INSTITUTE OF RADIOELECTRONICS

WARSAW UNIVERSITY OF TECHNOLOGY

FACULTY OF ELECTRONICS AND INFORMATION TECHNOLOGY

ANNUAL REPORT

2003

Warsaw, February 2004

Institute of Radioelectronics
Warsaw University of Technology

From the Director

Welcome to the 2003 edition of our Annual Report!

As I browse through its contents, I try to work out what picture of the Institute of Radioelectronics you will form from all the numbers and abstracts. I hope that you will appreciate our 182 published papers, 3 books including a textbook on UMTS, 36 completed research projects, and 177 defended M.Sc. and B.Sc. theses. I also hope that, whatever your observations, you will not miss the most important point: people of high purpose and great enthusiasm that continues to thrive. Our staff members play, quite naturally, a double role of scientists and educators. With an increasing number of teaching courses and research contracts, they also need to become managers. We need reliable leaders to meet our goals and to co-ordinate our tasks, and therefore we are proud and optimistic about the three new D.Sc. degrees (habilitations) defended by our staff in 2003. We have good reasons to believe that this optimistic trend of staff expansion and rejuvenation will continue. From this perspective, I am also pleased to mention our team of 41 Ph.D. students already exhibiting many brilliant skills. Several of them have already gained valuable distinctions at scientific conferences and are expressing deep interest in further University career.

Instead of highlighting more of the contents of these pages, here is an emblematic story. Besides people, another important asset of the Institute resides in our strong laboratory bases comprising a range of high profile measurement and control equipment. These are our vehicles for providing truly interactive teaching, stimulating participation in research projects, and attracting engineering contracts. They are being continuously re-shaped and upgraded basing on our own resources, grants as well as donations from commercial institutions. However, what has been felt missing for years, not only at the Institute but also in the Faculty of Electronics and Information Technology as a whole, is an antenna laboratory. Antenna technology is one of the fastest developing ones within the field of electronics and telecommunications. Therefore, setting up a facility compliant with the up-to-date technology standards has been an essential though complex task. In a spirit that seeks challenge, three years ago we launched a dedicated long-term antenna initiative, and this year our Antenna Laboratory has been successfully completed. It consists of two parts: antenna fundamentals, allowing demonstration of radiation phenomena and radiocommunication techniques taught within the basic courses, and professional, allowing specialised measurements in advanced projects. The kernel of the latter part is an original anechoic chamber supplemented with measurement objects, such as GSM base station antennae and other antennae designed by our staff.

There are so many ways that we want and need to follow: guarding the local spirit of scientific and experimental excellence is one; another is to gain more international dimension. We perceive the Sixth Framework Programme of the European Community as a great chance, for which we have been getting prepared and which has become a reality. Two of our 6th Framework projects have already started and one is well under way. Our three recent Eureka projects have been technically successful and also valuable for gaining managerial knowledge. The long - term collaboration with CERN and industrial partners in Sweden and the US extends our horizons and brings research funding.

It is said that the limits of scientific activity are drawn by imagination. In Poland today, they are drawn more prosaically and closer by the harsh economics. I do not think I should need to spell out any details at this point. However, I am pleased to say that at the Institute of Radioelectronics our hearts pump with enough vigour to obviate many limitations. We incessantly seek new forms of work and new partnerships. This year our joint efforts with ORACLE have led to the creation of *Centre of Expertise: Mobile, Wireless and Voice Solutions.* This Centre is hosted in the Faculty building and promises a good platform on which to implement our scientific knowledge into technological practice with minimum delay.

Such a diverse environment – and the strong personalities working in it –enables us to monitor technical as well as socio-economical changes on the global scale, and to adjust our educational offer accordingly. Today our courses cover a wide selection of subjects but have been grouped into three well-defined categories: radiocommunications, multimedia, and biomedical engineering. This is compatible with an analogous grouping of our research specialisations, and hence valuable synergy effects between science and teaching have already been observed. In particular, the aforementioned laboratory basis serves and stimulates both. The three areas of radiocommunications, multimedia, and biomedical engineering are also consistent with the worldwide hot trends. All this contributes to our students studying perhaps more in depth and with higher scores than they would in a less structured and dedicated world.

I want our partners, supporters, and friends to know all this. We would be delighted to receive your feedback. The Institute of Radioelectronics is determined to continue in its winning ways for many years to come. Your insights will help us define new concepts and initiatives to fulfil our potential.

Warsaw, February 2004

Professor Józef Modelski, Ph.D., D.Sc.

Contents

This Annual Report summarises the research
activities of the Institute in 2003, as well as
the teaching activities of the academic year
2002/200

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 three measurable objectives: to provide teaching of societal relevance; to seek excellence in scientific research; and to run projects meeting 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.

The year 2003 has been successful in all regards, reinforcing the enthusiasm and dedication of our staff. The Institute now assembles 10 professors and 42 assistant professors, many of which have gained national and world-wide recognition over the years. We highly appreciate the active and vibrant leadership of our senior professors as well as continuous rejuvenating of the staff, once again confirmed this year by three new D.Sc. degrees (habilitations).

As educators, our staff performs sterling work and exhibits immense stamina. The effects are directly measurable in terms of quality and numbers of supervised diplomas: 91 M.Sc. and 86 B.Sc. theses have been defended this year. Moreover, one student has completed his Ph.D. and 5 are working towards it today. 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.

In all these domains, members of our staff derive valuable scientific results and create new knowledge. This is documented by an impressive number of papers in refereed journals (58) and conference presentations (109). Moreover, 3 books with comprehensive overviews have been published this year.

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.

An increasing fraction of industrially oriented work has been facilitated by our motivation as well as quite an exceptional laboratory basis. Starting from the most recent acquisitions, it comprises:
- Antenna Laboratory for professional and basic measurements,
- Radiocommunication Laboratory with a GSM system,
- An anechoic chamber, and a sound studio,
- Tomography laboratory.

The picture is completed with a HP ImagePoint, and various professional software packages. On the whole, 12 laboratories, as well as the computer network, are available to the students.

The Foundation for the Development of Radiocommunications and Multimedia Technologies plays a special role in perpetuating scientific research within our Institute and the whole Faculty. In 2003, the Foundation has subsidised 5 undergraduate and 9 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. This year we have successfully completed two EUREKA projects and become well established within the Sixth Framework Programme of the European Community. We work in partnership with the Swedish Institute for Food and Biotechnology, Landeskrankenhaus-Universitatsklinikum Graz, SIEMENS AG Oesterreich, Technische Universitaet Graz, Worcester Polytechnic Institute (US), and Lviv Polytechnic National University. 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
 e-mail: J.Modelski @ire.pw.edu.pl

Secretariat:

Anna Tratkiewicz
 room 422, phone +48(22)6607233,+48(22)8253929
 fax: +48(22)8253769
 e-mail: A.Tratkiewicz@ire.pw.edu.pl

Deputy Director for Research:

Krzysztof Zaremba, Ph.D., D.Sc., Associate Professor
 room 72, phone +48(22)6607955,+48(22)8251363
 e-mail: K.Zaremba @ire.pw.edu.pl

Secretariat:

Anna Noińska
 room 424, phone +48(22)6607829,+48(22)8255248
 fax:+48(22)8255248
 e-mail: A.Noinska@ire.pw.edu.pl

Deputy Director for Academic Affairs:

Piotr Brzeski, Ph.D., Assistant Professor
 room 424, phone +48(22)6607829,+48(22)8255248
 e-mail: P.Brzeski@ire.pw.edu.pl

Secretariat:

Anna Morawska (to 31.10.2003)
 room 424, phone +48(22)6607829,+48(22)8255248
 fax:+48(22)8255248
 e-mail: D.Morawska@ire.pw.edu.pl

Aneta Bielska (from 1.11.2003)
 room 424, phone +48(22)6607829,+48(22)8255248
 fax:+48(22)8255248
 e-mail: A.Bielska@ire.pw.edu.pl

Deputy Director for Technical Affairs:

Maciej Konwicki, M.Sc., Head R&D Engineer (0.5)
 room 422, phone +48(22) 6607742,+48(22)8253929
 e-mail: M.Konwicki@ire.pw.edu.pl

Secretariat:

Aneta Bielska (to 31.10.2003)
 room 422, phone +48(22)6607742,+48(22)8253929
 fax: +48(22)8253769
 e-mail: A.Bielska@ire.pw.edu.pl

1.3. Organisation 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;
* Radio-Engineering Division;
* Television Division.

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

1.3.1. Electroacoustics Division

Head of Division

Zbigniew Kulka, Ph.D., D.Sc., Professor
 room 132, phone +48(22)6607621
 e-mail: Z.Kulka @ire.pw.edu.pl

Senior academic staff

Ewa Kotarbińska, Ph.D.	Assistant Professor
Andrzej Leszczyński, Ph.D.	Assistant Professor
Jerzy Narkiewicz-Jodko, Ph.D.	Assistant Professor (0.5)
Maria Tajchert, Ph.D.	Assistant Professor

Junior academic staff

Michał Moraszczyk, M.Sc.	Assistant (0.5) (from 1.10.2003)

Ph.D. students

Michał Kostrzewa[*], M.Sc.	from 1.10.2001
Grzegorz Kustra[*], M.Sc.	from 1.10.2000
Mariusz Mikołowicz[*], M.Sc.	from 1.03.2001
Michał Moraszczyk, M.Sc.	from 1.10.2003
Piotr Nykiel[**], M.Sc.	from 1.07.1998

Retirements:

Andrzej Aronowski	foreman

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 implemention on a PC.

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
 room 541, phone +48(22)6607402
 e-mail: T.Morawski@ire.pw.edu.pl

Senior academic staff

Wojciech Gwarek, D.Sc.	Professor
Stanisław Rosłoniec, D.Sc.	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

Junior academic staff - Ph.D. students
Tomasz Ciamulski[*], M.Sc.　　 from 1.03.2000
Paweł Kopyt[*], M.Sc.　　　　　 from 1.10.2001
Jacek Kubacki[*], M.Sc.　　　　 from 17.02.2003
Ryszard Michnowski[**], M.Sc.　from 2.05.1997
Artur Moryc[*], M.Sc.　　　　　 from 1.03.2002
Janusz Rudnicki[*], M.Sc.　　　 from 1.10.2000
Robert Szelenbaum[*], M.Sc.　 from 1.10.2001
Paweł Zajączkowski[*], M.Sc.　 from 1.11.2002

Technical staff
Krzysztof Robaczyński, M.Sc.　(0.5)
Mirosław Lubiejewski

Retirements
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 2003 included:

- design of high-frequency systems for radar techniques (oscilators, synthesisers, modulators, amplifiers, high-power noise sources, transmitter/receiver modules);
- methods of synthesis and computer-aided design of passive and active microwave circuits (couplers, summators 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 noncommensurate nonsynchronous transmission line stop-band filters and application of these 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
Zdzisław Pawłowski, Ph.D., D.Sc., Tenured Professor
　　　　　　　　(to 30.09.2003)
Krzysztof Zaremba, Ph.D., D.Sc., Associate Professor
　　　　　　　　(from 1.10.2003)
　　　room 72, phone +48(22)6607955,+48(22)8251363
　　　e-mail: K.Zaremba@ire.pw.edu.pl

Senior academic staff
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.　　　　Assistant Professor
　　　　　　　　　　　　　　　 (on the leave)
Marian Kazubek, Ph.D.　　　　 Assistant Professor
Bogumił Konarzewski, Ph.D.　 Assistant Professor
Janusz Marzec, Ph.D., D.Sc.　Associate 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.　　Assistant Professor
Dariusz Radomski, Ph.D.　　　Assistant Professor
Waldemar Smolik, Ph.D.　　　 Assistant Professor
Roman Szabatin, Ph.D.　　　　Assistant Professor

Junior academic staff
Tomasz Wolak, M.Sc.　　　　　Assistant (0.5)
　　　　　　　　　　　　　　　 (from 1.12.2003)

Ph.D. students
Paweł Bargieł[*], M.Sc.　　　　 from 1.10.2001
Piotr Boniński[*], M.Sc.　　　　 from 1.03.2002
Robert Kurjata[*] M.Sc.　　　　 from 1.10.2000
Mateusz Orzechowski[*], M.Sc.　from 1.03.2001
Adam Padée[*], M.Sc.　　　　　from 1.03.2002
Tymon Rubel, M.Sc.　　　　　　from 1.10.2003
Robert Sulej[*], M.Sc.　　　　　from 1.03.2002
Artur Trybuła[*], M.Sc.　　　　　from 1.03.2002
Tomasz Wolak[**], M.Sc.　　　　from 1.10.1999
Anna Wróblewska[*], M.Sc.　　 from 1.11.2002

Technical and administrative staff
Dariusz Ćwiek, M.Sc.　　　　　(on the leave)
Andrzej Wasilewski
Joanna Witkowska

Retirements
Waldemar Scharf, Ph.D.　　　　Assistant Professor

The research and teaching activities carried out in the Nuclear and Medical Electronics Division are concentrated on Biomedical Engineering. Research in this interdisciplinary area covers a broad range of topics and integrates sophisticated electronics and information technology with elements of medical knowledge. The Division's research is focused on the following topics:

- nuclear medicine (emission tomography: SPECT, PET);
- quantitative computer-aided tomography;
- tomographic dynamic studies;
- process tomography;
- magnetic resonance imaging (MRI), functional MRI, advanced application of MRI;
- analogue and digital radiography;
- medical image processing and recognition;
- methods and instrumentation for electrocardiography, high resolution electrocardiography and electro-encephalography;
- medical applications of isotope techniques;
- telemedicine;
- biomedical accelerators;
- mathematical modelling of physiological and disease process;
- application of predictive models in algorithms of medical diagnosis.

Areas of recent studies include:
- application of the vector space transformations for improving the quality of ECG recorder signals;
- electrical instability of heart study;
- multimodal imaging of topographic, tomographic and functional studies in medicine;

- correlated methods for the investigation of neuro-systems by NMR and SPECT tomography;
- MR imaging optimisation for functional studies;
- telecardiology;
- MRI tomography improvement with combined "passive" and "active" approach;
- 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;
- designing of detectors and read-out systems for high energy physics experiments;
- modelling of radiographic imaging systems.

1.3.4. Radiocommunications Division

Head of Division
Józef Modelski, Ph.D., D.Sc., Tenured Professor
room 422, phone +48(22)6607233
e-mail: J.Modelski @ire.pw.edu.pl

Senior academic staff:
Jan Ebert, Ph.D., D.Sc.	Tenured Professor (0.5)
Jacek Wojciechowski, Ph.D., D.Sc.	Professor
Tomasz Buczkowski, Ph.D.	Assistant Professor
	(on the leave 1.10.2003 - 31.12.2003)
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
Jerzy Kołakowski, Ph.D.	Assistant Professor
Tomasz Kosiło, Ph.D.	Assistant Professor
Krzysztof Kurek, Ph.D.	Assistant Professor
Mirosław Mikołajewski, Ph.D.	Assistant Professor
Juliusz Modzelewski, Ph.D.	Assistant Professor
Krzysztof Puczko, Ph.D.	Assistant Professor (0.5)
Karol Radecki, Ph.D.	Assistant Professor
Kajetana Snopek, Ph.D.	Assistant Professor
Zbigniew Walczak, Ph.D.	Assistant Professor
Yevhen Yashchyshyn, Ph.D.	Assistant Professor

Junior academic staff
Stanisław Maszczyk, M.Sc.	Assistant (0.5)
	(from 1.12.2003)

Ph.D. students
Piotr Bilski*), M.Sc.	from 1.10.2001
Paweł Kącki*), M.Sc.	from 1.03.2001
Tomasz Keller, M.Sc.	from 1.10.1999
Arkadiusz Kurek, M.Sc.	from 1.11.2002
Piotr Majchrzak*), M.Sc.	from 1.10.2002
Nguyen Minh**), M.Sc.	from 1.10.1999
Rajmund Pączkowski*), M.Sc.	from 17.02.2003
Marcin Piasecki**), M.Sc.	from 1.05.1999
Grzegorz Radzikowski*), M.Sc.	from 1.10.2000
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
Marek Marcinkowski
Stanisław Żmudzin, M.Sc. (0.25)

NATO Scholarship Holders
A.Synyavskyy, Ph.D.

Retirements:
Stefan Hahn, Ph.D., D.Sc.	Tenured Professor
Waldemar Kiełek, 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:

- radiocommunication 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 and modelling 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 – the influence of radio communication systems on a human's health and environment as well as on electronic equipment, protection zones planning.

1.3.5. Radio-Engineering Division

Acting Head of Division
Wiesław Winiecki, Ph.D., D.Sc., Associate Professor
room 442, phone +48(22)6607341
e-mail: W.Winiecki@ire.pw.edu.pl

Senior academic staff
Roman Z. Morawski, Ph.D., D.Sc.	Professor
	(on sabbatical leave 1.02.2003 - 30.09.2004)
Andrzej Miękina, Ph.D.	Assistant Professor
Krzysztof Mroczek, Ph.D.	Assistant Professor
Andrzej Podgórski, Ph.D.	Assistant Professor

Junior academic staff
Robert Łukaszewski, M.Sc.	Assistant

Technical staff
Tomasz Daniluk, M.Sc. (0.5)

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;
- designing automated computer-based measuring systems.

Current research topics include:
- software environment for computer-aided design of algorithms for reconstruction of measurands and for calibration of measuring systems;
- software environment for computer-aided design of measuring systems, virtual instrumentation, plug-in boards for data acquisition, IEEE-488 equipment, systems for measurement of wide-range broadcasting signals, modern information technologies e.g. LabVIEW, Java, XML and modern communications technologies e.g. the Internet, GSM, Bluetooth in distributed control and 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.

1.3.6. Television Division

Head of Division
Władysław Skarbek, Ph.D., D.Sc., Professor
room 452, phone +48(22)6605315
e-mail: W.Skarbek@ire.pw.edu.pl

Senior academic staff

Andrzej Buchowicz, Ph.D.	Assistant Professor
Grzegorz Galiński, Ph.D.	Assistant Professor (from 11.03.2003)
Krystian Ignasiak, Ph.D.	Assistant Professor
Tomasz Krzymień, M.Sc.	Senior Lecturer
Marek Rusin, Ph.D.	Assistant Professor (0.5)

Junior academic staff

Piotr Bobiński, M.Sc.	Assistant (0.5) (from 1.12.2003)

Ph.D. students

Piotr Bobiński[**], M.Sc.	to 31.10 2003
Krzysztof Kucharski[*], M.Sc.	from 1.03.2002
Grzegorz Pastuszak[*], M.Sc.	from 17.02.2003
Adam Pietrowcew, M.Sc.	from 1.10.1998
Aneta Świercz[*], M.Sc.	from 1.10.2002
Krol Wnukowicz[**], M.Sc.	from 1.03.1999

Technical staff
Bogdan Kwiatkowski, M.Sc.
Tomasz Smakuszewski, M.Sc.

The 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) in Multimedia Technical Committee no. 288 at the Polish National Committee for Standardisation.

Specific research topics in 2003 included:
- video and audio compression;
- intelligent multimedia systems;
- image indexing, multimedia database indexing;
- object tracking and recognition;
- motion analysis;
- selected topics in the design of cable television networks.

1.4. Evening Studies and Continuing Education

1.4.1. Engineering Evening Studies on Radio-communications

Head
Jacek Jarkowski, Ph.D.
room 433, phone +48(22)6607841, +48 601307606
e-mail: J.Jarkowski@ire.pw.edu.pl

Secretariat
Anna Noińska
room 424, phone +48(22)6607829, +48(22)8255248
fax: +48(22)8255248
e-mail: A.Noinska@ire.pw.edu.pl

Board of Consultants
Tadeusz Morawski, Ph.D., D.Sc. – chairman,
Sławomir Kula, Ph.D.,
Krzysztof Kowalski, Ph.D.,
Waldemar Radzikowski, Ph.D.

1.4.2. Postgraduate Studies

Head
Stanisław Rosłoniec, Ph.D., D.Sc., Professor
room 545, phone:+48(22) 6607956
e-mail: S.Rosloniec@ire.pw.edu.pl

Secretariat
Aneta Bielska
room 424, phone +48(22)6607829, +48(22)8255248
fax: +48(22)8255248
e-mail: A.Bielska@ire.pw.edu.pl

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

Head
Maciej Konwicki, M.Sc.
room 422, phone +48(22)6607742
e-mail: M.Konwicki@ire.pw.edu.pl
RADEM@ire.pw.edu.pl

Secretariat
Aneta Bielska (to 31.10.2003)
room 422, phone +48(22)6607742, +48(22)8253929
fax: +48(22)8253769
e-mail: A.Bielska@ire.pw.edu.pl

Programme Board
Józef Modelski, Ph.D., D.Sc. - chairman,
Andrzej Buchowicz, Ph.D.,
Jacek Cichocki ,Ph.D.,
Sławomir Kula, Ph.D.,

Marek Rusin, Ph.D.,
Maciej Konwicki, M.Sc.

1.4.4. Studies on Audiological Techniques

Head
Andrzej Leszczyński, Ph.D.
 room 130, phone +48(22)6607748
 e-mail: A.Leszczynski@ire.pw.edu.pl

Secretariat
Joanna Witkowska
 room 66, phone+48(22)6607955, +48(22)8251363
 e-mail: J.Witkowska@ire.pw.edu.pl

1.5. Other Institute's Units

1.5.1. Library

Curator
Teresa Miąsek, M.Sc.
 room 557, phone +48(22)6607627
 e-mail: T.Miasek@ire.pw.edu.pl

1.5.2. Financial Section

Head
Janina Gałęcka
 room 416, phone +48(22)6607645
 e-mail: J.Galecka@ire.pw.edu.pl

Staff
Janina Nowak,
Hanna Szot.

1.5.3. Supply Section

Head
Helena Oleksak
 room 34, phone +48(22)6607957, +48(22)8253769
 e-mail: H.Oleksak@ire.pw.edu.pl

Staff
Andrzej Laskowski,
Andrzej Skrzypkowski.

1.5.4. Multimedia Technical Committee no. 288 at the Polish Committee for Standardisation

Head
Władysław Skarbek, Ph.D., D.Sc., Professor
 room 452, phone +48(22)6605315
 e-mail: W.Skarbek@ire.pw.edu.pl

Secretary
Bohdan Kwiatkowski, M.Sc.

1.5.5. Auxiliary Administrative Staff

Janina Chmielak,
Andrzej Owczarek, M.Sc. (0.25).

.

2. STAFF

2.1. Senior academic staff

Piotr Bogorodzki

room #70, phone: 660-7819
e-mail: P.Bogorodzki@ire.pw.edu.pl

M.Sc. ('88), Ph.D. ('98); biomedical engineering; Assistant Professor, Nuclear and Medical Electronics Division; [Pro1], [Pro29], [Pro47], [Pro49], [Pro52], [Pub162].

Piotr Brzeski

room #67/68, phone: 660-7577
e-mail: P.Brzeski@ire.pw.edu.pl

M.Sc. ('70), Ph.D. ('82); biomedical engineering; Assistant Professor, Nuclear and Medical Electronics Division; Deputy Director for Academic Affairs of the Institute of Radioelectronics ('93-); Member of the Faculty Council ('90-); Member of the Dean's Financial Committee ('93-); Member of the Polish Association of Nuclear Medicine ('89-); Team award (II^0) of the Rector (2003); [Edu4], [Edu54], [Edu55], [Edu56], [Edu111], [Edu112]; [Pro1], [Pro32], [Pro40]; [BSc18], [BSc50]; [Pub6], [Pub68], [Pub69], [Pub179].

Andrzej Buchowicz

room #451, phone: 660-7840
e-mail: A.Buchowicz@ire.pw.edu.pl

M.Sc. ('88), Ph.D. ('97); television, digital signal and image processing, digital television systems; Assistant Professor, Television Division; Head of the Digital Television Studies in the Television Division of the Institute of Radioelectronics ('97-); Head of the Student Laboratory of Television Fundamentals ('96-); [Edu50], [Edu119], [Edu130]; [Pro9], [Pro13], [Pro51], [MSc78]; [BSc7], [BSc24], [BSc30], [BSc33]; [Pub7], [Pub71].

Tomasz Buczkowski

room #444, phone: 660-7796
e-mail: T.Buczkowski@ire.pw.edu.pl

M.Sc. ('67), Ph.D. ('78); electronics and telecommunications; environmental and health aspects of electronics; Assistant Professor, Radiocommunications Division; Member of the Scientific Advisory Board, Polish Association for the Blind ('95-); Member of Technical Commission 183 „Safety of Information Technology, Telecommunications and Business Equipment", Polish Committee for Standardisation ('99-); Chairman of the ITU-R (CCIR) Study Group 7 "Time and Frequency" ('83-); Polish Chamber of Commerce for Electronics and Tele-communication, End-of Life Electronic Equipment Com-mittee, Member (2003-); [Edu51], [Edu109]; [Edu142]; [Pro3]; [MSc34], [MSc56], [MSc75]; [BSc11], [BSc79]; [Pub171], [Pub172], [Pub173], [Pub174], [Pub175].

Małgorzata Celuch-Marcysiak

room #543, phone: 660-7631
e-mail: M.Celuch@ire.pw.edu.pl

M.Sc. ('88), Ph.D. ('96); microwaves; Assistant Professor, Microwave and Radiolocation Engineering Division; Head

of the Student Laboratory of Fields and Waves; reviewer for IEEE Transactions on MTT ('96-), IEEE Transactions on AP ('97-), IEEE Microwave and Guided Wave Letters (2000-), and IEEE Microwave and Wireless Components (2001-); [Edu60]; [Pub8], [Pub15], [Pub26], [Pub72], [Pub88], [Pub89], [Pub90].

Henryk Chaciński

room #433, phone: 660-7841
e-mail: H.Chacinski@ire.pw.edu.pl

M.Sc. ('75); electronics and telecommunications; Senior Lecturer, Radiocommunications Division; [Edu12], [Edu119], [Edu127], [Edu128], [Edu129]; [Pro3], [Pro20], [Pro26]; [MSc10], [MSc23], [MSc40]; [BSc41], [BSc46], [BSc60], [BSc71], [BSc72].

Jacek Cichocki

room #27, phone: 660-7635, fax: 8253759
e-mail: J.Cichocki@ire.pw.edu.pl

M.Sc. ('79), Ph.D. ('92); measurement and instrumenta-tion, radiocommunications; Assistant Professor, Radio-communications Division; Member of the Faculty Council (2002-); IEEE Member (2001-); Member of the Polish Society for Measurement, Automatic Control and Robotics POLSPAR ('92-); Head of the Organizing Committee of the National Conference KKRRiT 2004; [Edu22], [Edu74], [Edu116], [Edu124]; [Pro3], [Pro12], [Pro18], [Pro41]; [BSc66]; [Pub1], [Pub9], [Pub24], [Pub86], [Pub113].

Krzysztof Czerwiński

room #35, phone: 660-7962
e-mail: K.Czerwinski@ire.pw.edu.pl

M.Sc. ('68), Ph.D. ('86); electronics and telecom-munications; Assistant Professor, Radiocommunications Division; Vice-chairman of the ITU-R (CCIR) Study Group 7 „Time and Frequency" ('83-); [Edu5], [Edu87], [Edu91]; [Pro3]; [MSc5], [MSc8], [MSc27], [MSc29], [MSc35], [MSc70], [MSc77], [MSc87]; [BSc55], [BSc58]; [Pub99].

Krzysztof Derzakowski

room #550, phone: 660-7933
e-mail: K.Derzakowski@ire.pw.edu.pl

M.Sc. ('84), Ph.D. ('91); radio-frequency engineering, microwave technique; Assistant Professor, Radiocommunications Division; Head of the Student Laboratory of Microprocessors ('96-); [Pro24], [Pro26]; [BSc64], [BSc82]; [Pub96], [Pub182].

Grzegorz Domański

room #61, phone: 660-7643
e-mail: G.Domanski@ire.pw.edu.pl

M.Sc. ('94), Ph.D. (2001); nuclear and medical electronics; Assistant Professor, Nuclear and Medical Electronics Division; Secretary of the Warsaw Branch of Polish Society of Medical Physics (2001-); Faculty Coordinator of Radiological Protection (2002-); [Edu76]; [Pro1], [Pro15], [Pro19], [Pro28], [Pro35], [Pro46]; [BSc4],

[BSc23], [BSc28], [BSc45], [BSc57], [BSc65], [BSc74], [BSc76]; [Pub11], [Pub25], [Pub102], [Pub153].

Jan T. Ebert

room #538, phone: 660-7641, 8256261
e-mail: J.Ebert@ire.pw.edu.pl

M.Sc. ('56), Ph.D. ('63), D.Sc. ('69), Professor ('82-), Prof. Title. ('82); radio-frequency engineering, radio transmitters, power electronics, industrial electronics; Radiocommunications Division; Member of the Senate Committee on Education ('96-); IEE Fellow Member (94-); Deputy Chairman of the Engineer Section of the State Accreditation Board for Titles and Degrees ('99-); Member of the State Accreditation Board for Scientific Titles and Degrees ('96-); [Edu95], [Edu96]; [Pro6].

Grzegorz Galiński

room #451A, phone: 660-5016
e-mail: G.Galinski@ire.pw.edu.pl

M.Sc. (97'); Ph.D. (2003); image processing, multimedia systems, web technology; Assistant Professor, Television Division; Member of Multimedia Technical Committee no. 288 at Polish Committee for Standardisation ('99-); [Pro9], [Pro13], [Pro14], [Pro51]; [PhD1]; [Pub14], [Pub76].

Daniel Gryglewski

room #545, phone: 660-7633
e-mail: D.Gryglewski@ire.pw.edu.pl

M.Sc. ('96), Ph.D. (2001); microwave technique; Assistant Professor, Microwave and Radiolocation Engineering Division; [Edu98]; [Pro30], [Pro38], [Pro39], [Pro43], [Pro48], [Pto50]; [BSc8], [BSc15], [BSc44], [BSc70]; [Pub78], [Pub164], [Pub165].

Wojciech K. Gwarek

room #544, phone: 660-7631
e-mail: W.Gwarek@ire.pw.edu.pl

M.Sc. ('70; '74 at MIT), Ph.D. ('77), D.Sc. ('88); Professor ('94-); Prof. Title (2000); electronics; Microwave and Radiolocation Engineering Division; Head of the Electromagnetic Modelling Laboratory ('95); Fellow Member of IEEE (2000-); Head of the Faculty Council Committee on Awards and Distinctions (2002-); Member of the Technical Programme Committee of IEEE International Microwave Symposium ('99-); Member of the Editorial Board of IEEE Transactions on MTT ('88-); Member of the Review Board of IEEE Microwave & Guided Wave Letters ('96-); Member of the Technical Programme Committee of the International Microwave Conference MIKON ('93-); [Edu20], [Edu21], [Edu57]; [Pro4], [Pro21], [Pro30], [Pro48], [Pro50]; [Pub8], [Pub15], [Pub62], [Pub87], [Pub88], [Pub165].

Krystian Ignasiak

room #451A, phone: 660-5016
e-mail: kmi@ire.pw.edu.pl

M.Sc. ('94), Ph.D. ('99); informatics, multimedia systems, web technology; Assistant Professor, Television Division; Head of the Student Multimedia Laboratory ('99-); Member of Multimedia Technical Committee no. 288 at

Polish Committee for Standardisation ('99-); [Edu19], [Edu73], [Edu102], [Edu106]; [Pro9], [Pro13], [Pro51]; [MSc3], [MSc24], [MSc59], [MSc64], [MSc91]; [BSc9], [BSc42], [BSc49]; [Pub71].

