Contents

1. General information

This booklet presents an overview of the activities taking place at the *Faculty of Electronics and Telecommunications* from the "Politehnica" University of Timişoara with special focus on the year 2008. Information about the structure of the faculty, its position in the "Politehnica" University, and data concerning educational and research activities are presented.

Information that is more detailed can be obtained at the faculty and department secretariates. You can also find relevant information visiting our website:

http://www.etc.upt.ro

The "Politehnica" University of Timişoara was founded in 1920, with the purpose of serving the technical education and research needs in western Romania. It is a public university and consists of ten faculties.

The late Prof. Remus Rădulet, member of the Romanian Academy, introduced the study of **Electronics** at the "Politehnica" University of Timişoara in 1931. In 1970, the specialization on "*Electronics and Telecommunications*" was established within the Faculty of Electrical Engineering, and four years later, in 1974, a new department, "*Electronics, Automation and Measurements*" was founded. In 1976, the Faculty of Electrical Engineering moved its headquarters to the present building where the number of laboratories and other facilities increased substantially.

The former specialization "*Electronics and Telecommunications*" became the *"Faculty of Electronics and Telecommunications*" in 1990. Starting with the following year, a short-cycle higher education programme (College level) has been created, but its activity ended in 2007.

The *Master* degree programme was introduced in 1994.

Our Faculty provides training for engineers in Electronics and Telecommunications in two areas of specialization: *Applied Electronics* and *Telecommunications*. The College provided specialized training in the fields of *Electronics*, *Communications* and *Mailing Services* as well as in *Audio-Video* and *Multimedia Technologies*.

The teaching activities are organized on three levels of study:
- graduate programmes: "Diploma (Licensed) Engineer" in Romanian and English;
- postgraduate degree programmes: "Master"
- Doctoral studies leading to a "Doctor of Philosophy" degree (Ph.D.).

The graduate education level is organized in a 4-year period of studies. Students graduating from this educational form obtain the "Diploma (Licensed) Engineer" degree.

The Master degree programme consists of a 2-year programme of studies while the Ph.D. degree must be completed in three years.

The faculty has three departments:
- **Applied Electronics;**
- **Communications;**
- **Measurements and Optical Electronics,**

and cooperates with other faculties and departments like Mathematics, Physics, Electrical Engineering, Computer Science, Mechanical Engineering, Management, etc.
Teaching and learning are based on modern methods, especially with respect to practical activities. Special attention is paid to applied computer studies.

The teaching staff is organized in several teams and devotes a considerable amount of time to research programmes lead by professors who are also Ph.D. advisors. These teams are presented in the next chapters.

The governing authorities of the Faculty of Electronics and Telecommunications are:
  - The Faculty Council;
  - The Executive Board of the Faculty Council;
The Administrative Officers and the Executive Board of the Faculty Council are in charge of the ordinary activities in the faculty.

2. Structure of the Faculty of Electronics and Telecommunications

The Executive Board of the faculty is composed of:

- Dean: Prof. dr. ing. Marius OTEŞTEANU
- Vice Dean: Prof. dr. ing. Alimpie IGNEA until June 2008
- Vice Dean: Prof. dr. ing. Dan LASCU, Vice Dean since June 2008
- Vice Dean: Prof. dr. ing. Aurel GONTEAN
- Scientific Secretary: Conf. dr. ing. Florin ALEXA

Faculty address:

Bd. Vasile Pârvan No. 2,
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- e-mail: decan@etc.upt.ro

Secretariate: Chief Secretary Cecilia MOISE, secretariat@etc.upt.ro
        Laura MIRICĂ, Minerva POPA, Anca TURTĂ

Secretariate of the Applied Electronics (AE) Department:
- room B101,
- phone: +40-(0)256-403331;

Secretariate of Communications (COM) Department:
- room B201,
- phone: +40-(0)256-403301;

Secretariate of the Measurements and Optical Electronics (MOE) Department:
- room B301,
- phone: +40-(0)256-403361.

