wadel, Germany, Mar. 21-27, 2004), W. Skarbek (speaker) in the frame of Network of Excellence, VISNET, 6th Framework Programme.
- [Con37] *21st Meeting of the Society for Computer Applications in Radiology* (Virginia, Canada, May 18-23, 2004), A. Przelaskowski (speaker).
- [Con38] *Networked AV Systems & Home Platforms (NAVSHIP)*, concentration meeting, (Nice, France, Nov. 30-Dec. 3, 2004), W. Skarbek (convenor of CG4 on Media Processing).
- [Con39] *47th Session of the IMEKO General Council* (Lisbon, Portugal, Nov. 14-16, 2004), R. Z. Morawski (speaker).

10. THE PRIZES AND DISTINCTIONS RECEIVED BY THE STAFF

10.1. State Orders and Medals

Andrzej Leszczyński, Ph.D.

Roman Szabatin, Ph.D.

Złoty Krzyż Zasługi
(Golden Order of Merit)

Teresa Miąsek, M.Sc.,

Wojciech Wojtasiak, Ph.D.

Srebrny Krzyż Zasługi
(Silver Order of Merit)

Bohdan Kwiatkowski, M.Sc.

Brązowy Krzyż Zasługi
(Bronze Order of Merit)

10.2. Award of the Minister of the Environment

Tomasz Buczkowski, Ph.D.

Individual award: "Environment-friendly Media"

10.3. Awards of the Rector

Krzysztof Zaremba, Prof., Ph.D., D.Sc.

Individual award (I⁰) for the D.Sc. monography "*Chosen Radiational Methods of Tissue and Body Fluids Composition Measurements*" (*Wybrane radiacyjne metody badania składu tkanek i płynów ustrojowych*).

Jacek Cichocki, Ph.D.,

Jerzy Kołakowski, Ph.D.

Team award (I⁰) for the academic book: "*UMTS Third Generation Cellular System*" (UMTS system telefonii komórkowej trzeciej generacji).

Józef Modelski, Prof., Ph.D., D.Sc.

Yevhen Yashchyshyn, Ph.D.,

Henryk Chaciński, M.Sc.,

Jacek Jarkowski, Ph.D.,

Piotr Majchrzak, M.Sc.,

Team award (I⁰) for elaboration of the conception and the start-up the Antenna Laboratory

10.4 Awards of the Warsaw University of Technology

Jan Ebert, Prof., Ph.D., D.Sc.

Warsaw University of Technology, Person of Merit
(Zasłużony dla Politechniki Warszawskiej).

10.5. Scholarships granted by the Foundation for the Development of Radiocommunications and Multimedia Technologies

Daniel Gryglewski, Ph.D.

The first prize in the contest for the Best Poster Presentation for the paper: "A 100W ISM-2.45GHz Band Power Test System", *15th International Conference on Electromagnetic Fields & Materials: MIKON 2004* (Warsaw, Poland, May 17-18, 2004).

Paweł Bargiel, M.Sc.

Prize in the contest for the Young Authors for the paper: "Falkowe metody poprawy percepcji zmian patologicznych w mammogramach" (Wavelet methods in improving detection of lesions in mammograms), *Mat. X Sympozjum Nowości w Technice Audio i Wideo* (Proc. Xth Symposium: "New Trends in Audio and Video Technology").

Jerzy Guterman, M.Sc.

The first EuMA Microwave Prize for the conference paper: "Triple-Band Miniaturized Fractal Planar Inverted - F Antenna for a Small Mobile Terminal", *Proc. 15th International Conference on Electromagnetic Fields & Materials: MIKON 2004* (Warsaw, Poland, May 17-18, 2004).

11. STATISTICAL DATA (balance for the period from Dec. 31st of each year, in full-time equivalents)

SPECIFICATION	2000	2001	2002	2003	2004
academic staff	60,23	59,83	59,43	61,33	61,83
total					
tenured professors	4	3,5	3,6	3,5	3,4
professors	7	7	6	5	6,6
associate professors	0	0	0	3	3
assistant professors	41	42,5	43	42	42,5
senior lecturers	6,33	5,33	4,83	4,83	4,83
lecturers	0,9	0	0	0	0
assistants	1	2	2	3	1,5
Ph.D. students	50	50	49	39	43
total					
regular	25	19	13	1	0
regular, the third level studies	12	17	26	26	24
part-time	13	14	10	12	19
technical and administrative staff	24,5	23	20	19	21,65
total					
R&D associates	13,5	12	9	9	11,15
administrative associates	9	9	9	8	8,5
service workers	2	2	2	2	2
space	2549,1	2549,1	2549,1	2592,1	3308,1
total [m²]					
laboratories	1172,8	1172,8	1172,8	1279,8	1342
library	71,2	71,2	71,2	71,2	71,2
offices of academic staff	1305,6	1305,6	1305,6	1241,1	1241,1
library resources					
books (number of volumes)	14103	14302	14543	14756	15133
books (number of titles)	7765	7894	8012	8107	8262
journals (number of titles subscribed to)	125	125	125	125	125
teaching activities					
basic courses	27	26	28	35	37
advanced courses	51	47	49	47	48
other courses	51	70	58	57	59
international projects	1	1	1	1	1
research projects	46	53	40	52	58
total					
granted by the University	22	24	16	24	20
granted by the State institutions	10	14	15	16	12
other projects	14	15	9	12	26
titles and degrees awarded					
Prof. titles	1	2	1	1	0
D.Sc. degrees	0	0	0	3	2
Ph.D. degrees	1	5	5	1	6
M.Sc. degrees	65	72	83	91	85
B.Sc. degrees	52+24	56+77	53+29	54+32	58+54
B.Sc. degrees (English-medium-studies)	0	0	5	0	4
publications	164	146	149	185	222
total					
sci.-tech. books and chapters in books	3	4	2	3	1
sci.-tech. papers in journals	22	41	19	59	52
sci.-tech. papers in conference proceedings	122	83	119	110	145
textbooks	1	1	-	-	5
other publications	16	17	9	13	19
research reports	48	44	38	37	43
patents granted	0	0	0	2	0
conferences					
number of conferences attended by the staff	41	34	41	47	39
number of participants from the Institute	140	88	93	107	143