Tomasz Jamrógiewicz

room #59, phone: 660-7917
e-mail: T.Jamrogiewicz@ire.pw.edu.pl

M.Sc. ('72); nuclear and medical electronics; Senior Lecturer, Nuclear and Medical Electronics Division; Member of Technical Committees for Standardisation: TC 173 - Interfaces and Building Electronic Systems ('99-), and TC 302 - Using of Informatics in the Health Protection (2003-); Member of the Presidium of Polish CAMAC Committee ('89-); Engineering Evening Studies on Radiocommunications - tutorial assistance for semesters: I, III, V (2002-); [Edu14], [Edu86]; [Pro1], [Pro15], [Pro22]; [MSc22]; [BSc1], [BSc37]; [Pub20].

Jacek Jarkowski

room #433, phone: 660-7841
e-mail: J.Jarkowski@ire.pw.edu.pl

M.Sc. ('63), Ph.D8 ('75); radiocommunications; Assistant Professor, Radiocommunications Division; Head of the Postgraduate Studies on Radiocommunications (2000-); Member of the Foundation for the Development of Radiocommunications and Multimedia Technologies (2000-); [Edu39], [Edu113]; [Pro3], [Pro27]; [MSc14], [MSc50]; [BSc5], [BSc27], [BSc35]; [Pub150].

Marek Karolczak

room #67/68, phone: 660-7577
e-mail: M.Karolczak@ire.pw.edu.pl

M.Sc. ('76), Ph.D. ('92); biomedical engineering; Assistant Professor, Nuclear and Medical Electronics Division; Member of the European Association of Nuclear Medicine ('89-), on the leave.

Marian Kazubek

room #60, phone: 660-7917
e-mail: M.Kazubek@ire.pw.edu.pl

M.Sc. ('69), Ph.D. ('78); signal & image processing, pattern recognition, telediagnosis; Assistant Professor, Nuclear and Medical Electronics Division; [Edu49], [Edu101]; [Pro1], [Pro15], [Pro22]; [MSc36], [MSc61]; [Pub5], [Pub22], [Pub56], [Pub67].

Wojciech Kazubski

room #427, phone: 660-7378
e-mail: W.Kazubski@ire.pw.edu.pl

M.Sc. ('86), Ph.D. ('98); radio frequency engineering, radio receivers, RF measurement techniques, shortwave propagation; Assistant Professor, Radiocommunications Division; [Edu82], [Edu122]; [Pro3]; [BSc29], [BSc61].

Jerzy Kołakowski

room #27, phone: 660-7635, fax: 8253759
e-mail: J.Kolakowski@ire.pw.edu.pl

M.Sc. ('88), Ph.D. (2000); radiocommunications, measurement and instrumentation; Assistant Professor, Radiocommunications Division; member of the Board of the Foundation for the Development of Radiocommunications and Multimedia Technologies (2002-); Bronze Order of Merit (2003); [Edu62]; [Pro3]; [Pro12], [Pro18], [Pro41]; [MSc16], [MSc46], [MSc53], [MSc72]; [BSc19]; [Pub1], [Pub24], [Pub86], [Pub113].

Bogumił Konarzewski

room #64, phone: 660-7916
e-mail: B.Konarzewski@ire.pw.edu.pl

M.Sc. ('91), Ph.D. ('98); nuclear and medical electronics; Assistant Professor, Nuclear and Medical Electronics Division; [Pro1], [Pro15], [Pro19], [Pro28], [Pro46]; [MSc6], [MSc79]; [Pub11], [Pub25], [Pub102], [Pub153].

Tomasz Kosiło

room #434, phone: 660-7576
e-mail: T.Kosilo@ire.pw.edu.pl

M.Sc. ('70), Ph.D. ('77); radiocommunications; Assistant Professor, Radiocommunications Division, Head of the Radiocommunications Laboratory (2001-); Member of the Polish National Committee of the URSI (2002-); [Edu9], [Edu69], [Edu94], [Edu117], [Edu118], [Edu125], [Edu126], [Edu142]; [Pro3], [Pro25], [Pro31], [Pro37]; [MSc9], [MSc28], [MSc43], [Msc52], [MSc63], [MSc83]; [BSc62], [BSc80]; [Pub91], [Pub97], [Pub145], [Pub176].

Ewa Kotarbińska

room #127, phone: 660-7644
e-mail: ewkot@ciop.pl

M.Sc. ('73), Ph.D. ('81); acoustics, noise control, environmental acoustics; Assistant Professor, Electroacoustics Division; Associate Member of the Technical European Committee for Standardisation TC/159, Hearing Protectors ('96-); Member of the Polish Acoustics Society; Member of the European Acoustics Society (2002-); [Edu36], [Edu71]; [Pro2]; [MSc11]; [Pub27], [Pub93], [Pub94], [Pub95].

Tomasz Krzymień

room #535, phone: 660-7795
e-mail: T.Krzymien@ire.pw.edu.pl

M.Sc. ('86), television; Senior Lecturer, Television Division; [Edu13].

Zbigniew Kulka

room #132, phone: 660-7621
e-mail: Z.Kulka@ire.pw.edu.pl

M.Sc. ('67), Ph.D. ('80), D.Sc. ('96); Professor (2000-); analog electronics, a/d and d/a converters, digital audio; Electroacoustics Division, Head ('98-); Member of Scientific Books Authors Association ('86-); Secretary of the Board of the Foundation for the Development of Radiocommunications and Multimedia Technologies (2001-); Member of the Audio Engineering Soc. (2001-); Member of the Scientific Council of the Soltan Institute for Nuclear Studies (2003-); Member of the Scientific and

Research Center of Radio and Television (2003-); [Edu17], [Edu46]; [Pro2], [Pro17], [Pro42]; [MSc38], [MSc41]; [BSc21]; [Pub28], [Pub29], [Pub30], [Pub31], [Pub92], [Pub98].

Krzysztof Kurek

room #540, phone: 660-5476
e-mail: k.kurek@ire.pw.edu.pl

M.Sc. (97'), Ph.D. (2002), radiocommunications, radio-frequency engineering; Assistant Professor, Radiocommunications Division; [Edu90]; [Pro8], [Pro11], [Pro12]; [Pub100], [Pub101], [Pub149].

Andrzej Leszczyński

room #130, phone: 660-7748
e-mail: A.Leszczynski@ire.pw.edu.pl

M.Sc. ('61), Ph.D. ('72); acoustics, electroacoustics, ultrasonics; Assistant Professor, Electroacoustics Division; Chief of the Electroacoustic Education Class of the Faculty ('93-); Head of the Audiological Technics Study of the Institute of Radioelectronics ('96-); Member of the Faculty Electional Commission ('90-); Member of the Equipment Acquisition Expert Commission at the Ministry of Health and Social Care ('94-); [Edu2]; [Pro2], [Pro16], [Pro23]; [MSc57].

Janusz Marzec

room #62, phone: 660-7643
e-mail: J.Marzec@ire.pw.edu.pl

M.Sc. ('75), Ph.D. ('83), D.Sc. (2003); nuclear and medical electronics; Associate Professor, Nuclear and Medical Electronics Division; Silver Order of Merit (2003); [Edu86]; [Pro1], [Pro15], [Pro19], [Pro28], [Pro46]; [DSc1]; [Pub11], [Pub25], [Pub34], [Pub35], [Pub62], [Pub102], [Pub141], [Pub153].

Przemysław Miazga

room #547, phone: 660-7878
e-mail: P.Miazga@ire.pw.edu.pl

M.Sc. ('80), Ph.D. ('89); microwaves, computer engineering, measurements; Assistant Professor, Microwave and Radiolocation Engineering Division; [Edu48], [Edu59].

Andrzej Miękina

room #439, phone: 660-7346
e-mail: A.Miekina@ire.pw.edu.pl

M.Sc. ('85), Ph.D. ('98); measurement and instrumentation; Assistant Professor, Radio-Engineering Division; Member of IEEE ('99-); Treasurer of the IEEE Poland Section ('99-); [Edu65]; [Pro5]; [MSc15], [MSc68]; [Pub39].

Mirosław G. Mikołajewski

room #539, phone: 660-7724
e-mail: M.Mikolajewski@ire.pw.edu.pl

M.Sc. ('87), Ph.D. ('93); radio-frequency engineering; power electronics; radio transmitters; Assistant Professor,

Radiocommunications Division; [Edu3]; [Pro6]; [MSc90]; [Pub110].

Józef W. Modelski

room #535a, phone: 660-7723, 8256555
fax: 8256555;
e-mail: J.Modelski@ire.pw.edu.pl

M.Sc. ('73), Ph.D. ('78), D.Sc. ('87), Professor ('91-), Prof. Title ('94); radio-frequency engineering, microwave technique; Radiocommunications Division; Director of the Institute of Radioelectronics ('96-); Chairman of the Telecommunication Council - Advisory Body towards President of the Office of Telecommunications and Post Regulation (2003-); Member of "Interministerial Space Coordination Council" - Advisory Body towards Prime Minister (2001-); Member of Scientific Councils: Scientific and Research Center of Radio and Television - CENRIT, Chairman (91-), Telecommunication Research Institute - PIT (Vice - Chairman, 2003-), National Institute of Telecommunications (2003-); Member of the Committees of Polish Academy of Sciences PAN: Committee on Electronics and Telecommunications (96-) - Head of Microwave and Radiolocation Section (2003-), Committee on Space Research (2001-) - Head of Satellite Commission (2003-); President of the Foundation for the Development of Radiocommunications and Multimedia Technologies (2000-); Member of Editorial Board of IEEE Transactions on MTT ('95-); TPC Chairman of the International Microwave Conferences MIKON (96-); TPC Member of the European Microwave Conferences ('95-) and IEEE MTT-S International Microwave Symposium ('95-); IEEE Fellow (2000-); IEEE MTT-S AdCom Member, Chair of IEEE Region 8 Chapter Coordinaton Committee (2000-); Associated Member of the Ukrainian National Academy of Sciences ('99-); Chairman of the Rector's Committee on Modernization and Development (2002-); Medal of National Education (2003); [Edu77]; [Pro8], [Pro12], [Pro26], [Pro33], [Pro37]; [MSc85]; [BSc13]; [Pub23], [Pub24], [Pub41], [Pub42], [Pub49], [Pub50], [Pub59], [Pub84], [Pub86], [Pub91], [Pub100], [Pub101], [Pub105], [Pub113], [Pub114], [Pub115], [Pub129], [Pub130], [Pub131], [Pub147], [Pub148], [Pub149], [Pub150], [Pub167], [Pub168], [Pub169], [Pub170], [Pub177].

Juliusz S. Modzelewski

room #537, phone: 660-7793
e-mail: J.Modzelewski@ire.pw.edu.pl

M.Sc. ('77), Ph.D. ('93); radio-frequency engineering; power electronics; radio transmitters; Assistant Professor, Radiocommunications Division; [Edu3], [Edu75], [Edu111], [Edu112], [Edu122]; [Pro6]; [Pub37], [Pub38], [Pub116], [Pub117], [Pub118].

Roman Z. Morawski

room #445, phone: 660-7721
e-mail: R.Morawski@ire.pw.edu.pl

M.Sc. ('72), Ph.D. ('79), D.Sc. ('90); Professor ('93-), Prof. Title (2001); measurement and instrumentation; Radio-Engineering Division, Head (2000-2003); 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-); IEE Fellow Member ('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 International Programme Committee of the *XVIIth IMEKO World Congress* (2003);Member of the Technical Programme Committee of the *IEEE Instrumentation and Measurement Technology Conference* (2003); [Edu27], [Edu52]; [Pro5], [Pro30]; [Pub3], [Pub13], [Pub19], [Pub39], [Pub54], [Pub1119], [Pub178].

Tadeusz Morawski

room #541, phone: 660-7402
e-mail: T.Morawski@ire.pw.edu.pl

M.Sc. (electronics, '63), M.Sc. (mathematics, '66), Ph.D. ('70), D.Sc. ('73), Professor ('80-), Prof. Title ('80); microwave technique; 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 -2003); Member of the Scientific Council of Tele-Radiotechnique Institute ('99-); Senior Member of IEEE ('80-); [Edu58], [Edu99]; [Pro4], [Pro38]; [Pub40], [Pub120], [Pub121], [Pub164].

Krzysztof Mroczek

room #441, phone: 660-7946
e-mail: K.Mroczek@ire.pw.edu.pl

MSc. (95'), Ph.D. (2002); measurement and instrumentation; Assistant Professor, Radio-Engineering Division; [Edu81]; [Pro7]; [Pub41].

Jerzy Narkiewicz-Jodko

room #131, phone: 660-7999
e-mail: J.Narkiewicz@ire.pw.edu.pl

M.Sc. ('60), Ph.D. ('69); acoustics, electroacoustics, loudspeaker driver and systems, active sound control, passive and active noise control, ultrasonics; Assistant Professor, Electroacoustics Division; Member of the Student's Disciplinary Commission ('96-); Member of the Faculty Council Committee on History and Tradition ('99-); Member of Polish Acoustic Society ('68-); Member of Warsaw Council Noise Abbotment League ('87-); [Edu2]; [Pro2]; [MSc2], [MSc47], [MSc49], [MSc65], [MSc74]; [BSc3], [BSc25]; [Pub112], [Pub123].

Tomasz Olszewski

room #67, phone: 660-7577
e-mail: tomeko@ire.pw.edu.pl

M.Sc. ('82); nuclear and medical electronics; Senior Lecturer; Nuclear and Medical Electronics Division; Team award (II^0) of the Rector (2003); [Edu18], [Edu53]; [Pro1], [Pro32], [Pro40]; [BSc39]; [Pub6], [Pub68], [Pub69], [Pub179].

Lechisław Padèe

room #58, phone: 660-7917
e-mail: L.Padèe@ire.pw.edu.pl

M.Sc. ('70), Ph.D. ('80); nuclear and medical electronics; Senior Lecturer, Nuclear and Medical Electronics Division; [Edu26], [Edu84]; [Pro1], [Pro22], [Pro46].

Zdzisław Pawłowski

room #65, phone: 660-7955, 8251363
e-mail: Z.Pawlowski@ire.pw.edu.pl

M.Sc. ('59), Ph.D. ('64), D.Sc. ('87), Professor ('90-), Prof. Title ('90); nuclear and medical electronics; Nuclear and Medical Electronics Division, Head (1987-2003); Head of the Dean's Financial Committee (1990-2003); 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 the Polish Medical Society ('70-); Member of Medical Physics and Radiology Society, Polish Academy of Sciences ('99-), Member of Scientific Council of Institute for Nuclear Studies (1999-2003); [Edu15], [Edu64]; [Pro1], [Pro15], [Pro19], [Pro28], [Pro46]; [MSc42], [MSc45], [MSc67], [MSc89]; [BSc43]; [Pub11], [Pub25], [Pub80], [Pub102], [Pub153], [Pub162], [Pub180], [Pub181].

Ewa Piątkowska – Janko

room #69, phone: 660-7918
e-mail: E.Piatkowska@ire.pw.edu.pl

M.Sc. ('78), Ph.D. (2001); medical and nuclear engineering; Assistant Professor, Nuclear and Medical Electronics Division; Team award of the Rector (I^0) (2003); [Pro1], [Pro15], [Pro29], [Pro31], [Pro47], [Pro49], [Pro52]; [MSc21], [MSc25], [MSc26], [MSc37]; [BSc20], [BSc32]; [Pub42], [Pub125], [Pub162].

Andrzej Podgórski

room #431, phone: 660-5453
e-mail: A.Podgorski@ire.pw.edu.pl

M.Sc. ('75), Ph.D. ('83); measurement and instrumentation; Assistant Professor, Radio-Engineering Division; [Edu7], [Edu8]; [Pro5], [Pro25]; [MSc55]; [Pub122], [Pub132].

Artur Przelaskowski

room #58, phone: 660-7917
e-mail: A.Przelaskowski@ire.pw.edu.pl

M.Sc. ('90), Ph.D. ('95); signal & image processing, data compression; Assistant Professor, Nuclear and Medical Electronics Division; [Edu45]; [Pro1], [Pro22]; [MSc44]; [BSc6], [BSc17], [BSc48]; [Pub5], [Pub56], [Pub57], [Pub133], [Pub134], [Pub135], [Pub136], [Pub137], [Pub138].

Krzysztof Puczko

room #552a, phone: 660-7795
e-mail: K.Puczko@ire.pw.edu.pl

M.Sc. ('86), Ph.D. ('93); telecommunications, multimedia, radio-frequency engineering; Assistant Professor, Radio-Engineering Division; [Edu70].

Karol W. Radecki

room #29, phone: 660-7620
e-mail: K.Radecki@ire.pw.edu.pl

M.Sc. ('70), Ph.D. ('78); radio-frequency engineering and measurement; Assistant Professor, Radiocommunications Division; IEEE Member (2000-); Member of the National Committee of URSI; ('90-); Member of the Programme Committee of the National Symposium of Radio Science ('99-); National Chairman of URSI Commission A Electromagnetic Metrology ('90-); Member of the Scientific Advisory Board, Polish Association for the Blind ('95-); [Edu35], [Edu100], [Edu105], [Edu120]; [Pro3], [Pro18]; [MSc66].

Dariusz Radomski

room #4, phone: 660-7577
e-mail: D.Radomski@ire.pw.edu.pl

M.Sc. (96'), Ph.D. (2001); medical and nuclear engineering; Assistant Professor, Nuclear and Medical Electronics Division; [Pro1], [Pro36]; [Pub68].

Krzysztof Robaczyński

room #548, phone: 660-7622
e-mail: K.Robaczyński@ire.pw.edu.pl

M.Sc. ('69); microwave technique; Senior Lecturer (0.5), Microwave and Radiolocation Engineering Division; Faculty Coordinator for the Programme of Study ('94-); [Edu88]; [Pro45]; [BSc63], [BSc77].

Stanisław Rosłoniec

room #545, phone: 660-7956
e-mail: S.Rosloniec@ire.pw.edu.pl

M.Sc. ('72), Ph.D. ('76), D.Sc. ('91), Professor (2001-), Prof. Title (2001); microwave technique; Professor, Microwave and Radiolocation Engineering Division; Member of the Faculty Council Committee on Scientific Research (1999-2002); Member of the Faculty Council Commitee on Faculty Organisation (2002-); [Edu10], [Edu38], [Edu85], [Edu107]; [Pro4], [Pro14]; [MSc51]; [BSc56].

Marek Rusin

room #451A, phone: 660-7840
e-mail: M.Rusin@ire.pw.edu.pl

M.Sc. ('66), Ph.D. ('75); radiocommunications, television; Assistant Professor, Television Division; Term in Contract, half-time; [Edu11]; [Pro13].

Władysław Skarbek

room #452, phone: 660-5315
e-mail: W.Skarbek@ire.pw.edu.pl

M.Sc. ('72), Ph.D. ('77), D.Sc. ('94); Professor ('97-), Prof. Title ('2003); informatics; Television Division, Head (2000-), Head of the Multimedia Techniques Studies in the Television Division of the Institute of Radioelectronics ('97-); Head of the Student Laboratory of Multimedia Techniques ('97 -); Member of the Conference Programme Committee of: Computer Analysis of Images

and Patterns CAIP (1993-2003), Steering Commitee Chair 2003; Head of Multimedia Technical Committee no. 288 at Polish Committee for Standardisation ('99); ISO /SC29/WG11 (MPEG) expert (2000-); Member of Advisory Board of "Image Processing and Communications" ('95-); [Edu6], [Edu37], [Edu78]; [Pro9], [Pro13], [Pro28], [Pro51]; [Prof1]; [MSc12], [MSc13], [MSc48], [MSc69], [MSc84]; [Pub2], [Pub4], [Pub44], [Pub46], [Pub47], [Pub48], [Pub55], [Pub76], [Pub142].

Waldemar Smolik

room #5, phone: 660-7577
e-mail: W.Smolik@ire.pw.edu.pl

M.Sc. ('91), Ph.D. ('97); biomedical engineering, computer engineering; Assistant Professor, Nuclear and Medical Electronics Division; Head of Computer Tomography Laboratory ('99-); Team award (II^0) of the Rector (2003); [Edu28], [Edu31], [Edu43], [Edu80]; [Pro1], [Pro32], [Pro40]; [MSc86]; [BSc54]; [Pub6], [Pub68], [Pub69], [Pub179].

Kajetana Snopek

room #435, phone: 660-7647
e-mail: K.Snopek@ire.pw.edu.pl

M.Sc. (91'), Ph.D. (2002); signal and system theory; Assistant Professor, Radiocommunications Division; [Edu33], [Edu120]; [Pro3], [Pro27].

Maciej Sypniewski

room #547, phone: 660-7347
e-mail: M.Sypniewski@ire.pw.edu.pl

M.Sc. ('83), Ph.D. ('96); microwave technique; Assistant Professor ('96-), Microwave and Radiolocation Engineering Division; [Pub8].

Roman Szabatin

room #67/68, phone: 660-7577
e-mail: R.Szabatin@ire.pw.edu.pl

M.Sc. ('70), Ph.D. ('82); biomedical engineering; Assistant Professor, Nuclear and Medical Electronics Division; Head of the Nuclear Medicine Electronics Laboratory ('83 -); Member of the European Association of Nuclear Medicine ('89-); Treasurer of the Warsaw Branch of Polish Society of Medical Physics (2001-); V-ce President of Polish Society of Process Tomography (2003-); Team award (II^0) of the Rector (2003); [Edu66], [Edu72]; [Pro1], [Pro32], [Pro40]; [BSc2], [BSc10], [BSc12]; [Pub6], [Pub68], [Pub69], [Pub179].

Maria Tajchert

room #127, phone: 660-7644
e-mail: M.Tajchert@ire.pw.edu.pl

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-); [Edu34]; [Pro2]; [MSc30], [MSc60], [MSc71]; [BSc47], [BSc51], [BSc53]; [Pub51].

Zbigniew Walczak

room # 437, phone: 660-7479
e-mail: Z.Walczak@ire.pw.edu.pl

M.Sc. (98'), Ph.D. (2002); radio networks, heuristics methods, radiocommunications; Assistant Professor, Radiocommunications Division; [Edu44]; [Pro3]; [MSc58]; [Pub127].

Andrzej Więckowski

room #547, phone: 660-7347
e-mail: A.Wieckowski@ire.pw.edu.pl

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

Wiesław Winiecki

room #442, phone: 660-7341
e-mail: W.Winiecki@ire.pw.edu.pl

M.Sc. ('75), Ph.D. ('86), D.Sc. (2003); measurement and instrumentation; Associate Professor; Radio-Engineering Division; Acting Head of Division (2003-), Head of the Computer-Aided Measurement Laboratory ('94-); Member of the Faculty Council Committee on Research (2002-); Member of the Measuring Systems Section ('99'-) of the Metrology and Instrumentation Committee, Polish Academy of Sciences; Deputy-chairman of the Measurement Committee of the Polish Society for Measurement, Automatic Control and Robotics 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-); [Edu23], [Edu24], [Edu25], [Edu79], [Edu92]; [Pro7], [Pro20], [Pro25]; [DSc2]; [MSc17], [MSc18], [MSc32], [MSc54], [MSc81]; [Pub52], [Pub53], [Pub81], [Pub85], [Pub124], [Pub155], [Pub156], [Pub157], [Pub158], [Pub159], [Pub160].

Jacek Wojciechowski

room #443, phone: 660-7713
e-mail: jwojc@ire.pw.edu.pl

M.Sc. Electronics ('66), M.A. Mathematics ('75), Ph.D. ('76), D.Sc. ('89); Professor ('93-); Prof. Title (2002); signals and systems, radiocommunications, computer aided design, graphs and networks, mathematical methods in engineering; 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], [Edu44], [Edu47], [Edu61]; [Pro3],

[Pro10], [Pro12]; [MSc4]; [Pub45], [Pub64], [Pub139], [Pub152].

Wojciech Wojtasiak

room #545, phone: 660-7638
e-mail: W.Wojtasiak@ire.pw.edu.pl

M.Sc. ('79), Ph.D. ('86); 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-); [Edu3], [Edu67], [Edu68]; [Pro4], [Pro30], [Pro34], [Pro38], [Pro39], [Pro48], [Pro50]; [MSc7], [MSc20]; [BSc22], [BSc36]; [Pub56], [Pub65], [Pub78], [Pub109], [Pub164], [Pub165], [Pub166]

Yevhen Yashchyshyn

room #551, phone: 660-7833
e-mail: E.Jaszczyszyn@ire.pw.edu.pl

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-); [Edu63], [Edu83]; [Pro12], [Pro26]; [MSc1], [MSc62], [MSc73], [MSc76]; [BSc31], [BSc39]; [Pub49], [Pub50], [Pub59], [Pub105], [Pub114], [Pub115], [Pub128], [Pub147], [Pub148], [Pub149], [Pub167], [Pub168], [Pub169], [Pub171], [172]; [Pat1], [Pat2].

Krzysztof Zaremba

room #72, phone: 660-7955
e-mail: K.Zaremba@ire.pw.edu.pl

M.Sc. ('81), Ph.D. ('90), D.Sc. (2003); nuclear and medical electronics; Associate Professor; Nuclear and Medical Electronics Division; Head of Division (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-); [Edu16], [Edu40]; [Pro1], [Pro15], [Pro19], [Pro28], [Pro46]; [DSc3]; [MSc19], [MSc39], [MSc80]; [BSc14], [BSc16], [BSc37]; [Pub11], [Pub25], [Pub60], [Pub61], [Pub102], [Pub153].

Jolanta Zborowska

room #542, phone: 660-7642
e-mail: J.Zborowska@ire.pw.edu.pl

M.Sc. ('74), Ph.D. ('83); microwave technique; Assistant Professor ('83-), Microwave and Radiolocation Engineering Division; Head of the Students' Laboratory of Fields and Waves; [Pro4]; [MSc31], [MSc88]; [BSc52]; [Pub40], [Pub120], [Pub121].

2.2. Junior academic staff

Piotr Bobiński, M.Sc.	Assistant (0.5) *phone: 660-5016*
Grzegorz Galiński, M.Sc.	Assistant (0.5) *phone: 660-5016*
Robert Łukaszewski, M.Sc.	Assistant *phone: 660-7340*
Stanisław Maszczyk, M.Sc.	Assistant (0.5) *phone: 660-7635*
Michał Moraszczyk, M.Sc.	Assistant (0.5) *phone: 660-7637*
Tomasz Wolak, M.Sc.	Assistant (0.5) *Phone: 660-7918*

2.2.1. Ph.D. students

Paweł Bargieł[*], M.Sc.
Piotr Bobiński[**], M.Sc.
Piotr Bilski[*], M.Sc.
Piotr Boniński[*], M.Sc.
Tomasz Ciamulski[*], M.Sc.
Paweł Kącki[*], M.Sc.
Tomasz Keller, M.Sc.
Paweł Kopyt[*], M.Sc.
Michał Kostrzewa[*], M.Sc.
Jacek Kubacki[*], 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.
Ryszard Michnowski[**], M.Sc.
Mariusz Mikołowicz[*], M.Sc.
Nguyen Minh[**], M.Sc.
Michał Moraszczyk, M.Sc.
Piotr Nykiel[**], M.Sc.
Mateusz Orzechowski[*], M.Sc.
Adam Padèe[*], M.Sc.
Grzegorz Pastuszak[*], M.Sc.
Rajmund Pączkowski[*], M.Sc.
Marcin Piasecki[**], M.Sc.
Grzegorz Radzikowski[*], M.Sc.
Tymon Rubel, M.Sc.
Janusz Rudnicki[*], M.Sc.
Robert Sulej[*], M.Sc.
Robert Szelenbaum[*], M.Sc.
Rafał Szumny[*], M.Sc.
Tomasz Szymański[*], M.Sc.
Aneta Świercz[*], M.Sc.
Arkadiusz Trojanowski[*], M.Sc.
Artur Trybuła[*], M.Sc.
Karol Wnukowicz[**], M.Sc.
Tomasz Wolak[**], M.Sc.
Anna Wróblewska[*] M.Sc.
Sebastian Wydra[*], M.Sc
Michał Zajączkowski[*], M.Sc.

[*] the third-level studies
[**] Ph.D. studies graduated

2.3. Technical and administrative staff

Aneta Bielska	Secretary *phone:660-7742,8253929*
Janina Chmielak	Senior Technician *phone: 660-7987*
Dariusz Ćwiek, M.Sc.	Senior Development Engineer *phone: 660-7577*
Tomasz Daniluk, M.Sc.	Development Engineer *phone: 660-7340*
Janina Gałęcka	Senior Accountant *phone: 660-7645*
Maciej Konwicki, M.Sc.	Head R&D Engineer *phone:660-7233,8253929*
Bogdan Kwiatkowski, M.Sc.	Senior R&D Engineer *phone: 660-5367*
Andrzej Laskowski	Worker *phone: 660-7957*
Mirosław Lubiejewski	Foreman *phone: 660-7633*
Marek Marcinkowski	Senior Foreman *phone: 660-7378*
Teresa Miąsek, M.Sc.	Curator of the Library *phone: 660-7627*
Danuta Morawska	Secretary (to 30.10.2003) *phone:660-7829,8255248*
Anna Noińska	Secretary *phone:660-7829,8255248*
Janina Nowak	Accountant *phone: 660-7743*
Helena Oleksak	Section Manager *phone:660-7957,8253769*
Andrzej Owczarek, M.Sc.	Senior Development Engineer - (0.5) *phone: 660-7793*
Krzysztof Robaczyński, M.Sc.	Senior R&D Engineer *phone: 660-7622*
Andrzej Skrzypkowski	Foreman *phone: 660-7378*
Tomasz Smakuszewski, M.Sc.	R&D Engineer *phone: 660-7840*
Hanna Szot	Accountant *phone: 660-7743*
Anna Tratkiewicz	Secretary *phone:660-7233,8253929*
Andrzej Wasilewski	Worker *phone: 660-7919*
Joanna Witkowska	Senior Technician *phone:660-7955,8251363*
Stanisław Żmudzin, M.Sc.	Senior R&D Engineer- (0.25); *phone: 660-7635.*

3. TEACHING ACTIVITIES (academic year 2002/2003)

3.1. Regular studies: Areas of Concentrations

- **Radiocommunications and Multimedia Technologies**

Head
Tadeusz Morawski, Ph.D., D.Sc., Tenured Professor
room 541, phone +48(22)6607402
e-mail: T.Morawski@ire.pw.edu.pl

- **Biomedical Engineering**

Head
Zdzisław Pawłowski, Ph.D., D.Sc., Tenured Professor
room 65, phone +48(22)6607955, +48(22)8251363
e-mail: Z.Pawlowski@ire.pw.edu.pl

3.2. Basic courses

[Edu1]   *Basics of Digital Technology* (Podstawy techniki cyfrowej - PTCY); 1h/week; semester 5; C. Zieliński.

[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. - 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 Microprocessor Technique* (Podstawy techniki mikroprocesorowej - TMIK); 4h/week; semester 5; K. Czerwiński.

[Edu6]   *Basics of Multimedia Techniques* (Podstawy technik multimedialnych - PTMU); 3h/week; elective; W. Skarbek.