Faculty Council:

1. Prof. dr. ing. Ivan BOGDANOV, Head of Department AE
2. Prof. dr. ing. Aurel GONTEAN, Vice Dean
3. Prof. dr. ing. Vasile GUI, Head of Department COM
4. Prof. dr. ing. Alimpie IGNEA, Vice Dean until June 2008
5. Prof. dr. ing. Alexandru ISAR
6. Prof. dr. ing. Dan LASCU, Vice Dean since June 2008
7. Prof. dr. ing. Ioan NAFORNIŢĂ
8. Prof. dr. ing. Marius OTEŞTEANU, Dean
9. Prof. dr. ing. Viorel POPESCU
10. Prof. dr. ing. Dan STOICIU, Head of Department MOE
11. Prof. dr. ing. Liviu TOMA
12. Prof. dr. ing. Radu VASIU
13. Conf. dr. ing. Florin ALEXA, Scientific Secretary
14. Conf. dr. ing. Georgeta BUDURA
15. Conf. dr. ing. Cătălin CĂLEANU
16. Conf. dr. ing. Ioan LIE
17. Conf. dr. ing. Eugen MÂRZA
18. Andrei TERNAUCIUC, Ph.D student
19. Sergiu HRISTEA, student III EA
20. Cristina COMAN, student III TST
21. Ana PETCU, student III TST
22. Paul HARFAŞ, student IV EA
23. Emilia CARAGEA, student V TC

2.1. Applied Electronics Department

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Department board:
- Prof. dr. ing. Ivan BOGDANOV - Head of Department
- Prof. dr. ing. Dorina ISAR
- Conf. dr. ing. Cătălin CĂLEANU
- Prof. dr. ing. Dan LASCU
- As. ing. Mircea BĂBĂIȚĂ

Staff
- Prof. dr. ing. Ivan BOGDANOV: Industrial Robots, Computer Control of Electrical Drives;
- Prof. dr. ing. Horia CÂRSTEA: Electronic Technology. Electronic Equipment Testing;
- Prof. cons. dr. ing. Mircea CIUGUDEAN: Conception of Analog Integrated Circuits and their Applications;
- Prof. dr. ing. Aurel GONTEAN: Programmable Logic Systems. Digital Circuits;
- Prof. dr. ing. Sabin IONEL: DSP Applications. Statistical Signal Processing. Failure Diagnosis;
- Prof. dr. ing. Dorina ISAR: Industrial Process Control Equipment. Signal Processing for Signal/Noise Ratio Enhancement;
- Prof. dr. ing. Dan LASCU: High Frequency Power Processors. Power Factor Correction Circuits. Modelling and CAD in Power Electronics;
- Prof. cons. dr. ing. Tiberiu MUREȘAN: Digital Circuits. Industrial Robot Driving. Switched Mode Power Supplies;
- Prof. dr. ing. Viorel POPESCU: Power Electronics, Switched Mode Power Supplies;
- Prof. cons. dr. ing. Mihail Eugen TĂNASE: Doppler Telemetry;
- Prof. dr. ing. Virgil TIPONUȚ: Analog Electronic Circuits. Programmable Logic Systems. Sensors and Transducers. Neural Networks;
- Conf. dr. ing. Dan ANDREICIUC: Industrial Robots. Mobile Robots;
- Conf. dr. ing. Cătălin CĂLEANU: Electronic Devices and Circuits;
- Conf. dr. ing. Ioan JIVEȚ: Design of ASIC (VLSI) Circuits. Design of Digital Systems with Microcontrollers and Microprocessors. Clinical applications of Electrical Bio-impedance. Tomography;
- Conf. dr. ing. Ioan LIE: Electronics. Doppler Telemetry;

- Conf. dr. ing. Adrian POPOVICI: Industrial Electronics. Materials for Electronics;
- S.l. dr. ing. Lucian JURCA: Analog Electronic Circuits;
- S.l. dr. ing. Valentin MARANESCU: Conception of Analog Integrated Circuits;
- S.l. dr. ing. Dan NEGOIŢESCU: Industrial Electronics. Power Factor Correction Circuits;
- As. ing. Mircea BĂBĂIŢĂ: Digital Circuits. Electrical Drives;
- As. ing. Marllene DĂNEŢI: DSP Applications. Statistical Signal Processing. Failure Diagnosis. Multimedia;
- As. ing. Beniamin DRĂGOI: Conception of Analog Integrated Circuits.
- As. ing. Aurel FILIP: Analog Electronic Circuits;
- As. ing. Petru PAPAZIAN: Digital Circuits;
- As. ing. Sorin POPESCU: Analog Electronic Circuits. Programmable Logic Systems;
- As. ing. Bogdan MARINCA: Doppler Telemetry;

Other employees: 2 chief technicians, 5 technicians and 2 secretaries.

2.2. Communications Department

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Department board:
- Prof. dr. ing. Vasile GUI - Head of Department
- Prof. dr. ing. Ioan NAFORNIŢĂ
- Prof. dr. ing. Alexandru ISAR
- Conf. dr. ing. Georgeta BUDURA
- Conf. dr. ing. Eugen MÂRZA

Staff
- Prof. dr. ing. Andrei CÂMPEANU: Telecommunications Equipment Technology. Telecommunications Circuits;
- Prof. dr. ing. Vasile GUI: Image Processing. Electronic Circuits and Devices;
- Prof. dr. ing. Alexandru ISAR: Signals, Circuits and Systems. Applications of Wavelets Theory. Time-Frequency Representations. Compression. Coding;
- Prof. dr. ing. Ioan NAFORNIŢĂ: Signals, Circuits and Systems. Adaptive Signal Processing. Time-Frequency Representations. Applications of Wavelets Theory. Microwaves;

- Prof. dr. ing. Miranda NAFORNIȚĂ: Theory of Information and Coding. Data Transmission. Signals, Circuits and Systems. Modern Communications Networks;
- Prof. dr. ing. Marius OTEŞTEANU: Television. Telephone Transmission Systems. Information Recording Techniques;
- Prof. cons. dr. ing. Anton POLICEC: Biomedical Electronics. Radiocommunications;
- Prof. dr. ing. Corneliu TOMA: Television. Analog Electronics. Image Compression. Motion Analysis. Pattern Recognition. Multimedia Technologies;
- Prof. dr. ing. Radu VASIU: Telecommunications Equipment Testing. Television and Digital Television. Multimedia Applications Development;
- Conf. dr. ing. Florin ALEXA: Television. Sound Techniques. Radiocommunications. Multimedia.;
- Conf. dr. ing. Corina BOTOCA: Microwaves. Signals, Circuits and Systems. Neural Networks;
- Conf. dr. ing. Georgeta BUDURA: Signals, Circuits and Systems. Nonlinear Signal Processing. Telecommunication Circuits;
- Conf. dr. ing. Lorin FORTUNA: Switching Systems for Telecommunications. Mail Traffic;
- Conf. dr. ing. Eugen MARZA: Radiocommunications. Mobile Radio. Radio Systems Engineering;
- S.l. dr. ing. Cornel BALINT: Switching Systems for Telecommunications;
- S.l. dr. ing. Muguraş MOCOFAN: Machine Vision and Pattern Recognition. Multimedia. Studio Equipment. Video Production;
- As. dr. ing. Horia BALTĂ: Optical Transmission and Processing of Information. Statistical Theory of Information Transmission. Theory of Information and Coding;
- S.l. dr.ing. Constantin M. BUCOS: Multimedia. Studio Equipment. Video Production;
- As. ing. Janos GAL: Signals, Circuits and Systems. Telecommunications Circuits;
- As. ing. Maria KOVACI: Statistical Theory of Information Transmission. Theory of Information and Coding. Signals Circuits and Systems;
- As. ing. Radu LUCACIU: Optical Transmission and Processing of Information;
- As. dr. ing. Nicolae MICLĂU: Optical Transmission and Processing of Information. Theory of Information and Coding;
- S.l. dr. ing. Corina NAFORNITA: Digital Signal Processing. Digital Watermarking;
- As. ing. Marius OLTEAN: Data Transmission on Radio Channels;
- As. ing. Mihai ONIȚA: Television. Audio and Video Compression. Streaming. Multimedia;
- As. ing. Marius SALAGEAN: Signals, Circuits and Systems;
- As. ing. Călin SIMU: Biomedical Electronics. Radiocommunications;
- As. ing. Andy VESA: Signals, Circuits and Systems. Mobile Radiocommunications;
- Prep. ing. Cristina STOLOJESCU: Digital Signal Processing.

2.3. Measurements and Optical Electronics Department

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Department board:

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- Prof. dr. ing. Liviu TOMA
- Prof. dr. ing. Traian JURCA

Staff

- Prof. dr. ing. Mircea CHIVU: Electrical and Electronic Measurements. Measurement of Electrical and Non Electrical Quantities. Television Channels Broadcasted Via Satellite;

- Prof. dr. ing. Aldo De SABATA: Adaptive Methods in Measurement. Signal Processing. Microwaves;

- Prof. dr. ing. Alimpie IGNEA: Electrical and Electronic Measurements. Electronic Measurements, Sensors and Transducers. Electromagnetic Compatibility. Antenna Calibration;

- Prof. dr. ing. Traian JURCA: Electronic Measuring Instruments. Precision Instrumentation. Programmable Measuring Systems;

- Prof. dr. ing. Dan STOICIU: Electronic Measuring Instruments. Metrology, Quality and Reliability. Electronic Measurements, Sensors and Transducers. General Theory of Measurement;

- Prof. dr. ing. Liviu TOMA: Data Acquisition Systems, Microprocessor Systems Architecture. Digital Processing Systems;

- Conf. dr. ing. Mihaela LASCU: Measurement of Electrical and Non Electrical Quantities. Sensors and Transducers. Virtual Instrumentation;