[Edu7]   *Basics of Programming* (Podstawy programowania - PRI); 4h/week; semester 1; A. Podgórski.

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

[Edu9]   *Basics of Radiocommunications* (Podstawy radiokomunikacji - PR); 2h/week; semester 4; T. Kosiło.

[Edu10]   *Basics of Radiolocation and Radio-navigation* (Podstawy radiolokacji i radionawigacji - PRIR); 3h/week; elective; S. Rosłoniec.

[Edu11]   *Basics of Television* (Podstawy telewizji - POTE); 3h/week; semester 6; M. Rusin.

[Edu12]   *Broadcasting Systems* (Systemy radiofoniczne - SYR); 3h/week; semester 4; H. Chaciński.

[Edu13]   *Cable Television* (Telewizja przewodowa - TVP); 3h/week; elective; T. Krzymień.

[Edu14]   *Computer Systems* (Systemy komputerowe - SYKO); 3h/week; elective; T. Jamrógiewicz.

[Edu15]   *Detection of Nuclear and Medical Signals* (Detekcja sygnałów biomedycznych i jądrowych - DSBJ); 4h/week; semester 6; Z. Pawłowski.

[Edu16]   *Digital Circuits - Laboratory* (Układy logiczne; laboratorium - ULOGE); 2h/week; laboratory; semester 4; K. Zaremba.

[Edu17]   *Digital Audio Systems* (Cyfrowe systemy foniczne - CSF); 3h/week; elective; Z. Kulka.

[Edu18]   *Electronics III* (Elektronika III - ELKA III); 2h/week; semester 4; T. Olszewski.

[Edu19]   *Event Driven Programming* (Programowanie zdarzeniowe - PZDT); 3h/week; semester 4, K. Ignasiak.

[Edu20]   *Fields and Waves* (Pola i fale - POFAT); 3h/week; semester 3; T. Morawski, W. Gwarek.

[Edu21]   *Introduction to Electronics, Informatics and Telecommunications* (Wstęp do elektroniki, informatyki i telekomunikacji - WEIT); 1h/week; semester 1; W. Gwarek.

[Edu22]   *Materials, Components, and Designs* (Materiały, elementy i konstrukcje - MEIK); 1h/week; laboratory; semester 6; J. Cichocki.

[Edu23]   *Measuring Systems* (Systemy pomiarowe - SPOM); 6h/week; semester 5; W. Winiecki.

[Edu24]   *Measuring Systems I* (Systemy pomiarowe I - SPOM I); 4h/week; semester 5; W. Winiecki.

[Edu25]   *Measuring Systems II* (Systemy pomiarowe II - SPOM II); 4h/week; semester 6; W. Winiecki.

[Edu26]   *Medical Electronic Instrumentation* (Elektroniczna aparatura medyczna - EAME); 4h/week; semester 5 - 6; L. Padée.

[Edu27]   *Numerical Methods (*Metody numeryczne - MNM); 3h/week; semester 3; R. Z. Morawski.

[Edu28]   *Object Oriented Programming (M)* (Programowanie obiektowe (M) - PROBI); 4h/week; semester 2; W. Smolik.

[Edu29]   *Operating Systems E* (Systemy operacyjne E - SOP); 1h/week; semester 5, L. Opalski.

[Edu30]   *Operating Systems 1* (Systemy operacyjne 1 - SOP); 1h/week; semester 5, L. Opalski.

[Edu31]   *Programming 2* (Programowanie 2 - PROG2); 3h/week; semester 5; W. Smolik.

[Edu32] *Radiology and Nucleonics* (Radiologia z Nukleoniką - NK); 3h/week; semester 5; W. Scharf.

[Edu33] *Signals and Systems* (Sygnały i Systemy - SYST); 4h/week; semester 3; K. Snopek.

[Edu34] *Sound Recording and Forming* (Odbiór i kształtowanie dźwięku - OKD); 3h/week; elective; M. Tajchert.

[Edu35] *Signals and Modulations* (Sygnały i modulacje - SYGM); 3h/week; semester 4; J. Wojciechowski, K. Radecki.

3.3. Advanced courses

[Edu36] *Acoustic Protection of Environment* (Akustyczna ochrona środowiska - AOS); 3h/week; elective; E. Kotarbińska.

[Edu37] *Adaptive Image Recognition* - EADIR); 4h/week; semester 6, W. Skarbek.

[Edu38] *Analysis and Synthesis of Microwave Circuits* (Analiza i synteza układów mikrofalowych - ASUM); 3h/week; elective; S. Rosłoniec.

[Edu39] *Antennae and Radiowave Propagation* (Anteny i propagacja fal - AIPF); 3h/week; elective; J. Jarkowski.

[Edu40] *Artificial Neural Networks in Medicine* (Sztuczne sieci neuronowe w medycynie - SESN); 3h/week; elective; K. Zaremba.

[Edu41] *Biomedical Accelerators* (Akceleratory biomedyczne - ABM); 2h/week; elective; W. Scharf.

[Edu42] *Biomedical Signals Processing* (Cyfrowe przetwarzanie sygnałów biologicznych - CPSB); 4h/week; elective; A. Grzanka.

[Edu43] *Computed Tomography* (Tomografia komputerowa - TOM); 4h/week; elective; W. Smolik.

[Edu44] *Modern Heuristic Techniques* (Współczesne techniki heurystyczne - WMH); 4h/week; elective; Z. Walczak., J. Wojciechowski.

[Edu45] *Data Compression* (Kompresja danych - KODA); 3h/week; elective; A. Przelaskowski.

[Edu46] *Digital Audio Signal Processing* (Cyfrowe przetwarzanie sygnałów fonicznych - CPSF); 3h/week; elective; Z. Kulka.

[Edu47] *Digital Communications A* - (EDICO); 4h/week; semester 5; J. Wojciechowski.

[Edu48] *Digital Circuits* (EDC1); 2h/week; elective; P. Miazga (English-medium studies).

[Edu49] *Digital Image Processing* (Cyfrowe przetwarzanie obrazów - CPOO); 4h/week; elective; M. Kazubek.

[Edu50] *Digital and Interactive Television* (Telewizja cyfrowa i interaktywna - TCI); 4h/week; elective; A. Buchowicz.

[Edu51] *Digital Information Transmission* (Cyfrowa transmisja informacji - CTIN); 3h/week; elective; T. Buczkowski.

[Edu52] *Digital Processing of Measurement Signals* (Cyfrowe przetwarzanie sygnałów pomiarowych - CPSP), 3h/week; R. Z. Morawski.

[Edu53] *Digital Systems* (Układy cyfrowe - UCYF): lab., elective; T. Olszewski.

[Edu54] *Diploma Seminar for Undergraduate Students* (Seminarium dyplomowe inżynierskie - SDI); 2h/week; P. Brzeski.

[Edu55] *Diploma Seminar for Graduate Students* (Seminarium dyplomowe magisterskie - SDM1); 2h/week; P. Brzeski.

[Edu56] *Diploma Seminar for Graduate Students* (Seminarium dyplomowe magisterskie - SDM2); 2h/week; P. Brzeski.

[Edu57] *Electromagnetic Compatibility* (Kompaty-bilność elektromagnetyczna - KE); 2h/week; elective; W. Gwarek.

[Edu58] *Electromagnetic Field Theory* (Teoria pola elektromagnetycznego - TPE); 4h/week; elective; T. Morawski.

[Edu59] *Evolutionary Algorithms* (EEVAL); 4h/week; elective; P. Miazga (English-medium studies).

[Edu60] *Fields, Waves and Antennae* (EFWA); 4h/week; elective; M. Celuch-Marcysiak (English-medium-studies).

[Edu61] *Graphs and Networks* (Grafy i Sieci - GIS); 2h/week; project: 2h/week; elective; J. Wojciechowski.

[Edu62] *GSM and Third Generation Cellural Systems* (GSM i systemy komórkowe trzeciej generacji - GSMS); 4h/week; elective; J. Kołakowski.

[Edu63] *Influence of Electromagnetic Waves on Living Organisms* (Oddziaływanie fal elektromagnetycznych na organizmy żywe - OFE); 2h/week; elective; Y. Yashchyshyn.

[Edu64] *Measured Data Analysis in Medicine* (Ana-liza danych pomiarowych w medycynie - ADP); 3h/week; elective; Z. Pawłowski.

[Edu65] *Methods and Algorithms for Processing of Measurement Signals* (Metody i algorytmy przetwarzania sygnałów pomiarowych - MAP); 3h/week; elective; A. Miękina.

[Edu66] *Methods and Equipment for Organ Structure Visualisation* (Metody i urządzenia do wizualizacji struktur narządowych - MWSN); 3h/week; elective; R. Szabatin.

[Edu67] *Microwave Technique* (Technika mikrofalowa - TMO); 4h/week; elective; W. Wojtasiak.

[Edu68] *Microwave Transmitters and Receivers* (Nadajniki i odbiorniki mikrofalowe - NOM); 2h/week; elective; W. Wojtasiak.

[Edu69] *Mobile Radio Communications* (Radio-komunikacja ruchoma lądowa - RRL); 3h/week; elective; T. Kosiło.

[Edu70] *Multi-service and Multimedia Networks* - EMSMN; 4h/week; elective; K. Puczko (English-medium-studies).

[Edu71] *Noise Control* (Ochrona przed hałasem - OPH); 2h/week; E. Kotarbińska.

[Edu72] *Nuclear Medicine Techniques* (Techniki medycyny nuklearnej - TMN); 4h/week; elective; R. Szabatin.

[Edu73] *Object Oriented Programming of Distributed and Multimedia Applications in Java* (Java - obiektowe programowanie aplikacji rozproszonych i multimedialnych - OPA); 3h/week; elective; K. Ignasiak.

[Edu74] *Radioelectronics Measurements* (Miernictwo radioelektroniczne - MR); 3h/week; elective; J. Cichocki.

[Edu75] *Radio Transmitting Technique and its Applications (*Technika nadawania radiowego i jej aplikacje - TNR); 4h/week; elective; J. Modzelewski.

[Edu76] *Radiological Apparatus in Diagnostics* (Aparatura radiologiczna w diagnostyce - ARDM); 2h/week; elective; G. Domański.

[Edu77] *Satellite Communications* (Łączność satelitarna - ŁS); 3h/week; elective; J. Modelski.

[Edu78] *Semantic Analysis of Images and Sounds* (Analiza semantyczna obrazu i dźwięku - ASOD); 3h/week; elective; W. Skarbek.

[Edu79] *Software for Measuring Systems* (Oprogramowanie systemów pomiarowych - OSP); 4h/week; elective; W. Winiecki.

[Edu80] *Software for Medical Systems* (Oprogramowanie systemów medycznych - OSM); 3h/week; elective; W. Smolik.

[Edu81] *System Measuring and Controlling Devices* (Systemowe urządzenia pomiarowe i sterujące - SUPS); 4h/week; elective; K. Mroczek.

[Edu82] *Technique of a Radio Signals Receiving* (Technika odbioru radiowego - TOR); 3h/week; elective; W. Kazubski.

[Edu83] *Theory and Designing of Antennae* (Teoria i projektowanie anten - TPA); 4h/week; elective; Y. Yashchyshyn.

[Edu84] *Ultrasonography Instrumentation* (Aparatura ultrasonograficzna - AUS); 3h/week; elective; L. Padèe.

3.4. Special courses

3.4.1. Engineering Evening Studies on Radiocommunications

[Edu85] *Antennae* (Anteny - ANR); 34h/sem.; semester 4; S. Rosłoniec.

[Edu86] *Basics of Computer Techniques* (Podstawy techniki komputerowej - PTKR); 70h/sem.; semester 1; T. Jamrógiewicz, J. Marzec.

[Edu87] *Basics of Digital Circuits and Microprocessing Technique* (Podstawy układów logicznych i techniki mikro-procesorowej - PULR); 55h/sem.; semester 4; K. Czerwiński.

[Edu88] *Basics of High-Frequency Techniques* (Podstawy techniki w.cz. - PTWR); 65h/sem.; semester 3; K.Robaczyński.

[Edu89] *Basics of Metrology* (Podstawy metrologii - PMER); 40h/sem.; semester 1; J. Olędzki.

[Edu90] *Basics of Satellite Communications* (Podstawy łączności satelitarnej - SATR); 20h/sem.; semester 4; K. Kurek.

[Edu91] *Circuits and Signals* (Obwody i sygnały - OSR); 45h/sem.; semester 2; K. Czerwiński.

[Edu92] *Computer-Aided Controlling and Data Processing* (Komputerowe sterowanie i przetwarzanie danych - KSTR); 41h/sem.; semester 5; W. Winiecki.

[Edu93] *Digital Signals Processing* (Cyfrowe przetwarzanie sygnałów - CPSR); 42h/sem.; semester 4; Z. Gajo.

[Edu94] *Digital Signals Transmission* (Cyfrowa transmisja sygnałów - CTSR); 43h/sem.; semester 5; T. Kosiło.

[Edu95] *Diploma Seminar* (Seminarium dyplomowe - SDR); 10h/sem.; semester 6; J. Ebert.

[Edu96] *Diploma Seminar 2* (Seminarium dyplomowe 2 - S2R); 20h/sem.; semester 7; J. Ebert.

[Edu97] *Economics and Accountancy* (Ekonomika i rachunkowość - ERR); 15h/sem.; semester 5; M. Holko.

[Edu98] *Electronic Systems* (Układy elektroniczne - UER); 42h/sem.; semester 3; D. Gryglewski.

[Edu99] *Fields and Waves* (Pola i fale - PFR); 72h/sem.; semester 2; T. Morawski.

[Edu100] *Frequency Standards* (Wzorce częstotliwości - WCR); 32h/sem.; semester 7; K. Radecki.

[Edu101] *Image Techniques* (Techniki obrazowe - TORR); 30h/sem.; semester 7; M. Kazubek.

[Edu102] *Internet Techniques* (Techniki internetowe - TINR); 30h/sem.; semester 7; K. Ignasiak.

[Edu103] *Law in Telecommunications* (Prawo w telekomunikacji - PTR); 15h/sem.; semester 4; C. Woźniak.

[Edu104] *Matematics I* (Matematyka I - MATI); 90h/sem.; semester 1; E. Stankiewicz-Wiechno.

[Edu105] *Materials and Elements* (Materiały i elementy - MER); 16h/sem.; semester 4; K. Radecki.

[Edu106] *Multimedia Techniques* (Techniki multimedialne - TMR); 20h/sem.; semester 6; K. Ignasiak.

[Edu107] *Numerical Methods* (Metody numeryczne - MNR); 35h/sem.; semester 3; S.Rosłoniec.

[Edu108] *Physics of the Solid Body* (Fizyka ciała stałego - FCS); 42h/sem.; semester 1; J. Szmidt.

[Edu109] *Programmable Digital Devices* (Programowalne układy cyfrowe - PUCR); 32h/sem.; semester 5; T. Buczkowski.

[Edu110] *Programming* (Programowanie - PMR); 32h/sem.; semester 3; R.Kurjata.

[Edu111] *Project 1* (Projekt 1 - PUR); 30h/sem.; semester 5; P.Brzeski.

[Edu112] *Project 2* (Projekt 2 - PSR); 60h/sem.; semester 6; P. Brzeski.

[Edu113] *Propagation of Waves* (Propagacja fal - PFR); 16h/sem.; semester 4; J. Jarkowski.

[Edu114] *Psychology of Management* (Psychologia zarządzania - PZR); 15h/sem.; semester 7; T. Wojtowicz.

[Edu115] *Radio Lines* (Linie radiowe - LRR); 30h/sem.; semester 7; J. Zygierewicz.

[Edu116] *Radioelectronics Measurements* (Miernictwo radiolektroniczne - MRR); 42h/sem.; semester 5; J. Cichocki.

[Edu117] *Radiocommunication Systems I* (Systemy radiokomunikacyjne I - SRK); 54h/sem.; semester 6; T. Kosiło.

[Edu118] *Radiocommunication Systems II* (Systemy radiokomunikacyjne II - SRK); 32h/sem.; semester 7; T. Kosiło.

[Edu119] *Radiodiffusion Systems* (Systemy radiodyfuzyjne - SRDR); 67h/sem.; semester 6; A. Buchowicz, H. Chaciński.

[Edu120] *Signals and Modulations* (Sygnały i modulacje - SM); 61h/sem.; semester 3; K. Snopek, K. Radecki.

[Edu121] *Subscriber Access Systems* (Systemy dostępu abonenckiego - SDAR); 15h/sem.; semester 5; A. Kalinowski.

[Edu122] *Technique of Emission and Receiving* (Technika emisji i odbioru - TER); 40h/sem.; semester 4; J. Modzelewski., W. Kazubski.

[Edu123] *Teletransmission Systems* (Systemy teletransmisyjne - STR); 30h/sem.; semester 5; S. Kula.

[Edu124] *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 a subject entitled: *Coding and Digital Modulations in Radiocommunications* (Kodowanie i modulacje cyfrowe w radiokomunikacji).

[Edu125] *Transmission Coding* (Kodowanie transmisyjne); 1x2h, once a year; T. Kosiło.

[Edu126] *Channel Coding* (Kodowanie kanałowe), 1x4h, once a year; T. Kosiło.

[Edu127] *Modulations with Frequency Keying* (Modulacje z kluczowaniem częstotliwości); 1x2h, once a year; H. Chaciński.

[Edu128] *Modulations with Phase Keying* (Modulacje z kluczowaniem fazy); 1x3h, once a year; H. Chaciński.

[Edu129] *Square Modulations of Amplitude* (Modulacja kwadratowa amplitudy); 1x2h, once a year; H. Chaciński.

[Edu130] *Modulation and OFDM Multi-access Technology* (Modulacja i techniki wielodostępu OFDM); 1x2h, once a year; A. Buchowicz.

3.4.3. Studies on Audiological Techniques

The Studies on Audiological Techniques represent a series of courses; 180h; twice a year.

[Edu131] *Anatomy and Physiology of Hearing* (Anatomia i fizjologia słyszenia); 12h.

[Edu132] *Ear Pathology* (Patologia ucha); 9h.

[Edu133] *Fundamentals of Acoustics* (Podstawy akustyki); 20h.

[Edu134] *Audiometry* (Audiometria); 32h.

[Edu135] *Hearing Aid Technology and Elements of Electronics* (Technika aparatów słuchowych i elementy elektroniki); 30h.

[Edu136] *Hearing Aid Measurements* (Miernictwo aparatów słuchowych); 14h.

[Edu137] *Earmold Technics* (Wkładki douszne); 5h.

[Edu138] *Hearing Aid Fitting* (Dobór aparatów słuchowych); 34h.

[Edu139] *Aural Rehabilitation* (Rehabilitacja); 7h.

[Edu140] *Elements of Psychology* (Elementy psychologii); 6h.

[Edu141] *Sign Language* (Język gestów); 6h.

3.5. International co-operation

[Edu142] SOCRATES Programme: **Higher Education**.
T. Kosiło, Ph.D., T. Buczkowski, Ph.D.
1999-2003

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

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

In both cases the Student Mobility actions were realised 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 (J. Olejniczak, T. Szymański);
- Portugal-Poland; two students for 6 months (L. Borges, J, Santos);
- Poland-Belgium; two students for 4 months (P. Kacprzyk, M. Burczyński);
- Belgium-Poland; two students for 4 months (R. Brondeel, J. Vanhoutte).

The B.Sc. theses have been positively recognized in Belgium.

In the frame of cooperation with Belgium "teaching staff mobility of short duration action" (Socrates code 06.05) was also realised.

- Belgium-Poland; one lecturer for one week;
- Poland-Belgium; one lecturer for one week.

4. RESEARCH PROJECTS

4.1. Projects granted by the University

Statutory projects

[Pro1] **Modern Techniques in Nuclear and Medicine Electronics** (Nowoczesne techniki elektroniki jądrowej i medycznej). **Zdzisław Pawłowski, Ph.D., D.Sc.** M. Kazubek, E. Piątkowska-Janko, R. Szabatin, P. Bogorodzki, P. Brzeski, G. Domański, T. Jamrógiewicz, B. Konarzewski, J. Marzec, T. Olszewski, L. Padèe, A. Przelaskowski, D. Radomski, W. Smolik, K. Zaremba, P. Boniński, R. Kurjata, M. Orzechowski, A. Trybuła, T. Wolak, A. Wróblewska 05.06.2002 - 15.10.2003

- *The analysis of optical tomography techniques in medicine*

The analysis of optical imaging techniques in medicine with emphasis on image reconstruction methods was presented. The review of applications of optical methods in different medical fields and results of comparative investigations of optical tomography properties were presented. The qualitative and quantitative analysis of image reconstruction methods in diffusive optical tomography was made in the work. The results of investigation of light transmission in layered biological objects were presented. The two papers - construction and development of laboratory optical tomograph and apparatus for superficial light scattering measurements presented during the XIIIth National Scientific Conference on Biocybernetics and Biomedical Enginering are the integral part of this report.

- *System for simultaneous registration and analyses of high resolution ECG signals*

A construction of modern equipment for registration of signals in high resolution ECG was the main purpose of this research study. The algorithm of evaluation of electrical instability of the atrium in a patient with hypertension was evaluated. By the echocardiography measurements of the geometry of left ventricle, patients were divided into 4 groups: normal, concentric remodeling, concentric and eccentric. The conference papers were prepared as a result of this study.

- *Optimization of methods for microcalcifications and spicules recognition in mammographic images*

Presented topic is a new stage of research in Image and Signal Processing Group. Due to the fact that microcalcifications are one of more important signs enabling the detection of breast cancer at an early stage, the goal of the research was designing and realization of a system for the automatic detection and classification of microcalcifications. The first step of the detection algorithm is to segment out the individual potential microcalcifications. This is achieved by applying opening by reconstruction top-hat technique and image thresholding based on approximation of an image local histogram with a probability density of Gauss distribution. Selected features of the segmented out objects are used as inputs to a neural network. The algorithm results are locations of suggested microcalcifications and optionally automatic diagnosis. The presented form of the system was verified in clinical tests using diagnosed databases (DDSM, digitized database from Wolski Hospital) after consultations with doctors. One also evaluated the Learning Vector Quantization algorithms in automatic feature selection and classification of microcalcification in mammographic images and comparison classification efficiency of LVQ to common applicable backpropagation neural network. The new feature selection method, based on the LVQ and Fisher discriminant criterion, was suggested. The usefulness of the selected features for classification was verified. The achieved results show the usefulness of the previously suggested methods in digital mammography.

- *High resolution capacitance tomograph*

Electrical Tomography ranks nowadays among areas of rapid development in tomographic techniques. The hardware design described here is the first capacitance tomograph designed and manufactured in Poland, at the Warsaw University of Technology, Institute of Radioelectronics. The sensing part of the tomograph consists of a set of electrodes placed around a cylindrical probe. The number of electrodes is 12 to 32 for various probe implementations. The measuring system consists of 32 transmitting circuits, 32 amplifying paths, 16-bit analog-to-digital converter. The circuits are controlled by a digital system, employing programmable devices (PLD). Measurement results are processed and visualized in the form of a reconstructed image on a personal computer, connected with the tomograph by a RS-422 or RS-232 interface. Modern digital and analogue technologies made it possible to obtain high sensivity of the tomograph. The relative root mean square error of the measured data is 0,025% for signals received from individual channels.

[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 05.06.2002 - 15.10.2003

Primary topics included in the statutory grant are as follows:

- design, construction and investigation of active subwoofer for home cinema multichannel sound systems;
- new type distributed mode loudspeaker (DML) examinations and measurements;
- design and tests of laboratory stands for loudspeaker measurements in reverberation circumstances by the use of gating techniques;

- design, computer simulation and implementation of 3-way loudspeaker crossover network on the SHARC 21065L digital signal processor evaluation of the measuring program for sampling jitter components in D/A converters based on spectral analysis.

[Pro3] **Modern Radiocommunication Systems – Selected Problems** (Współczesne systemy radiokomunikacyjne - wybrane problemy).
Tomasz Kosiło, Ph.D.
T. Buczkowski, J. Cichocki, H. Chaciński, K. Czerwiński, F. Alwafie, D. Grabowski, J. Guterman, D. Janusek, J. Jarkowski, W. Kazubski, J. Kołakowski, S. Maszczyk, K. Radecki, K. Snopek, Z. Walczak, J. Wojciechowski, S. Żmudzin
05.06.2002 - 15.10.2003

The study work "Modern radiocommunication system – selected problems" realized by the Radiocommunications Group of the Institute of Radioelectronics was focused on four different 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 points 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, comparing to the other published methods.

2. *Problems and methodology of measurements of UMTS mobile stations*.
The project dealt with methods for measurements of UMTS mobile stations. The scope of the project covered:

- analysis of requirements concerning UMTS mobile station,

- formulation of basic requirements concerning measurement arrangements,

- evaluation of the possibility of UMTS mobile testing in the Institute of Radioelectronics,

- experiments focused on WCDMA signal generation.

Within the frames of the project a device with software supporting generation of UMTS UTRA FDD base station test signals was developed. The solution was based on TMS320C6711 signal processor evaluation module. Acquired know-how allows for further development of investigations and didactic activity in the area of UMTS systems.

3. *Selected problems of short radio links application*.
The project was concerned with the indoor propagation analysis and modelling in the frequency range appropriate for short radio links. The second area of interests covered the application of such radio links for the 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.

4. *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 to real time measurements with high precision because of complicated correlation calculations. Because of today's technology development new ideas in that field are possible. The possibilities of building such radars as multiradars and radar networks were analysed. The accuracy of object localisation methods using correlation methodology in network multiradars was prepared.

[Pro4] **Modern Methods of Analysis and Designing of Microwave Devices** (Nowoczesne metody analizy i projektowania układów mikrofalowych).
Tadeusz Morawski, Prof., Ph.D., D.Sc.
J.Zborowska, S. Rosłoniec, W. Gwarek, W. Wojtasiak
05.06.2002 - 15.10.2003

Methods of designing analog phase modulators with varactor diodes, operating with extremely broadband, even of decade, frequency band have been elaborated. Numerical methods (finite difference) of solving Laplace equation and computing the characteristic impedance of different types of TEM lines have been worked out.
Divergence conservation properties in numerical simulations of microwave problems connected with computing parameters of antennae and resonator have been considered. The electro-termal model of power microwave transistor LDMOS has been elaborated.

[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
05.06.2002 - 15.10.2003

The main objectives of the project are related to the design and implementation of new algorithms for the 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 the 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. The results of the research accomplished have been partially published in 4 papers.

[Pro6] **Modelling, Analysis and Optimisation of Resonant dc/dc Converters with Synchronous Controllable Class DE Rectifier** (Modelowanie, analiza i optymalizacja rezonansowych prze-twornic napięcia stałego z regulatorami synchronicznymi).
Jan Ebert, Prof., Ph.D., D.Sc.
M. Mikołajewski, J. Modzelewski, A. Wajs
05.06.2002 - 15.10.2003

The project concerns analysis and optimization of resonant dc/dc converters with Class D_{ZVS} amplifier and synchronous regulators. A theoretical model of a complete dc/dc converter with synchronous controllable Class DE rectifier has been proposed. The model comprises operation of the converter in output voltage stabilization mode as well as an essential influence of the regulator on operation of Class D_{ZVS} amplifier. Theoretical results of the model analysis allow further optimizing of the converter. To verify the results of the analysis a laboratory model of the resonant dc/dc converter was built and tested. The converter operated at the constant frequency f=1MHz with maximum output power 150W/48V and efficiency 91%.

[Pro7] **Modern Methods of Computer Measuring Systems Designing** (Nowo-czesne metody projektowania rozpro-szonych systemów pomiarowych).
Wiesław Winiecki, Ph.D., D.Sc.
K. Mroczek, P. Bilski, T. Daniluk, R. Łukaszewski
05.06.2002 - 15.10.2003

Application of modern program technologies for distributed measuring systems designing was considered. Time features of integrated software environments ISE (LabView, LabWindows/CVI, VEE) in measuring systems designing were investigated. Time of some basic procedures performance was examined and compared. Influence of the ISE for time execution of measuring systems software was found and described. Possibilities of time optimisation of measuring systems were shown.

Possibilities of the usage of modern communication technologies for distributed measuring systems designing were investigated. Remote, wireless controlling of distributed virtual instrument (DVI) using GSM mobile phones was considered. A new concept of DVI that allows controlling measurement procedures from GSM mobile phone was proposed. Reduction of client computer to GSM phone as a mobile, small terminal is the main advantage of the proposal. A prototype of a wireless DVI was designed and investigated to verify the concept of virtual instrumentation. The instrument was provided for climate measurements. New prospects for distributed measurement systems (DMS) introduced by the Java 2 Micro Edition (J2ME) programming

technology embedded in portable information devices such as mobile phones were considered. A brief comparison with existing solutions was presented, a concept of a 2JME-based wireless DMS was proposed. The results of the work were presented in three conference papers and two raports.

[Pro8] **Investigations of Selected Wireless Communication Systems in ISM Band and Satellite Systems** (Badanie wy-branych systemów łączności bezprzewo-dowej w paśmie ISM oraz systemów satelitarnych).
Józef Modelski, Prof., Ph.D., D.Sc.
K. Kurek, T. Keller
05.06.2002 - 15.10.2003

Nowadays rapid development of wireless communication systems is observed: cellular systems (GSM, UMTS), WLANs (IEEE 802.11, HIPERLAN), short-range connectivity systems (Bluetooth, HomeRF), satellite systems. Part of these systems (i.e. IEEE 802.11, Bluetooth) works in public ISM bands, so the problem of intersystem interferences is important.

The project presents the experimental analysis of coexistence of communications systems working in 2.4 GHz ISM band, considering interferences between Bluetooth and WLAN IEEE 802.11 systems for different scenarios. The analysis of the directions of satellite communications systems development has also been presented.

[Pro9] **Web Services in MPEG-7 and MPEG-21 Applications** (Serwisy sieciowe w aplikacjach MPEG-7 i MPEG-21).
Andrzej Buchowicz, Ph.D.
K. Ignasiak, W. Skarbek, G. Galiński, P. Bobiński, M. Łempkowski, K. Wnu-kowicz, T. Keller, R. Seta, E. Snitkowska
05.06.2002 - 15.10.2003

There is a new technology called web services created to overcome limitations of the already existing solutions used in distributed systems. They are based on several widely accepted standards:

- SOAP defining data transmission protocol independent of the hardware and software platform;
- WSDL defining XML document which contains the complete technical service specification;
- UDDI and ebXML registries allowing for service registrations and discovery.

MPEG-7 is a new standard for describing multimedia content data. MPEG-21 standard aims at defining a normative open framework for multimedia delivery and consumption.

The objective of this project was to design a general framework for distributed application utilizing MPEG-7 and MPEG-21 descriptors for indexing multimedia data and test it in practice

The test application based on this design has been written in Java language with the use of Java Web Service Developer Pack from Sun Microsystems, Inc. The Color Temperature Descriptor has been implemented and used for contents based search of multimedia data. The results proved the correctness of the design.

Projects granted by the Rector

[Pro10] **Application of the Wavelet transform for Reduction of Narrowband Interference in CDMA Systems** (Wykorzystanie transformacji falkowej do eliminacji zakłóceń wąskopasmowych w systemach CDMA).
Jacek Wojciechowski, Prof., Ph.D., D.Sc.
S. Maszczyk
16.06 - 31.12.2003

The project concerns the method of reduction of narrowband interference in DSSS CDMA (*Direct Sequence Spread Spectrum Code Domain Multiple Access*) systems. The proposed algorithm is based on OWT *(Overcomplete Wavelet Transform)* and is realized in three main steps: decomposition, thresholding, and reconstruction. The method for threshold value determination based on CCDF *(Complementary Cumulative Distribution Function)* calculated for wavelet coefficients was also proposed. Investigations of algorithms proved their good efficiency.

[Pro11] **Project of Location System for YES2 Capsule** (Projekt systemu lokalizacji kapsuły satelitarnej YES 2).
Krzysztof Kurek, Ph.D.,
16.06 - 31.12.2003

YES2 (Young Engineers Satellite 2) „Space Mail" is an educational project for students, supported by the European Space Agency, that demonstrates the possibility of use of a tether system with inflatable capsule to return from space to Earth.
In this work the project and realization of system to locate YES2 capsule after its landing on Earth have been done. The system uses 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.

[Pro12] **Next Generation Radio Systems** (Systemy radiowe przyszłych generacji).
Józef Modelski, Prof., Ph.D., D.Sc.
J. Wojciechowski, J. Cichocki, Y. Yash-chyshyn, J. Kołakowski, T. Keller, K. Kurek, P. Majchrzak, S. Maszczyk, N. Minh, R. Pączkowski, K. Płatek, G. Radzikowski, T. Szymański, A. Trojanowski
09.07 - 31.12.2003

New radio communication systems (cellular systems: GSM, UMTS; WLANs: IEEE 802.11, HIPERLAN; short-range connectivity systems: Bluetooth, HomeRF) allow to realize new wideband services in new frequency bands. Within the design and implementation of these systems new problems (associated with variable number of users, their location and demand on services; intersystem interferences, interfaces between systems) have to be solved.
In this work analysis and verification of technical aspects of new radio communication systems have been done, considering:

- ultra-wideband systems UWB – their influence on GSM system;

- wireless personal area networks WPAN – possible applications and interfaces to wired systems;
- ultra-wideband intelligent antennae – antenna arrays using non-periodical radiators location and multilayer structures;
- packet cellular networks – influence of multipath propagation, conception of e-money and micro-payment protocols in such networks;
- OFDM systems as access networks.

[Pro13] **Metadata Normalization in Monitoring Systems Based on MPEG-7 Standard Extensions** (Normalizacja meta danych w aplikacjach monitoringu jako rozszerzenie standardu MPEG-7).
Władysław Skarbek, Prof., Ph.D., D.Sc.
A. Buchowicz, G. Galiński, K. Ignasiak, M. Rusin, S. Barański, P. Bobiński, K. Kucharski, G. Pastuszak, A. Świercz, K. Wnukowicz
09.07 - 31.12.2003

The aim of the project was to identify data types collected in typical monitoring and surveillance systems. Description of such data is called metadata which occupy much less storage than original data. Nevertheless standardised description of these data allows to integrate monitoring and surveillance systems with other services, in particular those implemented as *web services*.
The work resulted with XML Schema description of metadata and database schema for monitoring and surveillance systems. It has been also confirmed that *web services* are useful as an architecture of monitoring systems. The *web services* make it easy to integrate a number of software modules prepared for different platforms using different software tools.
A generic monitoring application was created with the use of identified metadata. The application allows to recognize faces in pictures acquired by the camera. The client application extracts the face descriptor, sends it to the server. The server searches the database for the most similar face stored in it. The search result is sent back to the client, which presents it. The communication between software modules uses SOAP protocol – the basic communication protocol in *web services*.

[Pro14] **Selected Numerical Methods with Applications in Engineering Tasks** (Metody numeryczne z przykładami zastosowań w zadaniach inżynierskich).
Stanisław Rosłoniec, Prof., Ph.D., D.Sc., B. Galiński, W. Gloger
09.07 - 31.12.2003

The proposed book presents fundamental numerical methods most frequently applied in engineering design and scientific analysis. The scope of the methods and related computational algorithms being considered are presented in detail in the Polish language contents of the book. The basic approach assumed in the book is that numerical methods are presented along with the key mathematical formulae relationships necessary for the development of useful for practice computational algorithms. In most cases these relationships are evaluated step by step from end to end and illustrated by appropriate "important for practice"

examples of calculations. Emphasis is placed on understanding why numerical methods work and on their various applications. Due to didactic approach the proposed book may be useful as a handbook for undergraduate students in mathematics, science and engineering, as well as professionally different enginering personnel. It is especialy recommended for students of electrical depertments of technical universities and engineering colleges.

Projects granted by the Dean

[Pro15] **Research Stand of Optical Tomography** (Stanowisko badawcze tomografii optycznej).
Grzegorz Domański, Ph.D.
Z. Pawłowski, R. Kurjata, B. Konarzewski, J. Marzec, K. Zaremba, T. Jamrógiewicz, E. Piątkowska-Janko, M. Kazubek, A. Trybuła
10.07.2002 - 31.05.2003

The research stand of diffuse optical tomography consisting of developed laboratory optical tomograph with fixed geometry and a PC computer was constructed. The development station was supported by the system for measurement of light distribution in biological tissue. The analysis of usefulness of particular groups of image sensors (p-n, photodiodes p-i-n photodiodes, photomultipliers, CCD matrices and CIS matrices) and light sources (for visible and near-infrared light) for diffuse optical tomography was carried out. The optimization of reconstruction process was performed. The evaluation of usefulness of particular systems for medical diagnostics (functional examination of tissue and organs, especially oxygenation measurement) and industry applications (optical homogeneity measurements of small cylindrical objects, transport phenomena research in pipes, boiling processes research) was carried out. A number of software tools for light propagation in biological tissue simulation was developed. The innovative method, joining advantages of nodal and Monte Carlo methods was proposed. Efficient, reliable and immune to noise algorithm for image reconstruction was used. The algorithm enables including of *a priori* information from another modality into reconstruction process. This will facilitate a new tomographic system design with better spatial resolution than present optical tomography systems.

[Pro16] **Elaboration of the Audio Test Signals and CD Test Design for Investigation and Rehabilitation of Autistic and Retarded Children** (Opracowanie sygnałów testujących i wykonanie płyty testowej CD do badań i rehabilitacji dzieci autystycznych i upośledzonych).
Andrzej Leszczyński, Ph.D.
R. Smoliński, H. Siedlecka
10.07.2002 - 31.05.2003

As a consequence of the previously finished works, the scope of the present one is to deliver a multimedia tool for investigation and rehabilitation of autistic and retarded children exhibiting different

hearing loss. Following the latest trends in children audiology, the elaborated tests are dealing with the sounds of natural environment, wild animals and environmental water. As a result, three CD discs have been worked out. The discs have been preliminarily investigated by audiology and pedagogy specialists. After some improvements the tests were used for behavioral tests of the group of several children with childish autism and hearing impairment. Finally, the results of the investigations have been registered with a DV video camera and are briefly commented in the paper.

[Pro17] **Investigation and Optimization of One- and Few-Bit Dithered Delta-Sigma Modulators for Digital Audio Applications** (Badania symulacyjne i optymalizacja modulatorów delta-sigma z ditherowanymi kwantyzatorami przeznaczonymi do cyfrowych systemów fonicznych).
Zbigniew Kulka, Prof., Ph.D., D.Sc.
10.07.2002 - 15.11.2003

The project presents time performance investigation results based on computer simulations of one- and few-bit different orders delta-sigma modulators used in the a/d and d/a audio converters. In the first part of the work, simulations were focused on time responses of modulators stimulated by the sinusoidal signals in steady-state conditions, i.e. after certain number of signal periods performed in relation to the moment of signal delivery to the modulator's input. As the main conclusion, it has been shown that group delay fluctuations exist with amplitude correlated with the period of stimulated signal and inversely proportional to its slew rate. In the second part of the work, the influence of the dither signal on the group delay magnitude fluctuations of the modulators has been analysed first. As observed, dithering increases the maximum range of group delay fluctuations. Next, relations between mean value of the modulators group delay and input signal frequency as well the modulators state variables were investigated. The state variables of the modulators were established statically, slow-variably and dynamically by imposing on the modulator's sinusoidal input signal (a simple ton) respectively d. c. component, triangular waveform and step signal with suitable chosen magnitudes. As supposed, the nonstationary structures of delta-sigma modulators demonstrate the group delay fluctuations in the function of the frequency and temporary amplitude value of the input signal as well as in the function of the modulator's state (state variables). These fluctuations are bigger for one-bit modulators and smaller for few-bit modulators. Moreover, they are also dependent on the type of the loop filter (FIR, IIR) and its order. The simulation results implicate that group delay fluctuations of the delta-sigma modulators may be responsible for subjectively perceived sound changes during recording and playing back the music signals by using systems equipped with one-bit or few-bit delta-sigma audio converters.

[Pro18] **Application of DSP Techniques for Generation and Analysis of Wideband Radio Emissions** (Wykorzystanie

technik DSP do analizy i generacji szerokopasmowych emisji radiowych).

Jerzy Kołakowski, Ph.D.

J. Cichocki, K. Radecki, S. Maszczyk

10.07.2002 - 15.11.2003

The project was focused on development of methods and software for generation, acquisition and analysis of wideband radio emissions using DSP techniques. The scope of the project was extended to preliminary investigation of UWB signals. Within the frames of the project the following tasks have been performed:

- development of computer models of UWB signals,
- development of prototype equipment for generation of UWB signals with PPM modulation,
- development of software for acquisition of wideband signals with the use of FPGA/DSP modules,
- investigations of UWB signal influence on quality of QPSK signal reception.

Developed software has been implemented in TMS320C6711, AED-101 and APS-240-XCV300 DSP and FPGA modules.

[Pro19] **Design of the Topography of the Integrated Circuit for the Read-out System of Gas Detectors Used in the High-Energy Physics Experiments** (Opracowanie topografii układu scalonego do odczytu danych z detektorów gazowych dla eksperymentów fizyki wysokiej energii).

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

Z. Pawłowski, J. Marzec, B. Konarzewski, G. Domański, W. Kuźmicz, E. Piwowarska, W. Pleskacz

10.07.2002 - 15.11.2003

The project was realised as a continuation of the Dean's grant carried out by the teams from the Institute of Radioelectronics and the Institute of Microelectronics and Optoelectronics in the year 2002. The final goal of the long-term collaboration of both institutes consists in the design and industrial application of a new type of the integrated circuit for the "front-end-electronics" of straw chambers - radiation detectors widely used in the high-energy physics experiments. This chip, called IRIMIO, consists of eight independent, identical channels. Each of them contains a charge preamplifier, "tail cancellation" circuit, base-line restorer and discriminator. A fully functional, technological design of the chip has been made in the frames of the present project. The authors are going to continue the project in the frames of the international collaboration with the members of the high - energy experiment COMPASS at CERN.

[Pro20] **Low-power Long-range Adaptive AM-Transmitters with Feedback Channels** (Opracowanie taniego, adaptacyjnego nadajnika/odbiornika AM o małej mocy i rozszerzonym zasięgu transmisyjnym).

Wiesław Winiecki, Ph.D., D.Sc.

A. Płatonow, H. Chaciński, R. Łukaszewski, T. Daniluk

10.07.2002 - 15.11.2003

The principles of construction of simple, cheap and low-energy AM-transmitters for a long-range reliable communication between the distant radio-sensors and base-station (BS) in wireless automatic data acquisition and monitoring systems have been developed. The extension of transmission range is achieved by using high-quality feedback channel, special class of data-processing algorithms and adaptively adjusted AM-modulator. Optimal combination of these factors provides the system with the properties of an ideal transmission system. The proposed solutions guarantee full utilization of the resources of the analogue and digital blocks of both direct and feedback channels that can be done in the simplest way, without coding. Simulations and laboratory experiments confirm analytically predicted effects.

[Pro21] **Lumped Circuit Model of Magnetized Ferrite Medium Corresponding to the Polder's Tensor and its Applications in FDTD Simulations** (Opracowanie skupionego schematu zastępczego ośrodka ferrytowego odpowiadającego tensorowi Poldera i zbadanie możliwości jego zastosowania w symulacjach FD-TD).

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

A. Moryc

15.07 - 31.12.2003

A new model of magnetized ferrite medium has been developed. Its advantage lies in the possibility to investigate separately dispersion and anisotropic properties. The frequency domain characteristics of the model have been found to be in full agreement with the Polder's theory. The model has been implemented in a 3D electromagnetic FD-TD code and verified against a benchmark known from literature – a rectangular waveguide partially filled with magnetized ferrite. The simulation results have been compared with results previously published by other authors. A paper describing this work has been accepted for publication in *IEEE Microwave and Wireless Components Letters*.

[Pro22] **Workstation for Co-operation with Ultrasound Scanners** (Stacja robocza do współpracy z aparatami ultrasonograficznymi ImagePoint).

Marian Kazubek, Ph.D.

A. Przelaskowski, T. Jamrógiewicz, L. Padèe, P. Boniński, A. Wróblewska

15.07 - 31.12.2003

We developed software to deal with specialized ImagePoint ultrasound scanner database. This software makes it possible to access and converge image data acquired by the scanner into several popular formats. Thus, there is possibility to extend built-in image processing techniques. A method for cardiac ejection fraction segmentation from ultrasound images was proposed. We treat hand-made contour as a starting point for our method, which is based on an effective active contour method. Moreover, we evaluated a new denoising method proposed by M. Kazubek. That method is based on Wiener filtering in wavelet domain with context tresholding as a pre-processing step.

[Pro23] **Digital Audio Workstation Based on the Linux Operation System** (Cyfrowa stacja robocza do zapisu i obróbki dźwięku oparta na systemie Linux).
Andrzej Leszczyński, Ph.D.
M. Kostrzewa, P. Nykiel
15.07 - 31.12.2003

The introductory part of the work considers general methods of access to the sound interface in PC class computer systems as well as the reasons of their time delay. The different kinds of access delay create errors in the sound reproduction process or the data lost during the sound recording. The main part of the work presents the results of the comparative tests of the efficiency and infallibility of the audio controller's subsystems in the Windows 9x and Linux OS. It has been concluded that the systems do not satisfy high requirements concerning the interrupt handling imposed on Digital Audio Workstations (DAW). Particularly it is not possible to obtain the delay lower than 3 ms, because both systems are not real time systems. The test performed during the work has showed anyway, that the modification of the source code of the Linux Operation System core fairly reduces the dependence of the delay time on the actual load of the system. Finally, other positive features of the DAW working with Linux OS compared to the Windows 9x have been indicated.

[Pro24] **Application of the FDTD Method for Analysis and Design of Dielectric Resonator Antennae** (Zastosowanie metody FDTD do analizy i projektowania anten z rezonatorami dielektrycznymi).
Krzysztof Derzakowski, Ph.D.
15.07 - 31.12.2003

The QuickWave simulator for analysis and design of dielectric resonator antennae has been used. About 50 projects of dielectric resonator antennae have been designed. Results of computations have been analysed and the projects have been optimized. The works has resulted in 50 optimal and universal projects of dielectric resonator antennae. The QuickWave simulator is very good for analysis and design of dielectric resonator antennae.

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

[Pro25] **Application of Novel Software and Communication Technologies in Distributed Virtual Instruments Design** (Wykorzystanie nowoczesnych technologii programowych i komunikacyjnych w projektowaniu sieciowych, wirtualnych przyrządów pomiarowych).
Wiesław Winiecki, Ph.D., D.Sc.
A. Podgórski, T. Kosiło, R.Łukaszewski, M.Karkowski, P. Bilski, R. Leoniak
01.08.2001 - 30.07.2003

The project concerns application of novel software and communication technologies in metrology. Main activity is focused on new kind of measuring virtual instruments, named distributed (or network) virtual instruments. Such instruments can be controlled via wire or wireless networks. The main objectives of the project are related to the application of novel software tools, such as: integrated environments (e.g. LabView, Measurement Studio, HPVEE, Java, C+SCPI, Data Socket, ActiveX, HTML, XML, WML, Flash, i.e.), and novel wire and wireless communication technologies, such as: Internet, GSM, GPRS, WAP, UMTS, Bluetooth, Wireless Ethernet, i.e., in distributed virtual instruments designing.

[Pro26] **New Kinds of Steerable Microwave Antennae with Multilayer Substrate** (Nowe rodzaje sterowanych anten mikrofalowych na podłożu wielowarstwowym).
Józef Modelski, Prof., Ph.D., D.Sc.
1.03.2002 - 28.02.2004
Y. Yashchyshyn, M. Szafran, K. Derzakowski, E. Bobryk, H. Chaciński, M. Piasecki, A. Mędrzak, A. Tomaszewska-Grzęda

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 the permittivity of which can be changed by applying and varying the dc electric field. The permittivity change enables to create different radiation patterns of the microstrip antenna. This permits to use such a substrate in several applications.

[Pro27] **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.
06.05.2002 - 31.12.2004
J. Jarkowski, K. Snopek, G. Hahn

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

[Pro28] **Optimisation Methods in Video Sequence Coders** (Metody optymalizacyjne w koderach sekwencji wideo). Ph.D. Grant.
Władysław Skarbek, Prof., Ph.D., D.Sc.
Piotr Bobiński
17.04.2003 - 16.04.2004

[Pro29] **Analysis of Application Possibilities and Coexistence Conditions for Communication Systems in ISM Band** (Analiza możli-wości stosowania oraz warunków współstnienia systemów łączności w paśmie ISM). Ph.D. Grant.
Józef Modelski, Prof., Ph.D., D.Sc.
Tomasz Keller
17.04.2003 - 16.07.2004

[Pro30] **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.
17.04.2003 - 16.04.2006

[Pro31] **Analysis and Project of a System for Data Transmission from Mini-Satellite** (Analiza i projekt systemu transmisji i przetwarzania danych mini-satelity).
Tomasz Kosiło, Ph.D.
29.04.2003 - 28.12.2004

[Pro32] **Capacitive Process Tomograph** (Pojemnościowy tomograf procesowy).
Roman Szabatin, Ph.D.,
P. Brzeski, J. Mirkowski, T. Olszewski, W. Smolik
15.10.2003 - 14.10.2005

[Pro33] **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., Ph.D., D.Sc.
Marcin Piasecki
28.10.2003 - 27.10.2004

[Pro34] **Electrical-Thermal Modelling of Microwave Power Transistors** (Elektryczno-termiczne modelowanie mikrofalowych tranzystorów mocy).
Wojciech Wojtasiak, Ph.D.
05.11.2003 - 04.02.2006

[Pro35] **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

[Pro36] **Hierarchical Statistic Modelling of Disease Process with Complex Etiology** (Hierarchiczne modelowanie statyczne procesu chorobowego o złożonej etiologii).
Dariusz Radomski, Ph.D.
05.11.2003 - 04.05.2006

4.3 Other projects

[Pro37] **Designing of Technical and Economic Analysis Regarding the Introduction of GSM-R System at E-20 Railway Line** (Opracowanie analizy techniczno-ekonomicznej dotyczącej wdrożenia systemu GSM-R na linii kolejowej E-20).
Tomasz Kosiło, Ph.D.,
02.12.2002 - 15.01.2003
Funded by Railways Telecommunications Ltd. (Telekomunikacja Kolejowa, sp. z o.o)

The main subject of the study is to define a configuration and costs of the GSM-R for the Polish railway network. The structure of the line has been defined. Then the implementation cost of GSM-R network has been calculated.

[Pro38] **20 W T/R Modules Design and Perform at C Band** (Opracowanie i wykonanie modeli modułów nadawczo-odbiorczych o mocy 20 W na pasmo C).
Wojciech Wojtasiak, Ph.D.,
D. Gryglewski, T. Morawski
30.05 - 30.11.2003
Funded by Industrial Institute of Telecommunications (Przemysłowy Instytut Telekomunikacji).

The 20 W, C band T/R module for active phased array radar was designed. The low-cost and miniature T/R modules with internal supply block were manufactured.

[Pro39] **8900 - 9500 MHz Frequency Meter Design and Perform** (Opracowanie i wykonanie częstościomierza w zakresie częstotliwości od 8900 MHz - 9500 MHz).
Wojciech Wojtasiak, Ph.D.,
D. Gryglewski, M. Lubiejewski
11.03.2002 - 15.04.2003
Funded by Faculty of Physics, Warsaw University of Technology (Wydział Fizyki Politechniki Warszawskiej).

The goal of this project was to design 8900 - 9500 MHz frequency meter. Application of new components required working out method for project designing. It was the main subject of this work.

[Pro40] **Design of the Technical Documentation and Two Prototypes of Multichannel Electronic Capacitance Meter for Oil, Water, Gas and Solid Suspension Separation Study** (Opracowanie dokumentacji technicznej oraz wykonanie dwóch prototypowych egzemplarzy wielokanałowego, pojemnościowego układu pomiarowego do badania procesów w przepływowym separatorze mieszaniny ropy, gazu, cieczy i zawiesiny stałej - etap IV).
Roman Szabatin, Ph.D.
W. Smolik, J. Mirkowski, T. Olszewski, P. Brzeski
31.03 - 24.04.2003
Funded by MIKROMAX Ltd.

The aim of this project was to elaborate the technical documentation of multichannel electronic

capacitance meter in order to confirm suitable conditions of its work.

[Pro41] **Design, Verification and Implementation of Extended Functional Capabilities of Stationary Directional Finding System** (Opracowanie, weryfikacja i wdrożenie koncepcji rozszerzenia możliwości funkcjonalnych oraz metrologicznych stacjonarnego systemu namierzania źródeł emisji radiowych).
Jacek Cichocki, Ph.D.
J. Kołakowski, S. Maszczyk
27.10.2003 - 15.12.2003
Funded by Office of Telecommunications and Post Regulations (Urząd Regulacji Telekomunikacji i Poczty)

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

[Pro42] **Measurements of Noise Emitted by Computer Systems** (Pomiary hałasu wytwarzanego przez systemy i podzespoły komputerowe).
Zbigniew Kulka, Prof., Ph.D., D.Sc.
02.01.2002 - 30.06.2003
Funded by Axel Springer Ltd.

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

[Pro43] **Construction of Two Converters** (Wykonanie dwóch konwerterów).
Wojciech Wojtasiak, Ph.D.
D. Gryglewski, M. Lubiejewski, R. Michnowski
10.10.2003-17.02.2004

Funded by 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 research results to be performed for the Regional Telecommunication Networks.

[Pro44] **Functional Investigations, Testing and Analysis of Technical State for Three Inefficient AP1 Units with Designing of Programme and Methodology** (Przeprowadzenie badań funkcjonalnych oraz wykonanie ekspertyzy i analiz stanu technicznego serii trzech niesprawnych zespołów AP1 wraz z opracowaniem metodyki usprawnienia zespołów).
Krzysztof Kowalski, Ph.D.
05.11.2003 - 28.11.2003
Funded by the Military Institute of Armament Technology (Wojskowy Instytut Techniczny Uzbrojenia).

Three specialised units have been developed, designed and constructed.

[Pro45] [**Functional Investigations of AP-2 Units, Analysis of Results and Design of Their Predictable Durability** (Przeprowadzenie badań funkcjonalnych zespołów AP-2 oraz wykonanie analizy uzyskanych wyników i opracowanie prognozy trwałości zespołów tego typu).
Krzysztof Robaczyński, M.Sc.
27.11 - 10.12.2003
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.

4.3. International co-operation

Pro46] **COMPASS Experiment at CERN - Design of the Apparatus, Collecting and Analysis of Data** (Eksperyment COMPASS w CERN-ie - Budowa aparatury, zbieranie i analiza danych).
Krzysztof Zaremba, Ph.D., D.Sc.
(Partially funded by KBN)
Z. Pawłowski, J. Marzec, B. Konarzewski, G. Domański, A. Padèe, R. Sulej
01.01.2001 - 31.12.2003

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). The project deals with the design and optimisation of the straw chambers, which are the main component of the large area tracking system in the experiment, as well as with the design of the read-out electronics for these detectors. Group from the Institute is also responsible for the performance of chambers and electronics in terms of the noise and electromagnetic interference pick up. The Institute is also involved in the applications of the „soft computing" methods (neural networks, genetic algorithms etc.) in the experimental data analysis.

Pro47] **Perfusion Monitoring System for Controlling of Surgical, Interventional and Pharmacological Treatments** (System monitorowania perfuzji podczas zabiegów chirurgicznych interwencyjnych i farmakologicznych).
Piotr Bogorodzki, Ph.D.
A. Piątkowski, E. Piątkowska-Janko
01.01.2001 - 31.12.2003
EUREKA - PERMON
Project No. 2427
(Partially funded by KBN)

The goal of the project is to design a radiological imaging system capable of quantitative monitoring organ flow/perfusion. This information is essential for the improvement of several surgical (including minimal invasive intervention procedures) and pharmacological treatment techniques so that they will be generally less costly and less traumatic to the patient, involving smaller incisions, less pain, and shorter hospital stays.

Pro48] **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.

Pro49] **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

Pro50] **Enhanced Optimisation of Microwave Thrawing 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 - 31.21.2003

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

Pro51] **Networked Audiovisual Media Technologies**
Władysław Skarbek, Prof., Ph.D., D.Sc.
K. Ignasiak, A. Buchowicz, G. Galiński, P. Bobiński, K. Kucharski, K. Wnukowicz
Sieć Doskonałości, VISNET (Network of Excellence, VISNET)
6 Program Ramowy (6th Framework Programme): "Integrating and Strenghtening the European Research Area (2002- 2006)"
01.12.2003 - 30.11.2005

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
(Partially funded by KBN)
01.01.2003 - 01.01.2005

The project is 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.

5. TITLES AND DEGREES AWARDED

5.1.Professor Titles

[Prof1] Władysław Skarbek - promoted to a professor title (Jul. 7, 2003).

5.2. D.Sc. Degrees

[DSc1] Janusz Marzec: *"Wielkopowierzchniowe detektory śladowe w eksperymentach fizyki wysokich energii"* (Large Area Trackers in HEP Experiments), Warsaw, Nov. 4, 2003.

[DSc2] Wiesław Winiecki: *"Wirtualne przyrządy pomiarowe"* (Virtual measuring instruments), Warsaw, Nov. 18, 2003.

[DSc3] Krzysztof Zaremba: *"Wybrane radiacyjne metody badania składu tkanek i płynów ustrojowych"* (Chosen radiational methods of tissue and body fluids composition measurements), Warsaw, Feb. 18, 2003.

5.3. Ph.D. Degree

[PhD1] Grzegorz Galiński: *"Detekcja i indeksowanie ruchu w sekwencji obrazów"* (Motion detection and indexing in image sequence), Prof. **W. Skarbek** (tutor), Warsaw, Jan. 17, 2003.

5.4. M.Sc. Degrees

[MSc1] Jarosław Amerek: *"Analiza i badanie sterowanych mikropaskowych przesuwników fazy na podłożu ferroelektrycznym"* (Analysis and investigations of tunable microstrip line phase shifters based on ferroelectric substrate), Assist. Prof. **Y. Yashhyshyn** (tutor), (5).

[MSc2] Michał Andruszkiewicz: *"Projekt i wykonanie zestawu głośnikowego"* (The design and construction of the loudspeaker system), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4.5).

[MSc3] Konrad Bałabuch: *"Wykorzystanie sprzętowego kodera MPEG do transmisji sygnału wideo z użyciem JMF"* (Using a hardware MPEG encoder for transmission of a video stream with JMF package), Assist. Prof. **K. Ignasiak** (tutor), (4.5).

[MSc4] Grzegorz Bednarek: *"Aplikacja bankowa na karcie SIM dla GSM"* (Bank application on a SIM card for the GSM network), Prof. **J. Wojciechowski** (tutor), (5).

[MSc5] Sławomir Bieńkowski: *"Systemy wewnątrzbudynkowego pokrycia sygnałem GSM"* (GSM indoor coverage systems), Assist. Prof. **K. Czerwiński** (tutor), (4).

[MSc6] Dariusz Bis: *"Metody klasyfikacji we wspomaganiu diagnostyki nowotworów techniką płytek genowych"* (Classification methods supporting tumor diagnostics by the Gene Chip Microarray Technology), Assist. Prof. **B. Konarzewski** (tutor), (5).

[MSc7] Piotr Błaszczyk: *"Projektowanie modułów nadawczo-odbiorczych do WLAN w pasmie UNII"* (Design of T/R modules to WLAN at UNII band), Assist. Prof. **W. Wojtasiak** (tutor), (5).

[MSc8] Waldemar Brzozowski: *"Lokalizacja stacji ruchomej w sieciach telefonii komórkowej"* (Localization of mobile devices in Cellular Radio Networks), Assist. Prof. **K. Czerwiński** (tutor), (4).

[MSc9] Michał Burczyński: *"High voltage technology 13T80 - test chip"* (Technologia wysokiego napięcia 13T80 - układ testowy), Assist. Prof. **T. Kosiło** (tutor), (5).

[MSc10] Jacek Cholewa: *"Analogowa modulacja amplitudy realizowana metodami cyfrowymi"* (Implementation of amplitude modulation with the use of digital signal processing methods), Assist. **H. Chaciński** (tutor), (5).

[MSc11] Paweł Czarnociński: *"Ocena zrozumiałości mowy w nausznikach przeciwhałasowych pod kątem bezpieczeństwa w hałaśliwym środowisku pracy"* (Speech intelligibillity in noise when wearing ear-muffs - considering safety of work), Assist. Prof. **E. Kotarbińska** (tutor), (5).

[MSc12] Piotr Daniluk: *"Wykorzystanie procesora bitowego VLx w implementacji dekodera w dekoderze JVT"* (Impelementation of binary decoder of JVT stream on VLx binary processor), Prof. **W. Skarbek** (tutor), (4.5).

[MSc13] Adam Dawidziuk: *'Optymalizacja operacji arytmetycznych dekodera JVT w architekturze procesora MAP - CA firmy Equator"* (Optimization of arithmetical algorithms of JVT's decoder for Equator's MAP-CA processor architecture), Prof. **W. Skarbek** (tutor), (5).

[MSc14] Hubert Dąbek: *"Modulacja w kanale transmisyjnym a jakość głosu w systemach telefonii komórkowej GSM"* (Modulation in the transmission channel and its influence on voice quality in GSM mobile systems), Assist. Prof. **J. Jarkowski** (tutor), (4.5).

[MSc15] Tomasz Drozd: *"Zastosowanie filtracji Wienera do estymowania składu substancji chemicznych"* (The application of Wiener filtration for estimation of chemical substance constitution), Assist. Prof. **A. Miękina** (tutor), (4.5).

[MSc16] Krzysztof Dufrěne: *"Real-time RF channel simulation based on digital signal processing"*, Assist. Prof. **J. Kołakowski** (tutor), (5) printed in English.

[MSc17] Serghei Duminov: *"Wykorzystanie lokalnej sieci komputerowej w rozproszonych systemach pomiarowych"* (Using computer network in distributed measurement systems), Assoc. Prof. **W. Winiecki** (tutor), (5).

[MSc18] Marcin Dutka: *"Konwerter protokołów TCP/IP na IEC-625"* (TCP/IP protocols converter at IEC-625), Assoc. Prof. **W. Winiecki** (tutor), (5).