- Conf. dr. ing. Daniel BELEGA: Electromagnetic Compatibility. Analog Integrated Circuits. Digital Processing Systems;

- S.l. dr. ing. Septimiu MISCHIE: Electrical and Electronic Measurements. Programmable Measuring Systems. Precision Instrumentation;

- S.l. dr. ing. Adrian VÂRTOSU: Microwaves. Microwaves and Optoelectronics Measurements. Television Channels Broadcasted Via Satellite;

- As. ing. Emil LUZAN: Measurement of Environmental Factors. Measurement of Electrical and Non Electrical Quantities;

- As. dr. ing. Robert PASZITKA: Microprocessor Systems Architecture;

- As. ing. Ciprian DUGHIR: Electromagnetic Compatibility. Antenna Calibration;

- As. ing. Liliana STOICA: Electromagnetic Compatibility. Digital Processing Systems. Electronic Measuring Instruments;

- As. ing. Cora IFTODE, Electromagnetic Compatibility, Digital Processing Systems, Electronic Measuring Instruments;

- As. ing. Adrian MIHĂIUȚI, Antenna Calibration. Electromagnetic Compatibility. Digital Processing Systems;

Other employees: two technicians, one secretary.

3. Educational activity

The Faculty of Electronics and Telecommunications provides education in electronic engineering, particularly in the areas of general and industrial electronics, telecommunications and measurement. The Faculty offers three educational programmes:

- A four-year programme. To obtain the degree of Diploma (Licensed) Engineer at the end of the four-year period of study, a student must pass the Licence written examination and the oral defence of the graduation thesis. Starting with the Academic year 2006/2007, the four-year graduate programme is also delivered in English.

- A two-year programme of Master Degree. A successful oral examination, which is a defence of the dissertation leads to graduation and the award of the Master degree.

- Doctoral studies programme leads to the Doctor Engineer degree.

Education is organized according to the transferable credits system (ECTS).

In agreement with the Bologna Declaration, The License-Master-Doctorate (LMD) system has been introduced in 2005.

3.1. The "Diploma (Licensed) Engineer" level

The educational goals of this level are:

- to give students comprehensive theoretical and practical knowledge in the field of electronic engineering;
- to provide students with practical skills for manufacturing electronic equipment and to introduce them to the most recently developed techniques and devices in the design of electronic equipment;
- to habituate students with permanent intellectual work;
- to accustom students to information and computer technology with the purpose of enabling them to use Computer Aided Design;
- to supply adequate knowledge in economics and business management, enabling graduates to take part directly in industrial activities or to work as managers;
- to teach students foreign languages, so as to prepare them for the mobility programmes promoted by the European Community and to foster their participation in international cooperation and research programmes;
- to provide students with knowledge in humanities for professional inter-communication skills.

Admission Requirements and Student Performance Standards

Entry requirements

Enrolment of students in the first year follows an admission examination, where candidates' general knowledge in mathematics is assessed.

Details of admission standards

The admission examinations are of the MCQ (Multiple-Choice Queries) type, with a maximum score of 100. A successful candidate must obtain a minimum score of 44. The final score is calculated by taking into account the Baccalaureate score, with a weight of 20%. The actual entrance minimum score may vary according to the number and level of the candidates. The table below presents the enrolment statistics over the last 3 years.

Academic Year	Number of candidates	Number of admitted candidates	Minimum entry score
2005/2006	377 for publicly funded places	280 publicly funded 39 self funded	7.29/10 5.04/10
2006/2007	356 for publicly funded places	295 publicly funded (76 in English) 44 self funded (5 in English)	6.437/10 5.271/10
2007/2008	385 for publicly funded places	302 publicly funded (32 in English) 38 self funded (6 in English)	6.896/10 5.174/10
2008/2009	257 for publicly funded places	257 publicly funded (36 in English)	5,070/10

Arrangements for direct entry

Graduates of other faculties that were awarded a licence diploma can be directly enrolled in an appropriate year of study, in accordance with ECTS.

College graduates that were awarded a license diploma can enrol in the second year of the 4-year cycle, after passing a number of examinations.
A certain number of candidates can follow the courses and obtain a diploma if they choose to finance their studies and obtain a minimum score of 5/10 at the admission exam.