[MSc19] Marcin Floryan: *"Laserowo-dopplerowski pomiar ukrwienia skóry"* (Laser-Doppler measurement of skin blood supply), Assoc. Prof. **K. Zaremba** (tutor), (5).

[MSc20] Tomasz Frączek: *"Dwuzakresowy nadajnik zakłóceń szumowych 900/1800 MHz"* (Noise jamming 900/800 MHz transmitter), Assist. Prof. **W. Wojtasiak** (tutor), (4).

[MSc21] Andrzej Giedzicz: *"System rejestracji danych na potrzeby zintegrowanego zestawu diagnostycznego LEDO"* (Data registration system for the Integrated Diagnostic Kit LEDO), Assist. Prof. **E. Piątkowska-Janko** (tutor), (4).

[MSc22] Marek Gienc: *"Grabber sygnałów wizyjnych"* (Video signals grabber), Asist. **T. Jamrógiewicz** (tutor), (4.5).

[MSc23] Marcin Gurtowski: *"Konwerter częstotliwości sygnałów telekomunikacyjnych"* (Frequency converter for telecommunication systems), Assist. **H. Chaciński** (tutor), (4.5).

[MSc24] Janusz Januszkiewicz: *"Architektura aplikacji biznesowych w oparciu o technologię Java 2 Enterprise Edition 2 z wykorzystaniem serwera aplikacji JBoss"* (Business applications architecture based on the Java 2 Enterprise Edition platform using Jboss server), Assist. Prof. **K. Ignasiak** (tutor), (4.5).

[MSc25] Jarosław Jóźwiak: *"Aplikacja wbudowana z kontrolerem ethernetowym RLT8019AS"* (Embedded device with RTL8019AS ethernet controller), Assist. Prof. **E. Piątkowska-Janko** (tutor), (4.5).

[MSc26] Dariusz Kacprzak: *"Analiza statystyczna i częstotliwościowa zmienności rytmu serca"* (Statistic and frequency analysis of heart rate variability), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).

[MSc27] Grzegorz Kacprzyk: *"Badanie jakości odbioru sygnału wzorca czasu DCF77"* (Research on receiving quality of DCF77 time standard), Assist. Prof. **K. Czerwiński** (tutor), (4).

[MSc28] Paweł Kacprzyk: *"Development of a PC input - output card for motor control"* Assist. Prof. **T. Kosiło** (tutor), (5); printed in English.

[MSc29] Piotr Kantorek: *"Projektowanie bezprzewodowej sieci komputerowej WLAN pracującej wewnątrz budynku"* (WLAN network design for indoor environments), Assist. Prof. **K. Czerwiński** (tutor), (5).

[MSc30] Michał Kasak: *"Analiza warunków akustycznych w reżyserni studia nagrań Zakładu Elektroakustyki - propozycja adaptacji akustycznej"* (Analysis of acoustic conditions in control room at the recording studio of the Electroacoustics Division - proposal of acoustic adaptation), Assist. Prof. **M. Tajchert** (tutor), (4.5).

[MSc31] Jarosław Klaus: *"Analogowy modulator fazy w technice niesymetrycznej linii paskowej z wykorzystaniem diod waraktorowych"* (Analogue phase modulator with varactor diodes in a hybrid technique), Assist. Prof. **J. Zborowska** (tutor), (3.5).

[MSc32] Tomasz Knyziak: *"Badanie przydatności telefonów komórkowych z wbudowaną maszyną wirtualną Java 2 Micro Edition do budowy rozproszonych systemów pomiarowych"* (The research on the suitability of mobile phones equipped with the Java 2 Micro Edition virtual machine for building distributed measurement systems), Assoc. Prof. **W. Winiecki** (tutor), (5).

[MSc33] Dorota Kochanowska: *"Analiza systemów z kolimatorami wielolistkowymi do współpracy z akceleratorami radioterapeutycznymi"* (Analysis of multileaf collimators' systems for collaboration with radiotherapeutic accelerators), Assist. Prof. **W. Scharf** (tutor), (5).

[MSc34] Tomasz Korniluk: *"Korelacyjny (szerokopasmowy) odbiornik pseudolosowego kodu DCF 77"* (Corelation (broadband) DCF 77 pseudo - random code receiver), Assist. Prof. **T. Buczkowski** (tutor), (5).

[MSc35] Krzysztof Kowalczyk: *"Badanie parametrów łaczy telemetrycznych"* (Investigation of telemetry communications), Assist. Prof. **K. Czerwiński** (tutor), (5).

[MSc36] Paweł Kozak: *"Zautomatyzowana detekcja i śledzenie krawędzi w sekwencjach z badań medycznych przy pomocy wybranej metody z rodziny aktywnych konturów"* (Automated detection and following of edges in medical sequences based on a chosen method from the family of active contours), Assist. Prof. **M. Kazubek** (tutor), (5).

[MSc37] Włodzimierz Kozak: *"Analiza sygnału spirometrycznego z wykorzystaniem urządzenia z interfejsem USB"* (Signal analysis in spirometry using USB interface data), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).

[MSc38] Marek Kozicki: *"Projekt i realizacja konwertera częstotliwości próbkowania na procesorze sygnałowym"* (Design and realisation of a sampling rate converter on a digital signal processor), Prof. **Z. Kulka** (tutor), (5).

[MSc39] Marcin Kozioł / Krzysztof Kowalczyk: *"Stymulator mięśni - układ do pobudzania mięśni impulsami prądowymi"* (Electric pulse muscle stimulator), Assoc. Prof. **K. Zaremba** (tutor), (4 /4.5).

[MSc40] Mariusz Krasuski: *"Propagacja fali elektromagnetycznej w budynku w paśmie*

2.4 GHz" (Radio - wave propagation channel at 2.4 GHz frequency band in buildings), Assist. **H. Chaciński** (tutor), (3.5).

[MSc41] Grzegorz Lenarcik: *"Projekt i realizacja dekodera dźwięku wielokanałowego Dolby Digital na procesorze sygnałowym"* (Evaluation of Dolby Digital decoding algorithm of surround sound working on signal processor), Prof. **Z. Kulka** (tutor), (4.5).

[MSc42] Arkadiusz Lewandowski: *"Funkcja przenoszenia modulacji i kwantowa wydajność detekcji promieniowania w luminescencyjnych sensorach obrazów radiograficznych"* (Modulation transfer function and detective quantum efficiency of luminescent radiographic screen), Prof. **Z. Pawłowski** (tutor), (4.5).

[MSc43] Krzysztof Łowczycki: *"Translator poprawek korekcyjnych systemu GPS standardu RTCM - SC104 na protokół transmisyjny USEP z aplikacją kontrolno - sterującą"* (Hardware translator for GPS system corrections of RTCM - SC 104 standard to USEP transmission protocol with software controlling application), Assist. Prof. **T. Kosiło** (tutor), (4.5).

[MSc44] Krzysztof Maksymiuk / Marek Skaliński: *"Implementacja interaktywnych metod wymiany i przetwarzania danych w prototypowym systemie teleradiograficznym"* (Implementation of interactive methods for data exchange and processing in a prototype teleradiological module), Assist. Prof. **A. Przelaskowski** (tutor), (5 / 5).

[MSc45] Karol Malinowski: *"Metody i aparatura do pomiarów parametrów luminescencyjnych sensorów obrazów"* (Methods and equipment for measurements of phosphor screens parameters), Prof. **Z. Pawłowski** (tutor), (5).

[MSc46] Jan Matuszewski: *"Programowe środowisko do badań procedur sterowania mocą w systemie UMTS"* (Software environment for investigation of power control procedures in UMTS system), Assist. Prof. **J. Kołakowski** (tutor), (5).

[MSc47] Damian Mazek: *"Cyfrowy układ sterujący kierunkiem promieniowania systemu głośnikowego w zakresie niskich częstotliwości"* (Digital system steering the direction of loudspeaker radiation in the range of low frequencies), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4.5).

[MSc48] Marcin Mazurek: *"Optymalizacja modułu predykcji dekodera H26L na platformie Equator"* (The H26L deoder prediction module optimization on the Equator board), Prof. **W. Skarbek** (tutor), (5).

[MSc49] Marcin Mądry: *"Projekt i wykonanie zestawu głośnikowego do kina domowego"* (The design and construction of home theater loudspeakers systems), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (5).

[MSc50] Joanna Michalska: *"Wyznaczenie charakterystyk promieniowania anten rezonato-rowych z okien o określonym rozkładzie współczynnika przejrzystości"* (Tracing of radiation - field patterns of resonator antennae from windows of a given transparency factor), Assist. Prof. **J. Jarkowski** (tutor), (4).

[MSc51] Krzysztof Mikulski: *"Antena tubowa - sektorowa zintegrowana z korektorem fazowym w postaci soczewki dielektrycznej, sterowanej"* (The sectoral horn with the dielectric zonal lens as the corrector), Prof. **S. Rosłoniec** (tutor), (3.5).

[MSc52] Rafał Miklaszewski: *"Monitoring obiektów stałych z wykorzystaniem pakietowej transmisji danych GPRS"* (Monitoring of structures based on GPRS technology), Assist. Prof. **T. Kosiło (**tutor), (4.5).

[MSc53] Marek Milewski: *"Programowe środowisko do badań procedur przenoszenia połączeń w systemie UMTS"* (Software environment for handover procedures investing in UMTS system), Assist. Prof. **J. Kołakowski** (tutor), (5).

[MSc54] Marek Naumowicz: *"Optymalizacja czasowa oprogramowania systemów pomiarowych w zintegrowanych środowiskach programowych"* (Time optimisation of measuring systems software in integrated program environments), Assoc. Prof. **W. Winiecki** (tutor), (5).

[MSc55] Rafał Newidek / Michał Pochmara: *"Implementacja interfejsu USB w przyrządzie pomiarowym"* (USB interface implementation on the measurement device), Assist. Prof. **A. Podgórski** (tutor), (4.5 / 5).

[MSc56] Jacek Olejniczak: *"Impact of the directional channel in adaptive beamforming for UMTS-FDD in micro-cells"* Assist. Prof. **T. Buczkowski** (tutor), (5).

[MSc57] Jacek Olszewski: *"Badanie właściwości cyfrowych aparatów słuchowych na przykładzie Digilife.com i Digital II Focus - Super Power firmy Oticon"* (Investigations of hearing abilities of digital hearing aids Digilife.com and Digital II Focus - Super Power, Oticon), Assist. Prof. **A. Leszczyński** (tutor), (5).

[MSc58] Daniel Paczesny: *"Analiza metod trasowania w sieciach ad hoc na przykładzie protokołu DSR"* (DSR as an example of routing protocols in ad hoc networks), Assist. Prof. **Z. Walczak** (tutor), (5).

[MSc59] Wojciech Parzych: *"Optymalizacja poziomu zapasów magazynowych wraz z przykładową implementacją w architekturze wielo-warstwej"* (Optimization of stock level with n-tier architecture implementation), Assist. Prof. **K. Ignasiak** (tutor), (4).

[MSc60] Krzysztof Pawłowski: *"Porównanie barwy dźwięku otrzymanego z modeli komputerowych sal i w warunkach rzeczywistych"* (The comparison of rooms and real conditions timbre received from computer models), Assist. Prof. **M. Tajchert** (tutor), (5).

[MSc61] Artur Paziewski: *"Składowanie i przetwarzanie medycznych danych pomiarowych w systemie klient - serwer"* (Storage and processing of medical measuring data on client - server system), Assist. Prof. **M. Kazubek** (tutor), (4.5).

[MSc62] Andrzej Pleszuk: *"Napięciowo sterowane ferroelektryczne anteny z falą wypływającą"* (Voltage controlled ferroelectric leaky wave antennae), Assist. Prof. **Y. Yashchyshyn** (tutor), (5).

[MSc63] Krzysztof Płatek: *"Analiza efektywności widmowej interfejsu OFDM w radiowych systemach dostępowych"* (Analysis of OFDM interface spectral efficiency in radio access systems), Assist. Prof. **T. Kosiło** (tutor), (5).

[MSc64] Paweł Prekurat: *"Wykorzystanie kodera sprzętowego MPEG do transmisji z użyciem pakietu IMF"* (Using hardware MPEG encoder for the transmission of a video stream with JMF package), Assist. Prof. **K. Ignasiak** (tutor), (4.5).

[MSc65] Marcin Remboch: *"Badania i pomiary drgań przenikających do domów"* (Research and measurement of vibrations penetrating houses), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (5).

[MSc66] Radosław Rdzanek: *"Generacja i analiza sygnałów z modulacją M-PSK"* (Generation and analysis of signals with M-PSK modulation), Assist. Prof. **K. Radecki** (tutor), (4.5).

[MSc67] Tymon Rubel: *"Klasyfikacja schorzeń nowotworowych techniką płytek genowych"* (Classification of tumors using gene expression data), Prof. **Z. Pawłowski** (tutor), (5).

[MSc68] Jarosław Siembida: *"Oprogramowanie minispektrofotometru SpectraMatch GT - procedury odtwarzania widma"* (Software dedicated to the minispectrophotometer Spectra Match GT - procedures of spectrum reconstruction), Assist. Prof. **A. Miękina** (tutor), (5).

[MSc69] Daniel Siemek: *"Wykorzystanie podsystemu strumieniowania w implementacji dekodera JVT w architekturze Equator"* (Utilization of Equator's processor streaming subsystem in the JVT decoder), Prof. **W. Skarbek** (tutor), (4.5).

[MSc70] Rafał Marcin Sikorski: *"Administracja baz danych pozyskanych w procesie zdalnego radiowego odczytu liczników energii elektrycznej"* (Data administration during remote radio counting of electrical energy meters), Assist. Prof. **K. Czerwiński** (tutor), (5).

[MSc71] Bartosz Stawiarski-Lietzau: *"Badanie i analiza formatów zapisu danych dźwiękowych z kompresją stratną i bezstratną pod kątem zastosowań w Polskim Radiu S.A."* (Analysis of sound formats with lossy and lossless compression as considered for application in Polish Radio), Assist. Prof. **M. Tajchert** (tutor), (5).

[MSc72] Artur Stułka: *"Symulacja działania stacji ruchomej UMTS w stanie gotowości"* (Operation of UMTS mobile station in idle mode - computer simulation), Assist. Prof. **J. Kołakowski** (tutor), (5).

[MSc73] Daniel Suchodolski: *"Liniowy szyk antenowy z elektrycznie kształtowaną wiązką"* (Line antenna array with electrical forming beam), Assist. Prof. **Y. Yashchyshyn** (tutor), (5).

[MSc74] Andrzej Szerszeń: *"Kształtowanie charakterystyki kierunkowej sygnalizatora ostrzegawczego pojazdu uprzywilejowanego"* (Shaping the directional characteristics of the emergency vehicle signalling device), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4.5).

[MSc75] Tomasz Szymański: *"Wpływ kierunkowego kanału propagacyjnego na adaptacyjne formowanie wiązki w trybie FDD systemu UMTS dla scenariuszy makrokomórkowych"* (Impact of the directional channel in adaptive beamforming for UMTS-FDD in macro-cells), Assist. Prof. **T. Buczkowski** (tutor), (5).

[MSc76] Tomasz Trepka: *"Ferroelektryczny transmisyjny modulator fazy"* (The ferroelectric direct phase modulator project), Assist. Prof. **Y. Yashchyshyn** (tutor), (4.5).

[MSc77] Paweł Truchel: *"System zdalnego odczytu liczników energii elektrycznej"* (System for remote counting of electrical energy meters), Assist. Prof. **K. Czerwiński** (tutor), (4.5).

[MSc78] Radosław Urban: *"Wpływ efektów upakowania na anteny mikropaskowe dla systemów komunikacji ruchomej"* (Packaging effects on microstrip patch antennae for mobile communication systems), Assist. Prof. **A. Buchowicz** (tutor), (4.5).

[MSc79] Artur Walecki: *"Modelowanie kwantowej wydajności detekcji luminescencyjnych sensorów w radiografii cyfrowej"* (A detective quantum efficiency modelling of radiographic luminescent receptors), Assist. Prof. **B. Konarzewski** (tutor), (5).

[MSc80] Karol Wawrzyniak: *"Modelowanie szeregów czasowych przy użyciu filtru Kalmana"* (Time series modelling using the Kalman filter), Assoc. Prof. **K. Zaremba** (tutor), (5).

[MSc81] Mariusz Witkowski: *"Radiokomunikacyjny system pomiarowo-kontrolny z wykorzystaniem zintegrowanego graficznego środowiska programowego LabView"* (Radiocommunication measurement and control system using integrated environment Lab-View), Assoc. Prof. **W. Winiecki** (tutor), (4,5).

[MSc82] Renata Wojtaszek: *"Wytyczne do projektowania nowej generacji akceleratorów biomedycznych"* (Guidelines to the design of a new generation of biomedical accelerators), Assist. Prof. **W. Scharf** (tutor), (4.5).

33

[MSc83] Piotr Woźniak: *"Symulacja kanału radiowego w paśmie milimetrowym"* (Simulation of radio channel at millimetre band), Assist. Prof. **T. Kosiło** (tutor), (4.5).

[MSc84] Przemysław Wrona: *"Synchronizacja strumienia audio z obrazem 3D. Gadająca głowa"* (Synchronization of audio stream and 3D animation. "Virtual talking head"), Prof. **W. Skarbek** (tutor), (5).

[MSc85] Grzegorz Wyszyński: *"Implementacja modelu propagacyjnego dla potrzeb automatycznego procesu planowania kanałów BCCH warstwy mikrokomórek"* (Implementation of the propagation model for the purpose of automatic process of BCCH channels planning in the micro-cells layer), Prof. **J. Modelski** (tutor), (5).

[MSc86] Damian Ząbczyk: *"Oprogramowanie akwizycji danych z kamery scyntygraficznej w systemie Windows"* (Software of data acquisition from scyntigraphic camera in Windows system), Assist. Prof. **W. Smolik** (tutor), (5).

[MSc87] Piotr Zdanowski: *"Opracowanie elementów systemu do zdalnego odczytu liczników energii elektrycznej drogą radiową"* (Radio terminals for radio link remote reading system), Assist. Prof. **K. Czerwiński** (tutor), (4.5).

[MSc88] Łukasz Ziółkowski: *"Analogowy przesuwnik fazy na pasmo o zakresie zmian fazy 180^0"* (180^0 L-band analog phase shifter), Assist. Prof. **J. Zborowska (**tutor), (5).

[MSc89] Patryk Zradziński: *"Rozkład przestrzenny dawek w radioterapii"* (Spatial distribution of absorbed doses in radioteraphy), Prof. **Z. Pawłowski** (tutor), (5).

[MSc90] Piotr Żochowski: *"Przetwornica napięcia DC/DC ze wzmacniaczem klasy D_{uzvs}"* (Dc/DC converter with a class D_{uzvs} power amplifier), Assist. Prof. **M. Mikołajewski** (tutor), (4.5).

[MSc91] Artur Żołądkiewicz: *"Architektura aplikacji biznesowych w oparciu o technologię Java Enterprise Edition oraz konepcję Data Access Object"* (Architecture of business applications on the basis of Java 2 Enterprise Edition Technology and Data Access Object Concept), Assist. Prof. **K. Ignasiak** (tutor), (5).

5.5. B.Sc. Degrees

[BSc1] Przemysław Bilski: *"System domowej opieki medycznej"* (Internet application for a health care center), Assist. **T. Jamrógiewicz** (tutor), (4.5).

[BSc2] Piotr Bogusz: *"Kontrola jakości diagnostycznych badań radioizotopowych wykonywanych za pomocą scyntykamer"* (Quality control of radioisotope diagnostic examinations with the use of a scintillation camera), Assist. Prof. **R. Szabatin** (tutor), (4.5).

[BSc3] Sebastian Brzeziński: *"Badanie skuteczności algorytmów w uzyskiwaniu "sfer ciszy" w kabinach przemysłowych"* (Investigation of efficiency of algorithms for achieving "zones of silence" in industrial cabins), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (4.5).

[BSc4] Marcin Bugaj: *"System do pomiaru bioluminescencji"* (A device for the bioluminescence measurement), Assist. Prof. **G. Domański** (tutor), (5).

[BSc5] Łukasz Florczak: *"Satelitarna instalacja antenowa - program badania i weryfikacji"* (Satellite antenna installation - programme for investigations and verification), (4.5), Assist. Prof. **J. Jarkowski** (tutor), (4.5).

[BSc6] Piotr Galas: *"Internetowy dekoder JPEG2000"* (JPEG2000 internet decoder), Assist. Prof. **A. Przelaskowski** (tutor), (4.5).

[BSc7] Andrzej Gładkowski: *"Aplikacja internetowa z wykorzystaniem technologii Java 2 Enterprise Edition (J2EE)"* (Internet application with Java 2 Enterprise Edition (J2EE) technology), Assist. Prof. **A. Buchowicz** (tutor), (4.5).

[BSc8] Rafał Goliszewski: *"Szerokopasmowy wzmacniacz z regulowanym poziomem mocy wyjściowej na pasmo 1.3 - 2.7 GHz"* (Broadband power amplifier with output power leveling at 1.3 - 2.7 GHz band), Assist. Prof. **D. Gryglewski** (tutor), (4).

[BSc9] Michał Gronowski: *"System zdalnego monitorowania radiokomunikacyjnych obiektów nadawczych"* (Remote system for monitoring the radiocommunication transmitting objects), Assist. Prof. **K. Ignasiak** (tutor), (5).

[BSc10] Dominik Grzywaczewski: *"Model sondy do przemysłowego tomografu pojemnościowego"* (Electrical capacitance tomography sensor model), Assist. Prof. **R. Szabatin** (tutor), (4).

[BSc11] Sebastian Gut / Paweł Kiliszek: *"Transmisja danych w systemie GSM z wykorzystaniem GPRS"* (Data transmission in GSM systems using GPRS), Assist. Prof. **T. Buczkowski** (tutor), (4).

[BSc12] Michał Janiak: *"Interfejs komunikacyjny do elektrycznego tomografu procesowego"* (Communication interface for the electrical

industrial tomograph), Assist. Prof. **R. Szabatin** (tutor), (4.5).

[BSc13] Piotr Jankowski: *"Generator szumu wizyjnego"* (Video noise generator), Prof. **J. Modelski** (tutor), (5).

[BSc14] Michał Kalinowski: *"Kompresja obrazów medycznych z zastosowanem sieci neuronowej"* (Medical image compression using neural network), Assoc. Prof. **K. Zaremba** (tutor), (5).

[BSc15] Grzegorz Kłos: *"Projekt układu poziomowania mocy na pasmo 0,5 ÷2,5 GHz"* (The design of levelling module for 0.5 ÷2.5 GHz band), Assist. Prof. **D. Gryglewski** (tutor), (5).

[BSc16] Mariusz Kobus: *"Rozpoznawanie komend głosowych z wykorzystaniem sztucznych sieci neuronowych"* (Artifical neural networks for isolated word recognition), Assoc. Prof. **K. Zaremba** (tutor), (5).

[BSc17] Jarosław Kołbuś: *"Architektura klient-serwer w JPEG 2000"* (JPEG 2000 client-server architecture), Assist. Prof. **A. Przelaskowski** (tutor), (4).

[BSc18] Radosław Kordziukiewicz: *"Oprogramowanie do wizualizacji serca na podstawie badań scyntygraficznych wykonanych techniką GSPECT"* (Software for heart visualization based on scyntigraphic investigations done by means of GSPECT technology), Assist. Prof. **P. Brzeski** (tutor), (5).

[BSc19] Michał Kowalski: *"Układ do badania sygnałów z modulacją QPSK z wykorzystaniem technik cyfrowego przetwarzania sygnałów"* (Test setup for investigation of QPSK signals using Digital Signal Processing), Assist. Prof. **J. Kołakowski** (tutor), (4.5).

[BSc20] Paweł Kozioł: *"Oprogramowanie elektrokardiografu do walizki lekarza pierwszego kontaktu"* (Electrocardiograph software for first contact doctor's suitcase), Assist. Prof. **E. Piątkowska-Janko** (tutor), (5).

[BSc21] Marek Kozicki: *"Projekt i realizacja konwertera częstotliwości próbkowania na procesorze sygnałowym"* (Design and implementation sampling rate converter on digital signal processing), Prof. **Z. Kulka** (tutor), (5).

[BSc22] Janusz Kulesza: *"Ogranicznik mikrofalowy na pasmo 3 - 3,5 GHz"* (3 - 3.5 GHz band microwave limiter), Assist. Prof. **W. Wojtasiak** (tutor), (4.5).

[BSc23] Sebastian Kupsz: *"System do badań parametrów optycznych luminoforów"* (System for investigations of luminofor optical parameters), Assist. Prof. **G. Domański** (tutor), (5).

[BSc24] Andrzej Malec: *"Edytor dokumentów XML w środowisku JFC/SWING"* (XML documents editor in JFC/SWING environment), Assist. Prof. **A. Buchowicz** (tutor), (5).

[BSc25] Piotr Minodzki: *"Słuchawki aktywne sterowane cyfrowo"* (Active headphones digitally directed), Assist. Prof. **J. Narkiewicz-Jodko** (tutor), (5).

[BSc26] Michał Morawski: *"Rozproszony system pomiarowy z wykorzystaniem modułu FieldPoint"* (Disperse virtual measurement system based on the FieldPoint module), Assist. **R. Łukaszewski** (tutor), (4.5).

[BSc27] Dariusz Niedzielewski: *"Projekt anteny helikalnej o polaryzacji kołowej"* (Design of the helical antenna with circular polarization), Assist. Prof. **J. Jarkowski** (tutor), (5).

[BSc28] Jakub Nyckowski: *"Karta akwizycji danych z interfejsem USB"* (Data acquisition card with USB interface), Assist. Prof. **G. Domański** (tutor), (5).

[BSc29] Radosław Olszewski: *"Wzmacniacz niskoszumowy na pasmo 450 MHz"* (Low - noise amplifier at 450 MHz band), Assist. Prof. **W. Kazubski** (tutor), (5).

[BSc30] Radosław Paczesny: *"Sieciowa transmisja danych multimedialnych z wykorzystaniem pakietu JMF (Java Media Framework)"* (Network multimedia data transmission using JMF (Java Media Framework) protocol), Assist. Prof. **A. Buchowicz** (tutor), (4.5).

[BSc31] Sławomir Pawelec: *"Opracowanie dookólnej stacji bazowej"* (Working out a round base station antenna), Assist. Prof. **Y. Yashchyschyn** (tutor), (5).

[BSc32] Michał Pawluczuk: *"Baza danych anestozjologicznych dla oddziału intensywnej terapii"* (Anesthesiological data base for the intense care unit), Assist. Prof. **E. Piątkowska-Janko** (tutor), (4.5).

[BSc33] Wojciech Pawłowski: *"Aplikacja kliencka z wykorzystaniem Java 2 Micro Edition"* (Client application with Java 2 Micro Edition), Assist. Prof. **A. Buchowicz** (tutor), (5).

[BSc34] Arkadiusz Prus: *"Rozproszony system pomiarowy z transmisją bezprzewodową z wykorzystaniem modułu FieldPoint"* (Distributed measuring system with the wireles broadcasting based on the FieldPoint module), Assist. **R. Łukaszewski** (tutor), (5).

[BSc35] Marcin Reymus: *"Badania anteny logarytmicznie periodycznej dipolowej (ALPD)"* (Investigations of ALPD dipol periodic logarithmic antenna), Assist. Prof. **J. Jarkowski** (tutor), (4.5).

[BSc36] Krzysztof Rożek: *"Syntezer częstotliwości dużej mocy na pasmo ISM"* (High power frequency synthesizer for ISM band), Assist. Prof. **W. Wojtasiak** (tutor), (4.5).

[BSc37] Karol Ruszczewski: *"Aplikacja do głosowego wybierania numerów telefonicznych"* (Application for voice-driven phone dialling), Assoc. Prof. **K. Zaremba** (tutor), (5).

[BSc38] Arkadiusz Soika: *"Akwizycja danych sterowana głosem"* (Data aquisition steered

by voice), Assist. **T. Jamrógiewicz** (tutor), (5).

[BSc39] Grzegorz Starczuk: *"Opracowanie pod-zespołów sterowanych anten adaptacyjnych na pasmo 1.2 GHz"* (The elaboration of tuned parts of adaptive antenna at frequency band 1.2 GHz), Assist. Prof. **Y. Yashchy-schyn** (tutor), (5).

[BSc40] Marcin Suchocki: *"Układ do akwizycji danych z przetwornikami A/C typu AD9260 firmy Analog Devices do scyntykamery OMEGA-500 firmy TECHNICARE"* (Data acquisition system working on A/C converters type AD 9260 Analog Devices for OMEGA 500 TECHNICARE gamma-camera), Assist. **T. Olszewski** (tutor), (4.5)

[BSc41] Sebastian Szklarz / Mariusz Witulski: *"Bezprzewodowa transmisja danych z rozpraszaniem widma w paśmie 2.4 GHz"* (Wireless spread spectrum data transmission in 2.4 GHz band.), Assist. **H. Chaciński** (tutor), (5).

[BSc42] Radosław Szołoch: *"Internetowa, wektorowa mapa Polski w architekturze klient-serwer"* (Internet, vectorial map of Poland), Assist. Prof. **K. Ignasiak** (tutor), (5).

[BSc43] Marta Tarasiuk: *"System do klasyfikacji schorzeń"* (Disease classification system), Prof. **Z. Pawłowski** (tutor), (5).

[BSc44] Artur Toczyłowski: *"Oprogramowanie ukladu pomiarowego strat odbicia w paśmie ISM, 2,4 GHZ"* (Software of measuring unit for reflection losses in ISM 2.4 GHz band), Assist. Prof. **D.Gryglewski** (tutor), (5).

[BSc45] Łukasz Wierzbicki: *"Dyfuzyjny tomograf optyczny"* (Diffusion optical tomograph), Assist. Prof. **G. Domański** (tutor), (4.5).

[BSc46] Arkadiusz Wodarczyk: *"Projekt i realizacja generatora sygnałów"* (Project and implementation of a signal generator), Assist. **H. Chaciński** (tutor), (3.5).

[BSc47] Karol Woźniak: *"Pochłanianie energii małej częstotliwości we wnętrzach*" (Low frequency energy absorption in the room), Assist. Prof. **M. Tajchert** (tutor), (4.5).

[BSc48] Piotr Zagórski: *"Interfejs kodeka JPEG2000"* (Interface of JPEG2000 codec), Assist. Prof. **A. Przelaskowski** (tutor), (4.5).

[BSc49] Przemysław Zambrzycki: *"Internetowa aplikacja ewidencji przedmiotów"* (Internet application for items registry), Assist. Prof. **K. Ignasiak** (tutor), (5).

[BSc50] Tomasz Zaremba: *"Wpływ konwen-cjonalnych algorytmów tomografii SPECT na rekonstrukcję modeli dyna-micznych"* (The influence of the conventional SPECT tomography algorithms on dynamical models reconstruction), Assist. Prof. **P. Brzeski** (tutor), (4).

[BSc51] Łukasz Zdunek: *"Pomiary akustyczne z wykorzystaniem techniki MLS"* (Acoustic measurements with the use of MLS method), Assist. Prof. **M. Tajchert** (tutor), (4.5).

[BSc52] Łukasz Ziółkowski: *"Analogowy przesuwnik fazy na pasmo L o zakresie zmian fazy 180^0"* (Analog phase shifter at L band in the range of 180^0 phase changes), Assist. Prof. **J. Zborowska** (tutor), (5).

[BSc53] Piotr Żyta: *"Ocena subiektywna najczęściej stosowanych koderów stratnych"* (Subjective evaluation of commonly used audio codes), Assist. Prof. **M. Tajchert** (tutor), (5).

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

[BSc54] Andrzej Bołoczko: *"Oprogramowanie do konwersji formatu obrazów tomograficznych"* (The software for tomographic image format conversion), Assist. Prof. **W. Smolik** (tutor), (5).

[BSc55] Wojciech Borkowski: *"Przyrząd do pomiaru impedancji mikroelektrod metalowych"* (Metal microelectrode impedance meter), Assist. Prof. **K. Czerwiński** (tutor), (5)

[BSc56] Grzegorz Cholewa: *"Szybkodziałający wyłącznik antenowy o dużej obciążalności energetycznej"* (Fast-acting antenna connection with high-energy load carrying capacity), Prof. **S. Rosłoniec** (tutor), (5).

[BSc57] Wojciech Choiński: *"Mikroprocesorowy miernik wilgotności"* (Microprocessor device for humidity monitoring), Assist. Prof. **G. Domański** (tutor), (4.5).

[BSc58] Jarosław Chrostek: *"Stanowisko pomiarowe do badania światłowodów polimerowych"* (Measuring system to investigation of plastic optical fibres), Assist. Prof. **R. Nowak** (tutor), (5)

[BSc59] Dariusz Cieśliński: *"Układ do pomiaru parametrów transmisyjnych systemu RDS"* (Arrangement for measurement of transmissing parameters in RDS system), Assist. Prof. **K. Czerwiński** (tutor), (4).

[BSc60] Adam Dudek: *"Interfejs USB"* (USB interface), Assist. **H. Chaciński** (tutor), (4).

[BSc61] Zbigniew Flasza / Sebastian Wójcik: *"Projekt radiowego systemu dostępu abonenckiego"* (Project of radio access system), Assist. Prof. **W. Kazubski** (tutor), (5 / 5).

[BSc62] Jolanta Gębuś: *"Projekt radiowej sieci dostępowej na obszarze wiejskim"* (Design of an access network in a village area), Assist. Prof. **T. Kosiło** (tutor), (4.5).

[BSc63] Andrzej Jaworski: *"Stacja wyniesiona mikroprocesorowego systemu zdalnego sterowania i kontroli"* (The peripherial station for the microprocessor system of remote monitoring and control), Assist. **K. Roba-czyński** (tutor), (5).

[BSc64] Jarosław Kantel: *"Projekt osiedlowego systemu telewizji kablowej. Trudne warunki odbioru programów telewizji naziemnej"* (Project of cable television housing estate. Difficult conditions of receiving television programmes), Assist. Prof. **K. Derzakowski** (tutor), (5).

[BSc65] Jarosław Klemczak: *"Mikroprocesorowy miernik mocy w.cz."* (Microprocessor high frequency power meter), Assist. Prof. **G. Domański** (tutor), (4.5)

[BSc66] Jan Edmund Kłos: *"Układ do pomiaru czasu przekroczenia maksymalnej dopuszczalnej dewiacji przez stacje radiodyfuzyjne"* (The device for the measurement of maximum deviation exceeding time in broadcasting transmitter signals), Assist. Prof. **J. Cichocki (**tutor), (5).

[BSc67] Krzysztof Kowalski: *"Projekt sieci dostępowej na terenie powiatu Ostrów Mazowiecka"* (Project of access network in Ostrów Mazowiecka administrative district), Prof. **K. Holejko** (tutor), (4).

[BSc68] Roman Kudlik: *"Projekt szerokopasmowej sieci dostępowej na terenie miasta Nowy Sącz"* (The project of the access network in Nowy Sącz area), Assist. Prof. **A. Zakrzewski** (tutor), (4.5).

[BSc69] Waldemar Kukwa: *"Pomiary* i eksploatacja *linii światłowodowych"* (Measurements and exploatation of optical waveguides), Prof. **K. Holejko** (tutor), (4).

[BSc70] Ewa Kurowska: *Projekt toru światłowodowego między dwoma centralami telekomunikacyjnymi Raków I - Zawodzie dla zapewnienia potrzeb lokalnych"* (The project of optical track between two telecommunication centrals Raków I - Zawodzie to assure the local telecommunication needs), Assist. Prof. **D. Gryglewski** (tutor), (4.5).

[BSc71] Wiesław Markowski: *"Projekt telekomunikacyjnej linii kablowej miejscowej"* (Project of the local cable telecommunication line), Assist. Prof. **A. Zakrzewski** (tutor), (3).

[BSc72] Marek Myśliwiec: *"Kompresor dynamiki sygnałów małej częstotliwości"* (Compressor for low frequency dynamic signals), Assist. **H. Chaciński** (tutor), (4).

[BSc73] Tomasz Oleś: *"Transmisja danych przez sieć energetyczną - część nadawcza modemu"* (Data transmission through the electric power network), Assist. **H. Chaciński** (tutor), (5).

[BSc74] Krzysztof Paradowski: *"Przenośny mikroprocesorowy czujnik gazu z wyświetlaczem LCD"* (Portable microprocessor gas sensor with LCD display), Assist. Prof. **G. Domański** (tutor), (5).

[BSc75] Marek Płachta: *"Pomiary uruchomieniowe kablowych linii światłowodowych zgodnie z normami i instrukcjami TP"* (The pre-starting measurements of optical waveguides according to Polish Telecommunications Ltd.), Assist. Prof. **A. Zakrzewski** (tutor), (5).

[BSc76] Jarosław Płaszczyński: *"Mikroprocesorowy czujnik gazu z łączem szeregowym RS232"* (Microprocessor gas sensor with RS232 serial interface), Assist. Prof. **G. Domański** (tutor), (4.5).

[BSc77] Grzegorz Przybyłowski: *"Stacja centralna mikroprocesorowego systemu zdalnego sterowania i kontroli"* (The main station for the microprocessor system of remote monitoring and control), Assist. **K. Robaczyński** (tutor), (4).

[BSc78] Cezary Skalik: *"System zarządzania siecią SDH na przykładzie Alcatel 1353 SH"* (SDH network administration systems based on the Alcatel 1353 SH services), Prof. **J. Siuzdak** (tutor), (5).

[BSc79] Paweł Teresiński: *"Stanowisko do pomiarów krótkoterminowej niestabilności częstotliwości"* (Measurement of the short - term instability of frequency), Assist. Prof. **T. Buczkowski** (tutor), (3.5).

[BSc80] Roman Tworzewski / Konrad Sobiczewski: *"Projekt sieci mieszalnej dla gminy Dzierzgowo powiat mławski"* (The project of mixed network for Dzierzgowo commune, Mława district), Assist. Prof. **T. Kosiło** (tutor), (5 / 4).

[BSc81] Dariusz Wąs / Manfred Niemiec: *"Projekt światłowodowej sieci dostępowej"* (Project of the fiber optic access network), Prof. **K. Holejko** (tutor), (3 / 3).

[BSc82] Sławomir Witkowski: *"Opracowanie i wykonanie przełącznika sygnałów analogowych o różnych częstotliwościach"* (Signals switch with different frequencies - elaboration and realisation), Assist. Prof. **K. Derzakowski** (tutor), (4.5).

6. PUBLICATIONS

6.1. Scientific and technical books, chapters in books

[Pub1]   J. Kołakowski, J. Cichocki: "UMTS - system telefonii komórkowej trzeciej generacji", (UMTS - Third Generation Cellular Systems), *Wydawnictwa Komunikacji i Łączności*, (Warszawa, 2003), Wyd. 1, ISBN-83-206-1507-0, 456 pp.

[Pub2]   W. Skarbek: "From Rough through Fuzzy to Crisp Concepts: Case Study on Image Color Temperature Description", Chapter 24, In: K. Pal Sankar, L. Polkowski, A. Skowron (Eds.): *"Rough - Neural Computing. Techniques for Computing with Words"*, *Springer*, pp. 587-597.

6.2. Other books, chapters in books

[Pub3]   R. Z. Morawski: "Problems Related to the Design and Use of System-level Indicators for Higher Education in Poland", Chapter VIII, In: "System-Level and Strategic Indicators for Monitoring Higher Education in the Twenty-First Century" (Ed.: A. Yonezawa and F. Kaiser), *UNESCO-CEPES Studies on Higher Education*, (Bucharest, Hungary, 2003), pp. 111-122.

6.3. Scientific and technical papers in journals

[Pub4]   M. Bober, K Kucharski, W. Skarbek: "Face Recognition by Fisher and Scatter Linear Discriminant Analysis", In: N. Petkov, M. A. Westenberg (Eds.): *"Computer Analysis of Images and Patterns"*, *Springer*, LNCS 2756, pp. 638-645.

[Pub5]   P. Boniński, M. Kazubek, A. Przelaskowski: „Zastosowanie kwantyzacji wektorowej LVQ i sieci neuronowych z propagacją wsteczną w wyborze cech i klasyfikacji mikrozwapnień", (LVQ and Neural Networks with Back Propagation Applied for Feature Selection and Classification of Microcalcifications), *Elektronizacja*, No. 3, (2003), pp. 11-15.

[Pub6]   P. Brzeski, J. Mirkowski, T. Olszewski, A. Pląskowski, W. Smolik, R. Szabatin: „Multichannel Capacitance Tomograph for Dynamic Process Imaging", *Opto-electronics Re-view*, No. 11, (2003), pp. 175-180.

[Pub7]   A. Buchowicz: "Standard telewizji inter-aktywnej DVB-MHP" (DVB-MHP Inter-active Television Standard), *Elektronizacja*, No. 6, (2003), ISSN 0138. 0826, pp. 22-24.

[Pub8]   M. Celuch-Marcysiak, M. Sypniewski, W. K. Gwarek: "A Novel FDTD System for Microwave Heating and Thawing Analysis with Automatic Time-Variation of Enthalpy-dependent Media Parameters", in: *Advances in Microwave and Radio-Frequency Processing, Springer Verlag*, (Dec. 2003), pp. 273-284.

[Pub9]   J. Cichocki: "Pomiary urządzeń radiowych cyfrowych systemów telefonii komórkowej - część druga", (Measurements of Radio Equipment for Digital Cellular Systems - Part Two), *Pomiary w Telekomunikacji*, No. 23, (2003), pp. 42-103.

[Pub10]   T. Daniluk: "LabVIEW 7 Express - kolejna generacja narzędzi graficznego projektowania systemów kontrolno-pomiarowych", (LabVIEW 7 Express - the Next Generation of Tools for Graphical Designing of Controlling - Measuring Systems), *Elektronik*, No. 7, (2003), ISSN 1248-4030, pp. 52-53.

[Pub11]   G. Domański, B. Konarzewski, J. Marzec, Z. Pawłowski, K. Zaremba: "Optymalizacja luminescencyjnych sensorów obrazu do radiografii medycznej" (Optimization of the Luminescent Image Sensors for Medical Radiography), *Elektronizacja*, No. 4 (2003), ISSN 0138. 0826, pp. 33-36.

[Pub12]   J. Falkiewicz, M. A. Okoński, G. Kustra: "Adaptive ANC System with Nonlinear Secondary Path", *Mechanika*, *Kwartalnik Akademii Górniczo-Hutniczej im. S. Staszica w Krakowie* (2003), Vol. 22, Z. 22, ISSN 0239-5282, pp. 263-271.

[Pub13]   L. Finkelstein, R. Z. Morawski: "Fundamental Concepts of Measurement", *Measurement - Journal of IMEKO*, No. 1-2 (2003), Vol. 34, No. 1, ISSN 0263-2241, pp. 1-2.

[Pub14]   G. Galiński: "Technika centroidów i technika dyspersji w wyszukiwaniu deskryptorów trajektorii ruchu" (Motion Trajectory Searching Using Centroid and Dispersion Methods), *Elektronizacja*, No. 4, (2003), ISSN 0138-0826, pp. 26-28.

[Pub15]   W. K. Gwarek, M. Celuch-Marcysiak: "Wide-band S-parameter Extraction from FD-TD Simulations for Propagating and Evanescent Modes in Inhomogeneous Guides", *IEEE Trans. Microwave Theory Tech.*, Vol. 51, No. 8, (Aug. 2003), ISSN 0018-9480, pp. 1920-1928.

[Pub16]   S. L. Hahn: "Complex Signals with Single-orthant Spectra as Boundary Distributions of Multidimensional Analytic Functions", *Bulletin of the Polish Academy of Sciences*, Vol. 51, No. 2, (2003), pp. 155-161.

[Pub17]   S. L. Hahn: "On the Uniqueness of the Definition of the Amplitude and Phase of the Analytic Signal", *Signal Processing*, No. 83, (2003), *Elsevier*, pp. 1815-1820.

[Pub18]   A. Iraqi, A. Barwicz, P. Mermelstein R. Z. Morawski, and W. Bock: „Design of a Wireless Communications Module for Telemetry in Civil Infrastructure Monitoring",

IEEE Trans. Instrum. & Meas., Vol. 52, No. 3, (Jun. 2003), pp. 973-977.

[Pub19] T. Jamrógiewicz: "K-SEP-I-0019 bardzo szybka magistrala IEEE 1394b" (K -SEP-I-0019 High-Performance Serial Bus IEEE 1394b), *Centralny Ośrodek Szkolenia i Wydawnictw*, (2003), 28 pp.

[Pub20] S. Jankowski, A. Oręziak, A. Skorupski, H. Kowalski, Z. Szymański, E. Piątkowska-Janko: "Computer-aided Morphological Analysis of Holter ECG Recordings Based on Support Vector Learning System", *Computers in Cardiology*, Vol. 30, (2003), pp. 597-600.

[Pub21] M. Kazubek: „Wavelet Domain Image Denoising by Thresholding and Wiener Filtering", *IEEE Signal Processing Letters*, Vol. 10, No 11, (2003), pp.324-326.

[Pub22] T. Keller, J. Modelski: "Integration of Home Digital Network and Bluetooth Wireless Communication System", *Journal of Telecommunications and Information Technology*, (1/2003), ISSN 1509-4553, pp. 45-50.

[Pub23] J. Kołakowski, J. Cichocki, J. Modelski: "Transmisja ultraszerokopasmowa - przyszłość sieci bezprzewodowych?" (Ultrawideband Transmission - Future of Wireless Communications?), *Przegląd Tele-komunikacyjny i Wiadomości Tele-komunikacyjne*, No. 6, (2003), pp. 312-317.

[Pub24] B. Konarzewski, Z. Pawłowski, G. Domański, J. Marzec, K. Zaremba: „Detective Quantum Efficiency and Modulation Transfer Fuction of Radiographic Luminescent Sensors - Comparison of Analytical Model and Monte Carlo Simulation", *Biocybernetics and Biomedical Engineering*, Vol. 23 No. 4, (2003), pp. 19-32.

[Pub25] P. Kopyt, M. Celuch-Marcysiak: "FDTD Modeling and Experimental Verification of Electromagnetic Power Dissipated in Domestic Microwave Ovens", *Journal of Telecommunications and Information Technology*, No. 1, (2003), ISSN 1509-4553, pp. 59-65.

[Pub26] E. Kotarbińska: "Attenuating Properties of Hearing Protectors in Versus Time Factor", *International Journal of Occupational Medicine and Environmental Health*, No. 16 (2003), pp. 67-72.

[Pub27] Z. Kulka: "Cyfryzacja toru fonicznego w takt TacT Audio" (TacT Audio M2150/S2150 Digital Audio Amplifiers), *Radioelektronik Audio-HiFi-Video*, No. 3, (2003), pp. 28-30.

[Pub28] Z. Kulka: "Korektory cyfrowe i zestawy głośnikowe firmy TacT Audio" (TacT Audio RCS 2.0/ TCS 10.0 Correction Systems and New Loudspeaker Systems), *Radioelektronik Audio-HiFi-Video*, No. 5, (2003), pp. 25-26.

[Pub29] Z. Kulka: "Muzyczne i kinowe systemy wielokanałowe" (Music and Home Theatre Multichannel Systems), *Jazz&Classics*, No 1, (2003), pp. 72-73.

[Pub30] 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), Part 1, *Radioelektronik Audio-HiFi-Video*, No. 12, (2003), pp. 16-17.

[Pub31] G. Kustra: "Zastosowanie adaptacyjnych sieci neuronowych w aktywnej redukcji hałasu" (Using Adaptive Neutral Nets in Active Noise Control Systems), *Elektronizacja*, No. 4, (2003), ISSN 0138-0826, pp. 17-21.

[Pub32] W. Maciszewski, W. Scharf: "Modern Accelerators for Radiotherapy. A Critical Review", *Eksploatacja i Niezawodność"*, No. 4, (2003), pp. 4-16.

[Pub33] J. Marzec: "Cross-talk in Straw Tube Chambers", *Nuclear Instruments and Methods in Physics Research* A 503, *Elsevier*, (2003), pp. 504-512.

[Pub34] J. Marzec: „Wielkopowierzchniowe detektory śladowe w eksperymentach fizyki wysokich energii" (Large Area Trackers in HEP Experiments), *Prace Naukowe Politechniki Warszawskiej „Elektronika"*, z.144 (2003), 158 pp.

[Pub35] M. Mikołowicz: "Koncepcja systemu laryngektofonu poprawiającego zrozumiałość mowy osób laryngektomowanych" (Concept of the Laryngectophone System for Speech Improvement after Laryngectomy), *Elektro-nizacja*, No. 4, (2003), pp. 22-25.

[Pub36] J. Modzelewski: "Efekt Millera w rezo-nansowych wzmacniaczach mocy wielkiej częstotliwości, klasy DE i klasy E" (Miller's Effect in Class-DE and Class-E High-Frequency Tuned Power Amplifiers), *Elektronizacja*, No. 11, (2003), ISSN 0138-0826, pp. 3-5.

[Pub37] J. Modzelewski: "Analiza strat komuta-cyjnych w rezonansowych wzmacniaczach mocy klasy DE" (Switching Losses in Class-DE Tuned Power Amplifiers), *Elektronizacja*, No. 12, (2003), ISSN 0138-0826, pp. 8-11.

[Pub38] R. Z. Morawski, A. Miękina, T. Oleszczak, A. Barwicz: „Polarization-versed Calibration of Spectrophotometric Transducers", *IEEE Trans. Instrum. & Meas.*, Vol. 52, No. 4 (Aug. 2003), pp. 1308-1313.

[Pub39] T. Morawski, J. Zborowska: "Szeroko-pasmowe mikrofalowe analogowe prze-suwniki fazy" (Broadband Microwave Analog Phase Shifters), *Elektronizacja*, No. 6, (2003), Warsaw, pp. 5-9.

[Pub40] K. Mroczek, J.Modelski: „Architektury sprzętowych rdzeni do algorytmu pasowania bloków - nowe wyniki" (Hardware Architectures for Block Matching Algorithm - New Results), *Elektronizacja,* No. 3, (2003), pp. 3-7.

[Pub41] M. Nguyen, J. Modelski: "A Solution for Increasing Data Rate of Doppler-RAKE System", *Journal of Telecommunications and Information Technology*, No. 3, (2003), pp. 130-134.

[Pub42] A. Oręziak, M.Niemczyk, E. Piątkowska-Janko, G. Opolski: "Detection of Atrial Electrical Instability in Hypertensive Patients", *Computers in Cardiology*, Vol. 30, (2003), pp. 557-560.

[Pub43] A. Pietrowcew, W. Skarbek: "Lokalna analiza składowych głównych drugiego rzędu w rozpoznawaniu twarzy" (Second Order Principal Component Analysis in Face Recognition Task), *Elektronizacja*, No. 4, (2003), ISSN 0138-0826, pp. 29-32.

[Pub44] G. Radzikowski, J. Wojciechowski: "Płatności pieniądzem cyfrowym w sieciach komórkowych" (Payments by Means of Digital Money in Cellular Networks), *Infotel*, No. 9, (2003), pp. 46-51.

[Pub45] W. Skarbek: "Merging Subspace Models for Face Recognition", In: N. Petkov, M. A. Westenberg (Eds.): *"Computer Analysis of Images and Patterns"*, *Springer*, LNCS 2756, pp. 606-613.

[Pub46] W. Skarbek: "Media cyfrowe" (Digital Media), *Przegląd Telekomunikacyjny*, No. 8-9, (2003), ISSN 1230-3496, pp. 404-408.

[Pub47] W. Skarbek, G. Kukiełka: "Optimal Intervals for Fuzzy Categories of Color Temperature with Application to Image Browsing", *Machine Graphics & Vision*, Vol. 11, No. 2/3, pp. 297-310.

[Pub48] M. Szafran, E. Bobryk, Y. Yashyschyn, J. Modelski: "Kompozyty ceramiczno-polimerowe dla zastosowań mikrofalowych" (Ceramic-polymer Composites for Microwave Applications), Ceramika, *Polski Biuletyn Ceramiczny PAN*, Vol. 79, (2003), ISSN 0860-3340, ISBN 83-89541-05-X, pp. 203-211.

[Pub49] A. Synyavskyy, Y. Yashchyshyn, J. Modelski. "Estimation of the Possibility to Solving of One-dimensional Inverse Scattering Problem by Analytical Methods", *Academic Journal of Lviv Polytechnic National University: "Computer Systems of Design. Theory and Practice"*, No. 471, (2003), pp. 125 – 135 (in Ukrainian language).

[Pub50] M. Tajchert: "Subiektywna ocena jakości dźwięku" (Subjective Assessment of Sound Quality), *Jazz&Classics*, No 2, (2003), pp. 72-73.

[Pub51] W. Winiecki: „Methodology for Distributed Designing of Distributed Virtual Instruments", *International Scientific Journal of Computing*, Dec.2003, Vol. 3, Issue 3 (ISSN 1727-6209).

[Pub52] W. Winiecki: "Wirtualne przyrządy pomiarowe (Virtual Measuring Instruments), *Prace Naukowe Politechniki Warszawskiej, "Elektronika"*, z. 145 (2003), 178 pp.

[Pub53] M. P. Wiśniewski, R. Z. Morawski, A. Barwicz: „An Adaptive Rational Filter for Interpretation of Spectrometric Data", *IEEE Trans. Instrum. & Meas.*, Vol. 52, No. 3, (Jun. 2003), pp. 966-972.

[Pub54] K. Wnukowicz, W. Skarbek: "Colour Temperature Estimation Algorithm for Digital Images - Properties and Convergence", *Optoelectronics Review*, Vol. 11, No. 3, (2003), ISSN 1230-3402, pp. 193-196.

[Pub55] W. Wojtasiak: "Mikrofalowe tranzystorowe wzmacniacze nadawcze dużej mocy" (Microwave Transistor Transmitting High-power Amplifiers), *Elektronizacja*, No. 7-8, (2003), pp. 16-20.

[Pub56] A. Wróblewska, P. Boniński, A. Przelaskowski, M. Kazubek: „Segmentation and Feature Extraction for Reliable Classification of Microcalcifications in Digital Mammograms", *Optoelectronics Review*, No. 11, (2003), pp. 227-235.

[Pub57] A. Wróblewska, A. Przelaskowski: „System automatycznej detekcji i klasyfikacji mikro-zwapnień w cyfrowej mammografii", (Computerized System of Microcalcifications Detection and Classification for Digital Mammography), *Elektronizacja* No. 3, (2003), pp. 8-11.

[Pub58] Y. Yashchyshyn, M. Szafran, J. Modelski, E. Bobryk. "Badanie właściwości materiałów ferroelektrycznych w zakresie mikrofal" (Investigations of the Ferroelectric Materials Behaviour in Microwave Band), *Kwartalnik Elektroniki i Telekomunikacji*, No. 49, (2003), z. 2, pp. 247-256.

[Pub59] K. Zaremba: „DECON - Method of the Quantitative Analysis of the XRS Spectra for the Trace Element Analysis", *Biocybernetics and Biomedical Engineering*, Vol. 23, No. 4, (2003), pp. 3-17.

[Pub60] K. Zaremba: „XRF Analysis of Trace Elements in Biological Samples - Theroretical Analysis", *Biocybernetics and Biomedical Engineering*, Vol. 23, No. 3, (2003), pp. 3-20.

[Pub61] M. Ziembicki, J. Marzec: „Sprzętowy generator liczb losowych do zastosowań kryptograficznych" (Hardware Random Number Generator Designed for Cryptographic Systems), *Kwartalnik Elektroniki i Telekomunikacji*, Vol. 49, z. 4, pp. 503-514.

6.4. Scientific and technical papers in conference proceedings

[Pub62] J. Antoniuk, M. Żukociński, A. Abramowicz, W. Gwarek: "Investigation of Resonant Frequencies of Helical Resonators", *Proc. 11th MICROCOLL* (Budapest, Hungary, Sept. 10-11, 2003), pp. 85-88.

[Pub63] P. Bargieł: „Metoda poszukiwania optymalnej płaszczyzny pomiarowej w tomograficznych badaniach przepływu krwi", (Optimal Plane Search Method in Blood Flow Measurements by Magnetic Resonance Imaging), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna*, *Tom II Biopomiary*, (Proc. XIIIth National Science Conference Biocybernetics and Biomedical Engineering, Vol. II Biomedical Measurements), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 788-791.

[Pub64] P. Bilski, J. Wojciechowski, V. Brygilewicz: "Design of Mechatronic Systems Using Fuzzy Logic and Wavelet Transform", *Proc. European Conference on Circuit Theory and Design*, (Cracow, Poland, Sept. 1-4, 2003), pp. III-377-III-380.

[Pub65] P. Błaszczyk, W. Wojtasiak: "Moduły N/O WLAN na pasma ISM i UNII" (N/O WLAN Modules at ISM and UNII Bands), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 129-132.

[Pub66] P. Bobiński: "Metody optymalizacyjne w koderach sekwencji wideo" (Optimisation Methods in Video Sequence Coders), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 89-97.

[Pub67] P. Boniński, M. Kazubek: „Porównanie efektywności obiektywnych miar jakości dla obrazów mammograficznych", (Comparison of the Effectiveness of Some Objective Quality Measures for Digital Mammograms), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna*, *Tom II Biopomiary*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 763-768.

[Pub68] P. Brzeski, J. Mirkowski, T. Olszewski, A. Pląskowski, D. Radomski, W. Smolik, R. Szabatin: „Wielokanałowy tomograf pojemnościowy", (Multichannel Capacitance Tomograph), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna*, *Tom II Biopomiary*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements (Gdańsk, Poland, Sept. 10-13, 2003), pp. 740-747.

[Pub69] P. Brzeski, J. Mirkowski, T. Olszewski, A. Pląskowski, W. Smolik, R. Szabatin: „Capacitance Tomography for Dynamic Process Imaging", *Proc. 3rd World Congress on Industrial Process Tomography* (Banff, Canada, Sept. 2-5, 2003), pp. 642-647.

[Pub70] W. Brzozowski: "Generacja mapy gęstości ruchu w sieci GSM na podstawie lokalizacji stacji ruchomej" (The Generation of Movement Density Map in GSM Based on Localization of Mobile Station), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 53-61.

[Pub71] A. Buchowicz, K. Ignasiak: "Aplikacja MPEG-7 z wykorzystaniem serwisów sieciowych" (MPEG-7 Application Using Network Services), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 349-352.

[Pub72] M. Celuch-Marcysiak: "Local Stereoscopic Field Singularity Models for FDTD Analysis of Guided Wave Problems", *Proc. 2003 IEEE IMS Symposium*, (Philadelphia, USA, Jun. 8-13, 2003), pp. 1137-1140.

[Pub73] K. Dufrěne: "Symulacja kanału radiowego w czasie rzeczywistym z wykorzystaniem technik DSP" (Real Time Radio Channel Simulation with the Use of DSP Technologies), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 159-171.

[Pub74] K. Dufrěne: "Symulacja kanału radiowego z wykorzystaniem techniki DSP" (Radio Channel Simulation Using DSP Technology), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 153-156.

[Pub75] J. Falkiewicz, M. Okoński, G. Kustra: "Adaptive ANC System with Nonlinear Secondary Path Based on Recurrent Neural Network", *Mat. VI Konferencji „Metody Aktywne Redukcji Drgań i Hałasu",* (Cracow, Poland, May 7-9, 2003), on CD-ROM, and, In: *„Kwartalnik Akademii Górniczo-Hutniczej - Mechanika",* 22(3), 2003, pp. 263-270.

[Pub76] G. Galiński, W. Skarbek: "Motion Trajectory Representations for Efficient Storage and Search", *Proc. SPIE Internet Multimedia Management Systems IV*, Vol. 5242, (Orlando, Florida, USA, Sept. 7-11, 2003), pp. 155-162.

[Pub77] H. Goszczyńska, T. Wolak, R. Kurjata, M. Orzechowski: „Pomiar przepływu wieńcowego na podstawie analizy obrazów koronograficznych - eksperyment wykonany na modelu tętnicy", (Coronary Blood Flow Measurement from Coronarographic Images Performed on the Artery Model), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom I Biosystemy*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. I - Biosystems), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 515-520.

[Pub78] D. Gryglewski, W. Wojtasiak: "Mikrofalowy generator PLL/DDS na pasmo L i S" (L and S Band Pll/DDS Microwave Generator), *Mat. II Krajowej Konferencji Elektroniki* (Proc. IInd National Conference on Electronics), (Kołobrzeg, Poland, Jun. 9-12, 2003), Vol. 1, pp. 295-300.

[Pub79] J. Guterman: "Drukowane anteny fraktalne dla terminali przenośnych" (Fractal Type Printed Antennae for Mobile Communications), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 33-45.

[Pub80] D. Janusek, Z. Pawłowski, S. Karczmarewicz, A. Przybylski: „Badania wykrywalności zmienności załamka T w elektrokardiogramach", (Investigations Based on Changes of T-wave Parameters in ECG), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom I Biosystemy*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. I - Biosystems), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 442-447.

[Pub81] M. Karkowski, W. Winiecki: "Modern Data Acquisition System in the Road Weather Stations Monitoring", *Proc. IEEE IDAACS Conf.* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 442-447.

[Pub82] T. Keller: "Eksperymentalne wyniki badania interferencji w paśmie ISM 2.4 GHz" (Experimental Results of Interference Research at ISM 2.4 GHz Band), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 467-470.

[Pub83] T. Keller: "Badania wydajności systemów łączności bezprzewodowej pracujących w paśmie ISM w obecności interferencji" (Examing of Wireless Systems' Throughput Working in ISM Band in the Presence of Interference), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 45-53.

[Pub84] T. Keller, J. Modelski: "Experimental Results of Testing Interferences in 2.4 GHz ISM Band", *Proc. 6th European Conference on Wireless Technology* (Münich, Germany, Oct. 6-10, 2003), pp. 81-84.

[Pub85] T. Knyziak, W. Winiecki: „The New Prospects of Distributed Measurement Systems Using Java™ 2 Micro Edition Mobile Phone", *Proc. IEEE IDAACS Conf.* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 291-295.

[Pub86] J. Kołakowski, J. Cichocki, J. Modelski: "Transmisja ultraszerokopasmowa - przyszłość sieci bezprzewodowych?" (Ultrawideband Transmission - Future of Wireless Communications?), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 52-58.

[Pub87] P. Kopyt, B. Salski, W. K. Gwarek: "Resonator-based Method for Estimation of Complex Permittivity of Materials", *Proc. 12th Conference on Microwave Technique: COMITE-2003* (Pardubice, the Czech Republic, Sept. 10-11, 2003), pp. 117-120.

[Pub88] P. Kopyt, M. Celuch-Marcysiak, W. K. Gwarek: "Microwave Processing of Temperature-dependent and Rotating Objects: Development and Experimental Verification of FDTD Algorithms", *Proc. 3rd World Congress on Microwave and Radio Frequency Applications* (Sydney, Australia, Dec. 2003), 2 pages.

[Pub89] P. Kopyt, M. Celuch-Marcysiak: "Accurate Modelling of Microwave Heating of Rotated Objects and Verification of the Results", *Proc. International Symposium on Future Technologies for Food Production and Future Food Scientists* (Gothenburg, Sweden, Jun. 2-4, 2003), pp. 75-78.

[Pub90] P. Kopyt, M. Celuch-Marcysiak: "Coupled Electromagnetic and Thermal Simulation of Microwave Heating Process", *Proc. 2nd International Workshop on Information Technologies and Computing Techniques for the Agro-Food Sector* (Barcelona, Spain, Nov. 26 - Dec. 1, 2003), pp. 51-54.

[Pub91] T. Kosiło, J. Modelski, K. Płatek: "Interfejs OFDM w radiowych systemach dostępowych" (OFDM Interface in Radio Access Systems), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 551-554.

[Pub92] M. Kostrzewa, Z. Kulka, P. Nykiel: "Badanie właściwości czasowych modulatorów delta-sigma" (Time Performance Investigations of Delta-sigma Modulators), *Proc. X Inter-*

national Symposium of Sound Engineering and Tonmeistering: ISSET 2003, (Wrocław, Poland, Sept. 11-13, 2003), *Prace Naukowe Instytutu Telekomunikacji i Akustyki Politechniki Wrocławskiej* No. 84, *Seria: Konferencje*, No. 28, pp. 103-108.

[Pub93] E. Kotarbińska, E. Kozłowski: "Metoda badań skuteczności akustycznej nauszników przeciwhałasowych w warunkach rzeczywistych" (The Method of Investigation of Real World Efficiency of Ear-muffs), *Mat. 50 Otwartego Seminarium z Akustyki: OSA 2003*, (Proc. The Fiftieth Open Seminar on Acoustics: OSA 2003), (Szczyrk-Gliwice, Poland, Sept. 23-27, 2003), pp. 83-86.

[Pub94] E. Kotarbińska, E. Kozłowski: "The Influence of Using Time, Storage and Exposure to Atmosferic Conditions on Attenuation of Ear-muffs", *Proc. The 32nd International Congress and Exposition on Noise Control Engineering: Inter-Noise 2003*, (Seogwipo, Korea, Aug. 25-28, 2003), pp. 2755-2760.

[Pub95] E. Kotarbińska: "Zmiana tłumienia nauszników przeciwhałasowych w funkcji czasu" (The Changes of Sound Attenuation of Earmuffs Due to the Period of Use), *Mat. XXXI Zimowej Szkoły Zwalczania Zagrożeń Wibroakustycznych*, (Gliwice-Szczyrk, Poland, Feb. 24-28, 2003), pp. 79-88.

[Pub96] J. Krupka, A. Abramowicz, K. Derzakowski: "Triplet Dielectric Resonator Filter with Direct Coupling", *Proc. International Conference on Electromagnetics for Advanced Applications: ICEAA* (Torino, Italy, Sep. 8-12, 2003), pp. 143-146.

[Pub97] K. Kucharski, T. Kosiło, K. Płatek: "Reflektorowe przekaźniki bierne w łączach mikrofalowych" (Reflector Passive Transmitters in Microwave Links), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 217-220.

[Pub98] Z. Kulka: "Cyfrowa technika foniczna – wybrane układy i systemy" (Digital Audio – Some Chosen Circuits and Systems), Referat plenarny (Plenary Paper), *Mat. 50 Otwartego Seminarium z Akustyki: OSA: 2003*, (Proc. The Fiftieth Open Seminar on Acoustics: OSA 2003), (Szczyrk-Gliwice, Poland, Sept. 23-27, 2003), pp. 526-537.

[Pub99] A. Kurek, K. Czerwiński: "System orientacji terenowej dla osób niewidomych" (System for the Blind People Supporting), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 91-93.

[Pub100] K. Kurek, J. Modelski: "Analiza przestrzennego rozkładu sygnałów wielodrogowych propagujących wewnątrz pomieszczenia" (Analysis of Spacial Distributions of Multiroad Propagate Indoor Signals), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 145-148.

[Pub101] K. Kurek, J. Modelski: "Stastical Model of the Indoor Propagation Channel", *Proc. 11th MICROCOLL* (Budapest, Hungary, Sept. 10-11, 2003), ISBN 963 212 166X, pp. 23-26.

[Pub102] R. Kurjata, Z. Pawłowski, G. Domański, A. Trybuła, K. Zaremba, J. Marzec, B. Konarzewski: „Laboratoryjny tomograf optyczny o stałej geometrii" (Fixed Geometry Laboratory Optical Scanner) *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom II Biopomiary* (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 877-882.

[Pub103] G. Kustra, J. Falkiewicz: "Using Genetic Algorithms in Active Noise Control", *Materiały VI Konferencji "Metody Aktywne Redukcji Drgań i Hałasu"*, (Cracow, Poland, May 7-9, 2003), on CD.

[Pub104] P. Majchrzak: "System radiotelemetryczny krótkiego zasięgu i jego zastosowanie w telemedycynie" (Short Range Radiotelemetry System and its Application to Telemedicine), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 125-128.

[Pub105] P. Majchrzak, Y. Yashchyshyn, J. Modelski: "Universal Antenna and RCS Measurements Range - Realization of Plannar Near-Field Measurements", *Proc. 5th NATO Regional Conference on Military Communications and Information Systems 2003: Capturing New CIS Technologies*, (Zegrze, Poland, Oct. 8-10, 2003).

[Pub106] S. Maszczyk: "Wykorzystanie paczek falkowych do redukcji zakłóceń wąskopasmowych w systemach DSSS" (Application of Wavelet Packets for Reduction of Narrowband Interference in DSSS Systems), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 161-164.

[Pub107] S. Maszczyk: "Wykorzystanie transformacji falkowej do redukcji zakłóceń wąskopasmowych w systemach CDMA" (Application of Wavelet Transform for Elimination of Narrowband Interference in CDMA Systems), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth

Seminar - Radiocommunications and Multi-media Technologies), (Warsaw, Dec. 10, 2003), pp. 19-24.

[Pub108] J. Matuszewski: "Programowe środowisko do badania procedur sterowania mocą w systemie UMTS" (Software Environment for Investigation of Power Control Procedures in UMTS System), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 25-32.

[Pub109] R. Michnowski, W. Wojtasiak: "The Electro-thermal Model of High Power LDMOS Transistor", *Proc. 11th GAAS Symposium*, (Münich, Germany, Oct. 6-10, 2003), pp. 243-246.

[Pub110] M. Mikołajewski: "Optimization of a Resonant Dc/dc Converter with a Class DE Inverter and a Class DE Controllable Rectifier", *Proc. ECCTD'03 - European Conference on Circuit Theory and Design*, (Cracow, Poland, Sept. 1-4, 2003), pp. 129-132.

[Pub111] M. Mikołowicz: "Realizacja i badania czujnika mikrofalowego przeznaczonego do zastoso-wania w systemie laryngektofonu" (Imple-mentation and Planning Tests of Microwave Electromagnetic Sensor Designed for Use in Laryngectophone System), *Proc. X Inter-national Symposium of Sound Engineering and Tonmeistering: ISSET 2003*, (Wrocław, Poland, Sept. 11-13, 2003), *Prace Naukowe Instytutu Telekomunikacji i Akustyki Poli-techniki Wrocławskiej* No. 84, *Seria: Kon-ferencje*, No. 28, pp. 159-163.

[Pub112] P. Minodzki, L. Morzyński, J. Narkiewicz-Jodko: "Słuchawki aktywne z cyfrowym układem sterującym" (Active Head-phones Controlled Digitally), *Mat. 50 Otwartego Seminarium z Akustyki: OSA 2003*, (Proc. The Fiftieth Open Seminar on Acoustics: OSA 2003), (Szczyrk-Gliwice, Poland Sept. 23-27, 2003), pp. 462-465.

[Pub113] J. Modelski, J. Kołakowski, J. Cichocki: "Techniki, architektury i zastosowania sieci bezprzewodowych", (Technology, Archi-tectures and Applications of Wireless Net-works), *Mat. Konferencji: Sieci Bez-przewodowe - Technologie, Rozwiązania i Zastosowania* (Proc. Conference: Wireless Networks - Technologies, Solutions and Applications), (Warsaw, 2003), pp. 8-18.

[Pub114] J. Modelski, Y. Yashchyshyn. "A New Microstrip Electrically Controllable Scan Antenna" *Proc. 33rd EuMC* (Münich, Ger-many, Oct. 7-9, 2003), ISBN 1-58053-836-3, pp. 931-934.

[Pub115] J. Modelski, Y. Yashchyshyn: "Phase Shifter on Composite Ferroelectric Substrate", P*roc. 13th Int. Crimean Conference: „Micr-owave & Telecommunication Technology”, CriMicro 2003*, (Sevastopol, Ukraine, Sept. 8-12, 2003), IEEE Catalog Number

03EX697, ISBN 966-7968-26-X, pp. 466-467.

[Pub116] J. Modzelewski: "Efekt Millera w rezonansowych wzmacniaczach mocy wielkiej częstotliwości klasy DE i klasy E" (Miller's Effect in Class-DE and Class-E High-Frequency Tuned Power Amplifiers), *Mat. II Krajowej Konferencji Elektroniki: KKE'03* (Proc. IInd National Conference on Electronics), (Kołobrzeg-Dźwirzyno, Poland, Jun. 9-12, 2003), pp. 325-330.

[Pub117] J. Modzelewski: "Straty komutacyjne w rezonansowych wzmacniaczach mocy klasy DE" (Switching Losses in Class-DE Tuned Power Amplifiers), *Mat. Konferencji: Postępy w Elektrotechnice Stosowanej*, (Proc. Conf-erence on Advances in Electrotechnics), (Kościelisko, Jun. 23-27, 2003), pp. 99-106.

[Pub118] J. Modzelewski: "Non-optimum Operation of Class DE Tuned Power Amplifiers", *Proc. ECCD'03: European Conference on Circuit Theory and Design*, (Cracow, Poland, Sept. 1-4, 2003), pp. II277-II280.

[Pub119] R. Z. Morawski: „Realists' vs. Instrumen-talists' Understanding of Measurement", *Proc. XVIIth IMEKO World Congress* (Cavtat-Dubrovnik, Croatia, June 22-27, 2003), CD-ROM.

[Pub120] T. Morawski, J. Zborowska: "Broadband Microwave Analog Phase Shifters" *Proc. 12th Conference on Microwave Techniques: COMITE 2003*, (Pardubice, the Czech Republic, Sept. 23-24, 2003), pp. 81-84.

[Pub121] T. Morawski, J. Zborowska: "Wielostanowe mikrofalowe przesuwniki fazy" (Multi-state Microwave Phase Shifters), *Mat. II Krajowej Konferencji Elektroniki* (Proc. IInd National Conference on Electronics), (Kołobrzeg, Po-land, Jun. 9-12, 2003), Vol. 1, pp. 277-282.

[Pub122] J. Mosakowski, A. Podgórski: „Implemen-tation of 1/1 Octave and 1/3 Octave Filters in Digital Signal Procesor", *Proc. XVIIth IMEKO World Congress (Cavtat-Dubrovnik, Croatia, June 22-27, 2003),* on CD-ROM.

[Pub123] J. Narkiewicz-Jodko, S. Brzeziński, A. Sze-szeń, G. Makarewicz, L. Morzyński: "Zasto-sowania laboratoryjne i praktyczne aktywnej redukcji dźwięku" (Laboratory and Practical Applications of Active Noise Control), *Proc. The Fiftieth Open Seminar on Acoustics: OSA 2003*, (Szczyrk-Gliwice, Poland, Sept. 23-27, 2003), pp. 466-469.

[Pub124] M. Naumowicz, W. Winiecki: „Zintegrowane środowiska programowe a parametry cza-sowe systemu pomiarowego" (Integrated Program Environments and Time Para-meters for Measuring System), *Mat. VI Szkoły-Konferencji „Metrologia Wspomagana Komputerowo - MWK'2003"* (Waplewo, Poland, May 6-29, 2003), pp. 289-296.

[Pub125] A. Oręziak, E. Piątkowska-Janko, G. Opolski: "P-wave signal-averaged ECG - a Useful Tool for Evaluation of Atrial Electrical

Stability in Hypertensive Patients with Left Ventricular Hypertrophy", *Lecture Notes of the ICB Seminars, 70th ICB Seminar on High Resolution ECG and MCG Mapping* (Warsaw, Oct. 16-18, 2003).

[Pub126] D. Paczesny, Z. Walczak: "Analiza metod trasowania w sieciach ad hoc na przykładzie protokołu DSR" (Analysis of Routing Methods in Networks for Example of DSR Protocol), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 69-75.

[Pub127] G. Pastuszak: "Sprzętowe implementacje algorytmów kompresji obrazów dla standardu JPEG2000" (Hardware Applications of Image Compression Algorithms for JPEG200 Standard), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 341-344.

[Pub128] S. Pawelec, Y. Yashchyshyn: "Model anteny stacji bazowej o dookólnej charakterystyce wąskopasmowych w systemach DSP" (Model of Omni-Directional Base Station Antenna), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 165-168.

[Pub129] R. Pączkowski, T. Keller, J. Modelski: "Koncepcja mobilnego dostępu do baz danych w oparciu o projekt systemu informacji studenckiej" (Concept of Mobile Access to Database Based on Student's Information System), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 515-518.

[Pub130] R. Pączkowski, T. Keller, J. Modelski: "System for Mobile Wireless Access to Student's Information", *Proc. EUROCON 2003*, (Ljubljana, Slovenia, Sept. 22-24, 2003), pp. 285-288.

[Pub131] M. Piasecki, J. Modelski: "Investigation of an Experimental Setup of a Smart Antenna", *Proc. International Microwave Symposium: IEEE MTT-S* (Philadelphia, USA, Jun. 8-13, 2003), pp. 1845-1848.

[Pub132] A. Podgórski, R. Nedwidek, M. Pochmara: „Implementation of the USB Interface in the Instrumentation for Sound and Vibration Measurements and Analysis", *Proc. IEEE IDAACS Conf.* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 159-163.

[Pub133] A. Przelaskowski: „Numerical Equivalent of Accuracy as a Measure of Medical Image Quality", *Proc. XVII IMEKO World Congress*,

(Dubrovnik, Croatia, Jun. 22-27, 2003), pp. 1726-1730.

[Pub134] A. Przelaskowski, A. Kukuła: „Estimation of Diagnostic Ability by Diagnostic Features Assessment Tests", *Proc. XVII IMEKO World Congress*, (Dubrovnik, Croatia, Jun. 22-27, 2003), pp. 1447-1451.

[Pub135] A. Przelaskowski: „Diagnostic Accuracy Measures of Lossy Compressed Mammograms", *Proc. First International ICSC-NAISO Symposium on Information Technologies in Environmental Engineering ITEE*, (Gdańsk, Poland, Jun. 24-27, 2003) pp. 49-55.

[Pub136] A. Przelaskowski: „Transformacja falkowa jako narzędzie analizy istotnych cech obrazów medycznych", (Wavelet Transform Applied to the analysis of Medical Images), *Mat. III Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom I Biosystemy*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. I - Biosystems), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 205-210.

[Pub137] A. Przelaskowski: „Standard JPEG2000 w kompresji obrazów medycznych", (Usefulness of JPEG2000 for Medical Image Compression), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom I Biosystemy*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. I - Biosystems), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 373-378.

[Pub138] A. Przelaskowski: „Dopuszczalność strat w kompresji medycznych danych obrazowych", (Acceptability of Irreversible reconstruction in medical image compression), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna, Tom II Biopomiary*, (Proc. XIIIth National Science Conference Biocybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements), (Gdańsk, Poland, sept. 10-13, 2003), pp. 812-817.

[Pub139] G. Radzikowski, J. Wojciechowski: "Prawna, ekonomiczna i techniczna analiza pieniądza cyfrowego" (Legal, Economic and Technical Analysis of Digital Money), *Mat. Konferencji: Electronic Commerce: Badania i Rozwój* (Proc. Conference: Electronic Commerce: Investigations and Development), (Gdańsk, Poland, 2003), ISBN 83-88617-85-0, pp. 129-136.

[Pub140] G. Radzikowski: "Comparison of Cryptographic Algorithms RSA and ECC in Application to Smart Card", *V Ogólnopolskie Warsztaty Doktoranckie* (Proc. Vth Doctoral Workshop), (Istebna, Poland, 2003), pp. 272-277.

[Pub141] J. Siwik, E. Piwowarska, J. Marzec, D. Bujalski: „BiCMOS Low Noise Amplifier-shaper-discriminator for HEP Experiments Drift

Chambers", *Proc. 10th International Conference MIXDES 2003*, (Łódź, Poland 26-28 Jun. 2003), pp. 168-173.

[Pub142] W. Skarbek: "MPEG-7", *Mat. Konferencyjne IX Konferencji Użytkowników i Deweloperów ORACLE"*, (Kościelisko, Poland, Oct. 21-25, 2003), ISSN 1641-2117, pp. 101-108.

[Pub143] R. Smoliński: "System do analizy cech przestrzennych pola akustycznego" (The System for Analysis of Spatial Features of an Acoustic Field), *Proc. X International Symposium of Sound Engineering and Tonmeistering (ISSET 2003)*, (Wrocław, Poland, Sept. 11-13, 2003), *Prace Naukowe Instytutu Telekomunikacji i Akustyki Politechniki Wrocławskiej*, No 84, *Seria: Konferencje* No. 28, pp. 115-120.

[Pub144] R. Smoliński: "System do analizy cech przestrzennych pola akustycznego" (The System for Analysis of Spatial Features of an Acoustic Field), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 97-103.

[Pub145] M. Sosnowski, T. Kosiło: "Microcontroller System for the Three Phase AC Induction Motors Using Space Vector Modulation and Flux Estimation", *Proc. EUROCON 2003: The International Conference on Computer as a Tool* (Ljubljana, Slovenia, Sept. 22-24, 2003), IEEE Catalog Number 03EX665, ISBN 0-7803-7763-X, on CD-ROM.

[Pub146] A. Stułka: "Symulacja działania stacji ruchomej UMTS w stanie gotowości" (Simulation of UMTS Mobile Station Operation in Idle State), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 61-68.

[Pub147] A. Synyavskyy, J. Modelski, Y. Yashchyshyn: "Determination of Multi-layered Permittivity Profile from Specified Angular Dependence of Reflection Coefficient" *Proc. DIPED'2003*, (Lviv, Ukraine, Sept. 23-25, 2003), IEEE Catalog Number: 03TH8689, ISBN 966-02-2888-0, pp. 43-46.

[Pub148] A. Synyavskyy, J. Modelski, Y. Yashchyshyn: "Synthesis of Multilayered Structures Based on the Approximation of One-dimensional Inverse Scattering Problem Solution", *Proc. 11th MICROCOLL*, (Budapest, Hungary, Sept. 10-11, 2003), ISBN 963 212 166 X, pp. 181-184.

[Pub149] A. Synyavskyy, K. Kurek, J. Modelski, Y. Yashchyshyn: "Four-element Smart Antenna for Direction Estimation and Fading Reduction in Two-wave Propagation Condition", *Proc. 6th European Conference on Wireless Technology: ECWT*, (Műnich, Germany, Oct. 8-10, 2003), ISBN 1-58053-838-x, pp. 191-194.

[Pub150] R. Szumny, J. Jarkowski, J. Modelski: "Analiza możliwości realizacji lokalizacji terminala w systemie GSM na podstawie pomiaru poziomu sygnału" (Analysis of Abilities of Terminal Localization in GSM System Based on Signal Level Measurement), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp, 87-94.

[Pub151] T. Szymański: "Zastosowanie inteligentnych szyków antenowych w trybie FDD systemu UMTS" (Application of Intelligent Antenna Arrays in FDD UMTS System), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 213-216.

[Pub152] A. Trojanowski, J. Wojciechowski: "Prognozowanie zaników w kanale radiowym Rayleigha z wykorzystaniem metod predykcji liniowej" (Prediction of Decay in Rayleigh Radio Channel Using the Line Prediction Method), *Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRRiT'03* (Proc. National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), pp. 267-270.

[Pub153] A. Trybuła, Z. Pawłowski, R. Kurjata, G. Domański, K. Zaremba, J. Marzec, B. Konarzewski: „Urządzenie do pomiaru rozkładów powierzchniowych światła rozproszonego w uwarstwionych strukturach biologicznych", (The Device for Measurement of the Surface Light Distribution in Layered Tissues), *Mat. III Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna*, *Tom II Biopomiary*, (Proc. XIIIth National Science Conference on Biocybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 871-876.

[Pub154] R. Urban: "Wpływ efektów upakowania na anteny mikropaskowe dla systemów komunikacji ruchomej" (The Influence of Packing Effects on Microstrip Antennae for Mobile Communication Systems), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 75-89.

[Pub155] W. Winiecki, P. Bilski: "Time Analysis of Virtual Spectrum Analyser", *Proc. IEEE IDAACS* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 144-149.

[Pub156] W. Winiecki, A. Kuran, R. Łukaszewski: "GSM Mobile Phone in Distributed Measuring System", *Proc. XVII IMEKO World*

Congress (Dubrovnik, Croatia, Jun. 22–27, 2003), on CDROM.

[Pub157] W. Winiecki, P. Bilski: "Time Aspects of Virtual Instrument Designing", *Proc. IEEE IMTC'03 Conference*, (Vail, Co, USA, May 21-23, 2003), pp. 913-918.

[Pub158] W. Winiecki, T. Mielcarz: „Internet-based Methodology for Distributed Virtual Instrument Designing", *Proc. IEEE IMTC'03 Conference*, (Vail, Co, USA, May 21-23, 2003), pp. 760-765.

[Pub159] W. Winiecki: "Methodology for Distributed Designing of Distributed Virtual Instruments", *Proc. IEEE IDAACS Conf.* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 422-427.

[Pub160] W. Winiecki: „Methodology of the Virtual Instruments' Time Analysis", *Proc. IEEE IDAACS* (Lviv, Ukraine, Sept. 8-10, 2003), pp. 432-436.

[Pub161] K. Wnukowicz: "Indeksowanie obrazów techniką temperatury barwowej" (Indexation of Images by Means of Colour Temperature Technology), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 103-111.

[Pub162] T. Wolak, Z. Pawłowski, P. Bogorodzki, E. Piątkowska-Janko, M. Orzechowski, R. Kurjata, D. Koziński, P. Bargieł, „Cyfrowe atlasy mózgu i ich wykorzystanie do analizy funkcjonalnych badań mózgu (Functional MRI)", (Digital Brain Atlases to Analyse Fuctional Magnetic Resonance Images of the Brain (fMRI)), *Mat. XIII Krajowej Konferencji Naukowej Biocybernetyka i Inżynieria Biomedyczna*, *Tom II Biopomiary*, (Proc. XIIIth National Science Conference on Bio-cybernetics and Biomedical Engineering, Vol. II - Biomedical Measurements), (Gdańsk, Poland, Sept. 10-13, 2003), pp. 775-780.

[Pub163] T. Wolak: "Cyfrowe atlasy mózgu i ich wykorzystanie do analizy funkcjonalnych badań mózgu (Functional MRI)", (Digital Brain Atlases to Analyse Fuctional Magnetic Resonance Images of the Brain (fMRI)), *Mat. IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (Proc. IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), pp. 111-119.

[Pub164] W. Wojtasiak, D. Gryglewski, T. Morawski, R. Michnowski: "Elektryczno-termiczne modelowanie mikrofalowych tranzystorów dużej mocy" (Electrical-thermal Modelling of Microwave High-power Transistors), *Mat. II Krajowej Konferencji Elektroniki* (Proc. IInd National Conference on Electronics), (Kołobrzeg, Poland, Jun. 9-12, 2003), Vol. 2, pp. 743-748.

[Pub165] W. Wojtasiak, D. Gryglewski, W. K. Gwarek: "High-frequency-stability Microwave High-

power Sources", *Proc. 9th International Conference on Microwave and High Frequency Heating*, (Loughborough, Great Britain, Sept. 1-5, 2003), pp. 305-308.

[Pub166] W. Wojtasiak: "Wzmacniacze dużej mocy z tranzystorami Si-LDMOS i Push-Pull GaAsFET na pasmo WCDMA i ISM2.4" (WCDMA and ISM2.4 Band High-power Amplifiers with Si-LDMOS and Push-Pull GaAsFET Transistors), *Mat. II Krajowej Konferencji Elektroniki* (Proc. IInd National Conference on Electronics), (Kołobrzeg, Poland, Jun. 9-12, 2003), Vol. 1, pp. 289-294.

[Pub167] Y. Yashchyshyn, A. Synavskyy, J. Modelski. "Evaluation of Possibilities of Solving the Inverse Scattering Problem for Multilayered Structures in the Case of Plane Wave", *Proc. VIIth Int. Conf. CADSM'2003*, Feb. 18-22, 2003, (Lviv-Slavsko, Ukraine), IEEE Catalog Number: 03EX 618, ISBN 966-553-278-2, pp. 307-310.

[Pub168] Y. Yashchyshyn, J. Modelski: "Low-cost Ferroelectric Ceramic-polymer Scan Antenna" *Proc. IMOC 2003*, (Foz do Iguacu, Brazil, Sept. 20-23, 2003), IEEE Catalog Number 03TH8678, ISBN 0-7803-7824-5, pp. 401-405.

[Pub169] Y. Yashchyshyn, M. Szafran, J. Modelski, E. Bobryk. "Investigation of the Ferroelectric Materials Behaviour in Micro-wave Band", *Proc. VIIth Int. Conf. CAD-SM'2003*, Feb. 18-22, 2003, (Lviv-Slavsko, Ukraine), IEEE Catalog Number 03EX618, ISBN 966-553-278-2, pp. 88-90.

[Pub170] Y. Yashchyshyn, J. Modelski, M. Szafran: "Ceramic-polymer Ferroelectric Materials for Antenna Applications" *Proc. ICATT2003*, (Sevastopol, Ukraine, Sept. 9-12, 2003), IEEE Catalog Number 03EX699, ISBN 0-7803-7881-4, pp. 687-691.

6.5 Other papers in journals and conference proceedings

[Pub171] T. Buczkowski: "Elektronika a środowisko - koncepcja zrównoważonego rozwoju", (Electronics and Environment - Idea of Sustainable Development), *Radioelektronik-Audio-HiFi-Video*, No. 2, (2003), pp. 32-33.

[Pub172] T Buczkowski: "Elektronika a środowisko. Zagrożenia ze strony przemysłu elektronicznego (1)" (Hazards Posed by Electronic Industry - Part 1), *Radioelektronik-Audio-HiFi-Video*, No. 4, (2003), pp. 28-29.

[Pub173] T. Buczkowski: "Elektronika a środowisko. Zagrożenia ze strony przemysłu elektronicznego (2)" (Hazards Posed by Electronic Industry - Part 2), *Radioelektronik-Audio-HiFi-Video*, No. 5, (2003), pp. 26-27.

[Pub174] T. Buczkowski: "Elektronika a środowisko. Zagrożenia ze strony przemysłu elektronicznego (3)" (Hazards Posed by

Electronic Industry - Part 3), *Radioelektronik-Audio-HiFi-Video*, No. 6, (2003), pp. 26-27.

[Pub175] T. Buczkowski: "Szkodliwość materiałów stosowanych w elektronice", (Harmful Materials in Electronics) *Radioelektronik-Audio-HiFi-Video*, No. 10, (2003), pp. 22-23.

[Pub176] T. Kosiło, K. Płatek: "Przekaźniki bierne, czyli...odbijamy" (Passive Transmitters, So.... Let's Go), *Telenet Forum*, (Jul. - Aug., 2003), ISSN 1641-795X, pp. 18-20.

[Pub177] J. Modelski: "Rozwój technik multi-medialnych w Instytucie Radioelektroniki Politechniki Warszawskiej", (Development of Multimedia Technologies in the Institute of Radioelectronics, Warsaw Institute of Technology), *Elektronizacja*, (4/2003), ISSN 0138-0826, pp. 4-5.

[Pub178] J. Woźnicki, R. Z. Morawski: "Public and Private Higher Education Institutions: Joint or Separate Evaluation and Ranking: the Polish Perspective", *Higher Education in Europe*, Vol. 27, No. 4, (Dec. 2002), published in 2003, pp. 461-466.

6.6. Abstracts

[Pub179] P. Brzeski, J. Mirkowski, T. Olszewski, A. Pląskowski, W. Smolik, R. Szabatin: „Capacitance Tomograph", *Proc. 72nd ICB Seminar Recent Achievements of Bio-impedance Research* (Warsaw, Poland, Nov. 13-16, 2003), 1 pp.

[Pub180] D. Janusek, S. Kaczmarewicz, A. Przybylski, G. Gościńska-Bis, T. Zając, A. Lubiński, D. Urbańczyk, A. Filipecki, Z. Pawłowski, P. Kułakowski: "Correlation Between T-wave Amplitude and Pacing Spike - T-wave Interval in Patients with Apparent T-wave Alternans", *Polish Heart Journal, 7th International Congress Polish Cardiac Society,* (Gdynia-Sopot-Gdańsk, Poland, Sept. 11-13 2003), Vol. 59, Suplement I, No. P0700, 1 pp.

[Pub181] D. Janusek, S. Karczmarewicz, Z. Pawłowski, A. Przybylski, K. Gościńska-Bis, T. Zając, A. Lubiński, D. Urbańczyk, A. Filipecki, P. Kułakowski: „Correlation Between Q-T Interval and T-wave Amplitude in Patients with Apparent T-wave Alternans Phenomenon", *Proc. EUROPACE 2003,* (Paris, France, Dec. 14-17, 2003), A 18-6, 1 pp.

[Pub182] J. Krupka, A. Abramowicz, K. Derzakowski: "Magnetically Tunable Dielectric Resonators Operating at Frequencies about 2GHz", *Proc. Physics Congress 2003*, (London, Great Britain, Mar. 23-27, 2003), 1 pp.

7. REPORTS

[Rep1]   P. Bogorodzki, A. Piątkowski, E. Piątkowska-Janko: *"System monitorowania perfuzji podczas zabiegów chirurgicznych interwencyjnych i farmakologicznych"* (Perfusion Monitoring System for Controlling of Surgical, Interventional and Pharmacological Treatments), Final report for the EUREKA PERMON grant, (No. E!2427), Institute of Radioelectronics, WUT, Warsaw, Dec. 2003, 20 pp.

[Rep2]   A. Buchowicz, K. Ignasiak, W. Skarbek, G. Galiński, P. Bobiński, M. Łempkowski, K. Wnukowicz, T. Keller, R. Seta, E. Snitkowska: *"Serwisy sieciowe w aplikacjach MPEG-7 i MPEG-21"* (Web Services in MPEG-7 and MPEG-21 Applications), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034 /0402), Warsaw, Nov. 2003, 18 pp.

[Rep3]   J. Cichocki, J. Kołakowski, S. Maszczyk: *"Opracowanie, weryfikacja i wdrożenie koncepcji rozszerzenia możliwości funkcjonalnych oraz metrologicznych stacjonarnego systemu namierzania źródeł emisji radiowych"* (Design, Verification and Implementation of Extended Functional Capabilities of Stationary Direction Finding System), Final report for the Office for Telecommunications Regulations (No.501E /1363), Warsaw, Dec. 2003, 40 pp.

[Rep4]   K. Derzakowski: *"Zastosowanie metody FDTD do analizy i projektowania anten z rezonatorami dielektrycznymi"* (Application of the FDTD Method for Analysis and Design of Dielectric Resonator Antennae), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/ 4054), Warsaw, Dec. 2003, 55 pp.

[Rep5]   G. Domański: *"Stanowisko badawcze tomografii optycznej"* (Research Stand of Optical Tomography), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4043), Warsaw, Nov. 2003, 26 pp.

[Rep6]   J. Ebert, M. Mikołajewski, J. Modzelewski, A. Wajs: *"Modelowanie, analiza i optymalizacja rezonansowych przetwornic napięcia stałego z regulatorami synchronicznymi"* (Modelling, Analysis and Optimisation of Resonant dc/dc Converters with Synchronous Controllable Class DE Rectifier), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0402), Warsaw, Nov. 2003, 21 pp.

[Rep7]   W. Gwarek: *"Opracowanie skupionego schematu zastępczego ośrodka ferrytowego odpowiadającego tensorowi Poldera i zbadanie możliwości jego zastosowania w symulacjach FD-TD"* (Lumped Circuit Model of Magnetized Ferrite Medium Corresponding to the Polder's Tensor and its Applications in FDTD Simulations), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4051), Warsaw, Dec. 2003, 10 pp.

[Rep8]   M. Kazubek: *"Stacja robocza do współpracy z aparatami ultrasonograficznymi ImagePoint"* (Workstation for Co-operation with Ultrasound Scanners), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4052), Warsaw, Dec. 2003, 27 pp.

[Rep9]   J. Kołakowski, J. Cichocki, K. Radecki, S. Maszczyk: *"Wykorzystanie technik DSP do analizy i generacji szerokopasmowych emisji radiowych"* (Application of DSP Techniques for Generation and Analysis of Wideband Radio Emissions), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4042), Warsaw, Nov. 2003, 56 pp.

[Rep10] T. Kosiło, T. Buczkowski, J. Cichocki, H. Chaciński, K. Czerwiński, F. Alwafie, D. Grabowski, J. Guterman, D. Janusek, J. Jarkowski, W. Kazubski, J. Kołakowski, S. Maszczyk, K. Radecki, K. Snopek, Z. Walczak, J. Wojciechowski, S. Żmudzin: *"Współczesne systemy radiokomunikacyjne - wybrane problemy"* (Modern Radiocommunication Systems – Selected Problems), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/ 0402), Warsaw, Nov. 2003, 53 pp.

[Rep11] T. Kosiło: *"Opracowanie analizy techniczno-ekonomicznej dotyczącej wdrożenia systemu GSM-R na linii kolejowej E-20"* (Designing of Technical and Economic Analysis Regarding the Introduction of GSM-R System at E-20 Railway Line), Final report for Telekomunikacja Kolejowa, sp. z.o.o (Railways Telecommunications Ltd.), (No. 501H /1358), Warsaw, Nov. 2003, 41 pp.

[Rep12] K. Kowalski: *"Przeprowadzenie badań funkcjonalnych oraz wykonanie ekspertyzy i analiz stanu technicznego serii trzech niesprawnych zespołów AP1 wraz z opracowaniem metodyki usprawnienia zespołów"* (Functional Investigations, Testing and Analysis of Technical State for Three Inefficient A1 Units with Designing of Programme and Methodology), Final report for Wojskowy Instytut Techniczny Uzbrojenia (Military Institute of Armament Technology), (No. 501E/1366), Warsaw, Nov. 2003, 48 pp.

[Rep13] Z. Kulka: *"Badania symulacyjne i optymalizacja modulatorów delta-sigma z ditherowanymi kwantyzatorami przeznaczonymi do cyfrowych systemów fonicznych"* (Investigation and Optimization of One- and Few-Bit Dithered Delta-Sigma Modulators for Digital Audio Applications), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4041), Warsaw, Nov. 2003, 31 pp.

[Rep14] Z. Kulka: *"Pomiary hałasu wytwarzanego przez systemy i podzespoły komputerowe"*

(Measurements of Noise Emitted by Computer Systems), Final report for Axel Springer Ltd., (No. 501H/1364), Warsaw, Jun. 2003, 14 pp.

[Rep15] Z. Kulka, A. Leszczyński, M. Tajchert, J. Narkiewicz-Jodko, E. Kotabińska: *"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/1034/0402), Warsaw, Nov. 2003, 126 pp.

[Rep16] K. Kurek: *"Projekt systemu lokalizacji kapsuły satelitarnej YES2"* (Project of Location System for YES2 Capsule), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4047), Warsaw, Dec. 2003, 15 pp.

[Rep17] A. Leszczyński: *"Opracowanie sygnałów testujących i wykonanie płyty testowej CD do badań i rehabilitacji dzieci autystycznych i upośledzonych"* (Elaboration of the Audio Test Signals and CD Test Design for Investigation and Rehabilitation of Autistic and Retarded Children), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4040), Warsaw, Nov. 2003, 26 pp.

[Rep18] A. Leszczyński, M. Kostrzewa, P. Nykiel: *"Cyfrowa stacja robocza do zapisu i obróbki dźwięku oparta na systemie Linux"* (Digital Audio Workstation Based on the Linux Operation System), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/5043), Warsaw, Dec. 2003, 37 pp.

[Rep19] J. Modelski, K. Kurek, T. Keller: *"Badanie wybranych systemów łączności bezprzewodowej w pasmie ISM oraz systemów satelitarnych"* (Investigations of Selected Systems for Wireless Communications in ISM Band and Satellite Systems), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0402), Warsaw, Nov. 2003, 24 pp.

[Rep20] J. Modelski, J Wojciechowski, J. Cichocki, Y. Yashchyshyn, J. Kołakowski, T. Kosiło, T. Keller, P. Majchrzak, N. Minh, R. Pączkowski, K. Płatek, G. Radzikowski, T. Szymański, A. Trojanowski: *"Systemy radiowe przyszłych generacji"* (Next Generation Radio Systems), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4050), Warsaw, Dec. 2003, 42 pp.

[Rep21] 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/1034/0402), Warsaw, Nov. 2003, 26 pp.

[Rep22] T. Morawski, J.Zborowska, S. Rosłoniec, W. Gwarek, W. Wojtasiak: *"Nowoczesne metody analizy i projektowania układów mikrofalowych"* (Modern Methods of Analysis and Designing of Microwave Devices), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0402), Warsaw, Nov. 2003, 68 pp.

[Rep23] Z. Pawłowski, M. Kazubek, E. Piątkowska-Janko, R. Szabatin, P. Bogorodzki, P. Brzeski, G. Domański, T. Jamrógiewicz, B. Konarzewski, J. Marzec, T. Olszewski, L. Padèe, A. Przelaskowski, D. Radomski, W. Smolik, K. Zaremba, P. Boniński, R. Kurjata, M. Orzechowski, A. Trybuła, T. Wolak, A. Wróblewska: *"Nowoczesne techniki elektroniki jądrowej i medycznej"* (Modern Techniques in Nuclear and Medical Electronics), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034/0402), Warsaw, Nov. 2003, 115 pp.

[Rep24] K. Robaczyński: *"Przeprowadzenie badań funkcjonalnych zespołów AP-2 oraz wykonanie analizy uzyskanych wyników i opracowanie prognozy trwałości zespołów tego typu"* (Functional Investigations of AP-2 Units, Analysis of Results and Prediction of Their Durability), Final report for Wojskowy Instytut Techniczny Uzbrojenia (Military Institute of Armament Technology), (No. 501E/1367), Warsaw, Dec. 2003, 40 pp.

[Rep25] S. Rosłoniec: *"Metody numeryczne z przykładami zastosowań w zadaniach inżynierskich"* (Numerical Methods with Applications in Engineering Tasks), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4049), Warsaw, Dec. 2003, 208 pp.

[Rep26] W. Skarbek, A. Buchowicz, G. Galiński, K. Ignasiak, M. Rusin, S. Barański, P. Bobiński, K. Kucharski, G. Pastuszak, A. Świercz, K. Wnukowicz: *"Normalizacja meta danych w aplikacjach monitoringu jako rozszerzenie standardu MPEG-7"* (Metadata Normalization in Monitoring Systems Based on MPEG-7 Standard Extensions), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503G/1034 4048), Warsaw, Dec. 2003, 20 pp.

[Rep27] R. Szabatin, W. Smolik, J. Mirkowski, T. Olszewski, P. Brzeski: *"Opracowanie dokumentacji technicznej oraz wykonanie dwóch prototypowych egzemplarzy wielokanałowego, pojemnościowego układu pomiarowego do badania pocesów w przepływowym separatorze mieszaniny ropy, gazu, cieczy i zawiesiny stałej - etap IV"* (Design of the Technical Documentation and Two Prototypes of Multichannel Electronic Capacitance Meter for Oil, Water, Gas and Solid Suspension Separation Study), Final

50

report for MIKROMAX Ltd., (No. 501E/1360), Warsaw, Apr. 2003, 100 pp.

[Rep28] W. Winiecki, A. Podgórski, T. Kosiło, R. Łukaszewski, M. Karkowski, P. Bilski, R. Leoniak: *"Wykorzystanie nowoczesnych technologii programowych i komunikacyjnych w projektowaniu sieciowych, wirtualnych przyrządów pomiarowych"* (Application of Novel Software and Communication Technologies in Distributed Virtual Instruments Design), Final report for the KBN grant, (No. 8T10CO112), Institute of Radioelectronics, WUT, Warsaw, Jul. 2003.

[Rep29] W. Winiecki, K. Mroczek, P. Bilski, T. Daniluk, R. Łukaszewski: *"Nowoczesne metody projektowania rozproszonych systemów pomiarowych"* (Modern Methods of Distributed Measuring Systems Designing), Final report for the statutory grant, Institute of Radioelectronics, WUT, (No. 504G/1034 /0402), Warsaw, Nov. 2003, 90 pp.

[Rep30] W. Winiecki: *"Technologie programowe i telekomunikacyjne w projektowaniu wirtualnych przyrządów pomiarowych"* (Software and Telecommunication Technologies in Virtual Instruments Designing), Internal report, Institute of Radioelectronics, WUT, Warsaw, Nov. 2003, 41 pp.

[Rep31] W. Winiecki, A. Płatonow, H. Chaciński, R. Łukaszewski, T. Daniluk: *"Opracowanie taniego, adaptacyjnego nadajnika/odbiornika AM o małej mocy i rozszerzonym zasięgu transmisyjnym"* (Low-power Long-range AM-Transmitters with Feedback Channels), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034 /4045), Warsaw, Nov. 2003, 36 pp.

[Rep32] J. Wojciechowski, S. Maszczyk *"Wykorzystanie transformacji falkowej do eliminacji zakłóceń wąskopasmowych w systemach CDMA"* (Application of Wavelet Transforms for Elimination of Narroband Interference in CDMA Systems), Final report for the Rector grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4046), Warsaw, Dec. 2003, 220 pp.

[Rep33] W. Wojtasiak: *"Opracowanie i wykonanie modeli modułów nadawczo-odbiorczych o mocy 20 W na pasmo C"* (20 W T/R Modules Design and Perform at C Band), Final report for Przemysłowy Instytut Telekomunikacji

(Industrial Institute of Telecommunications), (No. 501E/1361), 14 pp.

[Rep34] W. Wojtasiak: *"Wykonanie dwóch konwerterów"* (Construction of Two Converters), Final report for Regionalne Sieci Telekomunikacyjne "EL-NET" S.A. (Regional Telecommunication Networks "EL-NET" Stock Company), (No. 501H/1365), Warsaw, Nov. 2003, 14 pp.

[Rep35] W. Wojtasiak, D. Gryglewski, M. Lubiejewski: *"Opracowanie i wykonanie częstościomierza w zakresie częstotliwości od 8900 MHz - 9500 MHz"* (8900 - 9500 MHz Frequency Meter Design and Construction), Final report for Wydział Fizyki Politechniki Warszawskiej (Faculty of Physics, Warsaw University of Technology), (No. 501E/1358), Apr. 2003, 10 pp.

[Rep36] K. Zaremba, Z. Pawłowski, J. Marzec, B. Konarzewski, G. Domański, A. Padèe, R. Sulej: *"Eksperyment COMPASS w CERN-ie - Budowa aparatury, zbieranie i analiza danych"* (COMPASS Experiment at CERN - Design of the Apparatus, Collecting and Analysis of Data), Final report for the KBN grant, Institute of Radioelectronics, WUT, (No. 134/E-365/SPUB-M/506/G/2001), Warsaw, Dec. 2003, 38 pp.

[Rep37] K. Zaremba: *"Opracowanie topografii układu scalonego do odczytu danych z detektorów gazowych dla eksperymentu fizyki wysokiej energii"* (Design of the Topography of the Integrated Circuit for the Read-out System of Gas Detectors Used in the High-Energy Physics Experiments), Final report for the Dean grant, Institute of Radioelectronics, WUT, (No. 503G/1034/4044), Warsaw, Nov. 2003, 29 pp.

8. PATENT APPLICATIONS

[Pat1] M. Szafran, E. Bobryk, J. Modelski, Y. Yashchyshyn: *"Kompozyt ceramika-polimer do zastosowań mikrofalowych i sposób wytwarzania kompozytu ceramika-polimer do zastosowań mikrofalowych."* (Ceramic-polymer Composite for Microwave Applications and the Method of Production), P. 363196, 29.10.2003.

[Pat2] Y. Yashchyshyn, J. Modelski, M. Szafran, E. Bobryk: *"Antena skanująca"* (Scanning Antenna), P. 363195, 29.10.2003.

9. CONFERENCES, SEMINARS AND MEETINGS

9.1. International conferences

[Con1]   *7th International Conference: The Experience of Designing and Application of CAD Systems in Microelectronics* (Slavske, Ukraine, Feb. 18-22, 2003), Y. Yashchyshyn (speaker).

[Con2]   *NATO Regional Conference on Military Communications and Information Systems: RCMCIS'2003* (Zegrze, Poland, Apr. 15-17, 2003), W. Winiecki, P. Majchrzak (speakers).

[Con3]   *International Microwave Symposium: IEEE MTT-S* (Philadelphia, USA, Jun. 8-13, 2003), J. Modelski (session chairman, speaker), M. Celuch-Marcysiak (session chairman, member of jury - Student Paper Competition, speaker), M. Piasecki (speaker).

[Con4]   *International Microwave Technology Conference: IEEE IMTC'03* (Vail / Denver, Colorado, USA, May 21-23, 2003), W. Winiecki (speaker).

[Con5]   *XVII IMEKO World Congress: "Metrology in the 3rd Millenium* (Cavtat - Dubrovnik, Croatia, Jun. 22-27, 2003), R. Z. Morawski (member of the IPC, chairman of the TC7 Round Table, chairman of a session, speaker), A.Podgórski, W. Winiecki (speakers).

[Con6]   *First International NAISO Symposium on Information Technologies in Environmental Engineering: ITEE'03* (Gdańsk, Poland, Jun. 24-27, 2003), A. Przelaskowski (speaker).

[Con7]   *3rd Joint International Conference and Meeting of the International Society for Clinical Biostatistics and the Society for Clinical Trials* (London, Great Britain, Jul. 20-24, 2003), D. Radomski (participant).

[Con8]   *Inter-Noise 2003* (South Korea, Aug. 23-30, 2003), E. Kotarbińska (speaker).

[Con9]   *10th International Conference: Computer Analysis of Images and Patterns: CAIP'03* (Groningen, the Netherlands, Aug. 25-27, 2003), W. Skarbek (chair of the Steering Committee).

[Con10]   *European Conference on Circuit Theory and Design: ECCTD'03* (Cracow, Poland, Sept. 1-4, 2003), J. Modzelewski, M. Mikołajewski, P. Bilski, J. Wojciechowski (speakers).

[Con11]   *9th International Conference on Microwave and High Frequency Heating* (Loughborough, Great Britain, Sept. 1-9, 2003), W. Gwarek (speaker).

[Con12]   *Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications: IDAACS* (Lviv, Ukraine, Sept. 6-11, 2003), W. Winiecki (member of the IPC, chairman of a session, speaker), A. Podgórski, T. Knyziak (speakers).

[Con13]   *International Conference on Antenna Theory and Techniques: ICATT'03* (Sevastopol, Ukraine, Sept. 6-14, 2003), Y. Yashchyshyn (speaker).

[Con14]   *SPIE International Symposium: Information Technologies and Communications* (Orlando, Florida, USA, Sept. 7-11, 2003), G. Galiński (speaker).

[Con15]   *13th Int. Crimean Conference: „Microwave & Telecommunication Technology", CriMicro 2003*, (Sevastopol, Ukraine, Sept. 8-12, 2003), Y. Yashchyshyn (speaker).

[Con16]   *11th MICROCOLL Conference* (Budapest, Hungary, Sept. 9-11), J. Modelski (member of TPC, speaker), J. Antoniuk, K. Kurek, M. Żukociński (speakers).

[Con17]   *10th International Symposium of Sound Engineering and Tonmeistering - ISSET 2003* (Wrocław, Poland, Sept. 11-13, 2003), M. Kostrzewa, M. Mikołowicz, R. Smoliński (speakers), Z. Kulka, P. Nykiel (participants).

[Con18]   *7th International Congress Polish Cardiac Society* (Gdynia-Sopot-Gdańsk, Poland, Sept. 11-13, 2003), D. Janusek (participant).

[Con19]   *International Microwave Conference* (Ignazu Falls, Brasil, Sept. 18-26, 2003), J. Modelski (member of TPC, speaker).

[Con20]   *Computers in Cardiology 2003* (Saloniki, Greece, Sept. 20-25, 2003), E. Piątkowska-Janko (speaker).

[Con21]   *IEEE Region 8 EUROCON 2003, The International Conference on Computer as a Tool* (Ljubljana, Slovenia, Sept. 22-24, 2003), M. Sosnowski (participant).

[Con22]   *12-th Conference on Microwave Techniques; COMITE 2003* (Pardubice, the Czech Rep., Sept. 23-24, 2003), W. Gwarek, T. Morawski (speakers), M. Bury (participant).

[Con23]   *DIPED'2003*, (Lviv, Ukraine, Sept. 23-25, 2003), A. Synyavskyy (speaker).

[Con24]   *50th Open Seminar on Acoustics - OSA 2003* (Szczyrk-Gliwice, Poland, Sept. 23-27, 2003), Z. Kulka (speaker), E. Kotarbińska, J. Narkiewicz-Jodko (participants).

[Con25]   *International Conference: TELSIKS 2003* (Belgrad, Serbia and Montenegro, Sept. 30-Oct. 6, 2003), T. Szymański (participant).

[Con26]   *11th GAAS Symposium* (Münich, Germany, Oct. 6-10, 2003), R. Michnowski (speaker).

[Con27]   *6th European Conference on Wireless Technology* (Münich, Germany, Oct. 6-10, 2003), T. Keller (speaker).

[Con28]   *European Microwave Conference* (Münich, Germany, Oct. 7-9, 2003), J. Modelski

(member of TPC), Y. Yashchyshyn, (speakers).

9.2. Local conferences

[Con29] *TEM'03: Telekomunikacja - Elektronika - Multimedia: Digital Media of XXI Century* (Telecommunications - Electronics - Multimedia: Media Cyfrowe XXI Wieku), (Poznań, Poland, Apr. 9, 2003), W. Skarbek (speaker).

[Con30] *V Sympozjum Modelowanie i Pomiary w Medycynie* (V[th] Symposium Modelling and Measurements in Medicine), (Krynica Górska, Poland, May 12-15, 2003), A. Trybuła (speaker).

[Con31] *II Krajowa Konferencja Elektroniki: KKE'03* (IInd National Conference on Electronics), (Kołobrzeg-Dźwirzyno, Poland, Jun. 9-12, 2003), T. Morawski, W. Wojtasiak, J. Zborowska, J. Modzelewski (speakers).

[Con32] *Nowoczesne Technologie Otrzymywania Materiałów Ceramicznych i Metody ich Badań* (Modern Technologies for Ceramic Materials and Methods of their Investigations), (Konstancin, Poland, Jun. 10-11, 2003), Y. Yashchyshyn (speaker).

[Con33] *IV Krajowa Konferencja: Postępy w Elektrotechnice Stosowanej - PES-4* (IVth National Conference: Advances in Applied Electrotechnics), (Kościelisko, Poland, Jun. 23-27, 2003), J. Modzelewski, (speaker).

[Con34] *Krajowa Konferencja Radiokomunikacji, Radiofonii i Telewizji: KKRRiT2003* (National Conference on Radiocommunications, Broadcasting and Television), (Wrocław, Poland, Jun. 25-27, 2003), A. Buchowicz, P. Blaszczyk, J. Cichocki, K. Ignasiak, J. Kołakowski, K. Kurek, A. Kurek, T. Kosiło, J. Modelski, S. Maszczyk, P. Majchrzak, G. Pastuszak, K. Płatek, S. Pawelec, T. Szymański, R. Szumny, A. Trojanowski, D. Paczesny (participants).

[Con35] *XIII Krajowa Konferencja Biocybernetyki i Inżynierii Biomedycznej* (XIIIrd National Science Conference on Biocybernetics and Biomedical Engineering), (Gdańsk, Poland, Sept. 10-13, 2003), P. Bargieł, P. Boniński, G. Domański, D. Janusek, R. Kurjata, T. Olszewski, A. Przelaskowski, W. Smolik, R. Szabatin, A. Trybuła, T. Wolak (speakers).

[Con36] *70th ICB Seminar on High Resolution ECG and MCG Mapping* (Warsaw, Poland, 16-18, 2003), D. Janusek, Z. Pawłowski, E. Piątkowska-Janko (participants).

[Con37] *IX Konferencja Użytkowników i Deweloperów ORACLE: "Systemy informatyczne. Projektowanie, implementowanie, eksploatowanie"* (IXth Conference for ORACLE Users and Developers: "Informatic Systems. Designing,

Implementation, Exploatation), (Kościelisko, Poland, Oct. 21-25, 2003), W. Skarbek (speaker).

[Con38] *72th ICB Seminar: Recent Achievements of Bioimpedance Research* (Warsaw, Poland, Nov. 13-16, 2003), R. Szabatin (speaker), W. Smolik (participant).

[Con39] *XXII Konferencja Naukowo-Szkoleniowa: Neuroobrazowanie Czynnościowe w Neurologii i Psychiatrii*, (Warsaw, Poland, Nov. 21, 2003), P. Bogorodzki, T. Wolak (speakers), E. Piątkowska-Janko (participant).

9.3. Schools, seminars and meetings

[Con40] *Technical Programme Committee Meeting of IEEE International Microwave Symposium and Workshop: Emerging Technologies* (Philadelphia, USA, Jan. 10-14, 2003), J. Modelski (TPC member).

[Con41] *Seminarium Naukowe Sekcji Kształcenia Komitetu Metrologii PAN (Ustronie, January 6-8, 2003),* W. Winiecki (speaker).

[Con42] *European Microwave Conference Meeting* (Münich, Germany, Apr. 25-27, 2003), J. Modelski (TPC member, speaker).

[Con43] *VI Szkoła-Konferencja „Metrologia Wspomagana Komputerowo - MWK'2003"* (Waplewo, Poland, May 26-29, 2003), W.Winiecki (speaker).

[Con44] *50 Otwarte Seminarium z Akustyki: OSA 2003*, (50-th Open Seminar on Acoustics - OSA 2003), (Szczyrk, Poland, Sept. 22-27, 2003) J. Narkiewicz-Jodko, Z. Kulka (speakers).

[Con45] *International Workshop on Information Technologies and Computing Techniques for the Agro - Food Sector* (Barcelona, Spain, Nov. 26 - Dec. 1, 2003), P. Kopyt (participant).

[Con46] *IV Seminarium - Radiokomunikacja i Techniki Multimedialne* (IVth Seminar - Radiocommunications and Multimedia Technologies), (Warsaw, Dec. 10, 2003), P. Bobiński, T. Keller, S. Maszczyk, D. Paczesny, R. Smoliński, T. Wolak, K. Wnukowicz, (speakers).

[Con47] *Rezonans Magnetyczny w Diagnostyce Medycyny Obrazowej* (Magnetic Resonance for Diagnostics in Medical Imaging), (Warsaw, Dec. 19, 2003), seminar organized by the Warsaw Branch of Polish Society of Medical Physics, and Nuclear and Medical Electronics Division, Institute of Radioelectronics, K. Zaremba (chairman), P. Bogorodzki, M. Gołębiewski (speakers).

[Con48] *Konferencja Szkoleniowa; "Nowe Techniki Multimedialne w Obiektach Widowiskowych"*, Polskie Centrum OISTAT, (Warsaw, Poland, Dec. 1-2, 2003), Z. Kulka (speaker)

10. PRIZES AND DISTINCTIONS RECEIVED BY THE STAFF

10.1. State Orders and Medals

Józef Modelski, Prof., Ph.D., D.Sc.
Medal Komisji Edukacji Narodowej
(Medal of National Education)

Janusz Marzec, Ph.D., D.Sc.
Srebrny Krzyż Zasługi
(Silver Order of Merit)

Jerzy Kołakowski, Ph.D.
Andrzej Wasilewski
Brązowy Krzyż Zasługi
(Bronze Order of Merit)

10.2. Awards of the Rector

Kajetana Snopek, Ph.D.
Individual award (II^0) for the research project: "*Cohen's Class Distributions of Multidimensional Signals and Their Applications*" (Rozkłady klasy Cohena sygnałów wielowymiarowych i ich zastosowania).

Krzysztof Mroczek, Ph.D.
Individual award (III^0) for the research project: "*Hardware for Motion Estimation Algorithms and Image Texture Coding by Means of Methods Based on Orthogonal Transformations*" (Realizacje sprzętowe algorytmów estymacji ruchu oraz kodowania tekstury obrazu metodami transformacji ortogonalnych).

Zdzisław Pawłowski, Prof., D.Sc.
Team award (I^0) for the monography "*Medical physics*" (Fizyka medyczna), Oficyna Wydawnicza PW (Academic Publishing House), ISBN 83-87674-37-0, Warsaw (2002).

Roman Szabatin, Ph.D.
Tomasz Olszewski, M.Sc.
Jacek Mirkowski, Ph.D.
Waldemar Smolik, Ph.D.
Piotr Brzeski, Ph.D.
Team award (II^0) for the research project: "*Electronic Capacity ET1 Tomograph*" (Elektroniczny tomograf pojemnościowy ET1).

10.3. World Telecommunication Day '2003 Award

Józef Modelski, Prof., Ph.D., D.Sc.
Siemens Recognition Statuette for Contribution in Development of Radiocommunications and Multimedia Technologies.

10.4. Award of the Polish Section of the Audio Engineering Society

Michał Kostrzewa, M.Sc.
Piotr Nykiel, M.Sc.
Individual awards for the conference paper "*Time Performance Investigation of Delta-Sigma Modulators*" (Badanie właściwości czasowych modulatorów delta-sigma), *Proc. 10th International Symposium of Sound Engineering and Tonmeistering: ISSET2003* (Mat. X Międzynarodowego Sympozjum Reżyserii i Inżynierii Dźwięku), (Wrocław, Poland, Sept. 11-13, 2003).

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

Krzysztof Dufrěne, M.Sc.
The first award for the conference paper "*Radio Channel Simulation Using DSP Technologies*" (Symulacja kanału radiowego z wykorzystaniem technik DSP), *Proc. National Conference on Radiocommunications, Broadcasting and Television* (Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRiT"2003), (Wrocław, Poland, Jun. 25-27, 2003).

Arkadiusz Kurek, M.Sc.
The second award for the conference paper "*Navigation System for the Blind People Supporting*" (System orientacji terenowej dla osób niewidomych), *Proc. National Conference on Radiocommunications, Broadcasting and Television* (Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRiT"2003), (Wrocław, Poland, Jun. 25-27, 2003).

Tomasz Keller, M.Sc.
The fourth award for the conference paper "*Experimental Results of Interference Investigation at 2,4 GHz Band*" (Eksperymentalne wyniki badania interferencji w paśmie ISM 2,4 GHz), *Proc. National Conference on Radiocommunications, Broadcasting and Television* (Mat. Krajowej Konferencji Radiokomunikacji, Radiofonii i Telewizji: KKRiT"2003), (Wrocław, Poland, Jun. 25-27, 2003).

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

SPECIFICATION	1999	2000	2001	2002	2003
academic staff total	62,73	60,23	59.83	60,43	62,33
tenured professors	4,5	4	3,5	3,6	3,5
professors	6	7	7	6	6
associate professors	0	0	0	0	3
assistant professors	42,5	41	42,5	44	42
senior lecturers	4,83	6,33	5,33	4,83	4,83
lecturers	2,9	0,9	0	0	0
assistants	2	1	2	2	3
Ph.D. students total	39	50	50	49	35+6
regular	28	25	19	13	1
regular, the third level studies	3	12	17	26	25
part-time	8	13	14	10	9
technical and administrative staff total	25	24,5	23	20	20
R&D associates	14	13,5	12	9	9
administrative associates	8	8	8	8	8
librarian	1	1	1	1	1
service workers	2	2	2	2	2
space total	2549,1	2549,1	2549,1	2549,1	2592,1
laboratories	1172,8	1172,8	1172,8	1172,8	1279,8
library	71,2	71,2	71,2	71,2	71,2
offices of academic staff	1305,6	1305,6	1305,6	1305,6	1241,1
library resources					
books (number of volumes)	13629	14103	14302	14543	14756
books (number of titles)	7624	7765	7894	8012	8107
journals (number of titles subscribed to)	59	125	125	125	125
teaching activities					
basic courses	27	27	26	28	35
advanced courses	45	51	47	49	47
other courses	25	51	70	58	57
international projects	2	1	1	1	1
research projects total	49	46	53	40	52
granted by the University	27	22	24	16	24
granted by the State institutions	7	10	14	15	16
other projects	15	14	15	9	12
titles and degrees awarded					
Prof. titles	0	1	2	1	1
D.Sc. degrees	0	0	0	0	3
Ph.D. degrees	3	1	5	5	1
M.Sc. degrees	46	65	72	83	91
B.Sc. degrees	10	52+24	56+77	53+29	55+32
B.Sc. degrees (English-medium-studies)		0	0	5	0
publications total	119	164	146	149	182
sci.-tech. books and chapters in books	15	3	4	2	3
sci.-tech. papers in journals	23	22	41	19	58
sci.-tech. papers in conference proceedings	68	122	83	119	109
textbooks	2	1	1	-	-
other publications	11	16	17	9	12
research reports	45	48	44	38	37
patents granted	3	0	0	0	2
conferences					
number of conferences attended by the staff	39	41	34	41	47
number of participants from the Institute	94	140	88	93	107