Number of students
2005/2006

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	313	53	192	34
Second year	AE + TC	237	54	149	17
Third year	AE	119	26	66	27
Fourth year	AE	103	22	61	20
Fifth year	AE	86	70	12	4
Third year	TC	119	22	61	36
Fourth year	TC	116	44	60	12
Fifth year	TC	108	78	24	6

2006/2007

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	348	91	167	90
Second year	AE + TC	291	66	130	95
Third year	AE	81	21	32	28
Fourth year	AE	102	25	71	6
Fifth year	AE	86	57	28	1
Third year	TC	134	46	63	25
Fourth year	TC	83	56	23	4
Fifth year	TC	83	80	1	2

2007/2008

Year of study	Specialization	Total number of students	Number of students who obtained the necessary credits	Number of students who did not obtain the required credits	Number of withdrawn students
First year	AE + TC	302	87	127	88
Second year	AE + TC	303	82	135	86
Third year	AE	93	19	52	22
Fourth year	AE	75	19	52	4
Fifth year	AE	85	56	28	1
Third year	TC	108	23	58	27
Fourth year	TC	98	67	25	6
Fifth year	TC	79	75	3	1

AE=Applied Electronics
TC=Telecommunications
Note: The third column in the above tables includes re-enrolled students who withdrew before completing their studies in former years.

Average duration of study:

Academic year	Specialization	Average duration of study
2004/2005	AE	5.87 years
	TC	5.57 years
2005/2006	AE	5.60 years
	TC	5.22 years
2006/2007	AE	5.78 years
	TC	5.49 years
2007/2008	AE	5.82 years
	TC	5.39 years

Note: AE = Applied Electronics, TC = Telecommunications.

Structure of the Academic Year

The academic year consists of two 14-week semesters and three examination sessions. The license and dissertation (Master) examinations take place in June and February. The Admission examinations take place in July and September.

  The holidays are:
  1. Christmas holiday (two weeks);
  2. After the winter session of examinations (one week);
  3. Easter holiday (one week);
  4. Summer holiday (two months).

Teaching

The teaching activity is organized in: courses, seminars, laboratory and project classes. A 100 % attendance of the laboratory classes is a prerequisite for each academic year.

Examinations and continuous assessment

Each course ends with an examination or another assessment form as stipulated in the curriculum. The examination format (either written or oral) is proposed by the department and is approved by the Faculty Council.

Students can sit for their examinations and continuous assessments no more than three times, re-examination for grade improvement being included.

Dismissal and Readmission

By the end of a year, a student must have obtained a minimum number of 40 credit points from a total of 60/year, out of which a minimum number of 30 should be obtained after the summer session. If these conditions are not fulfilled, the student is removed from the faculty registers. A student who has been dismissed from the faculty is eligible to apply to that faculty for readmission the next year, having to pay for the expenses, until the missing obligations are completed.

Curriculum for the Academic Year 2008 - 2009

Before the introduction of the LMD system, the curriculum for the licensed engineer level had two cycles:
- First - cycle (first and second year of study),
- Second - cycle (third, fourth, and fifth year of study).

In 2008/2009, students from the fifth year have followed this system. The corresponding curriculum is presented below.

Fifth Year of Study for Applied Electronics (Second - cycle)

| Sem. | Course Type | Course Title | | | Structure [hours/week] | | | | Credit points |
| | | Domain | | | | | | | |
		Power Electronics	Industrial Robots	Instruments For Measurement And Research	C	S	L	P	
I	Pack. 3	Electronic Drives	Computer Controlled Electrical Drives	Metrology	3	0	2	1	7
	Pack. 4	Ultrasonic Electronic Systems	Electronic Equipment Testing	Microwaves and Optoelectronic Instrumentation	3	0	2	0	6
	Pack. 5	DSP Applications in Power Electronics	Artificial Vision And Pattern Recognition	Sensors and Transducers	3	0	2	0	7
	Pack. 6	CAD for Power Converters	Intelligent Sensors	Modelling and Simulation	3	0	2	0	6
	Opt. 4*	Measurement of Environmental Parameters *** Kinematics and Dynamics of Industrial Robots DSP in Process Control			2	0	2	0	4

Fifth Year of Study for Communications (Second - cycle)

Sem.	Course Type	Course Title / Domain — Telecommunications Integrated Systems	Communication Networks	Multimedia	C	S	L	P	Credit points
I	Pack. 3	Communications Software	Communications Software	Multimedia Databases	3	0	2	1	7
	Pack. 4	Communication Equipment Testing	Telecommunications Traffic	Audio-Video Compression	3	0	2	0	6
	Pack. 5	Mobile Communications	Networks Optimisation	Audio-Video Production	3	0	2	0	7
	Pack. 6	Digital Switching Systems 2	Adaptive Signal Processing	Recording Techniques	3	0	2	0	6
	Opt. 4*	Modern Telecommunications Techniques / Internet Information Transmission Security			2	0	2	0	4

*   Either a course from the recommended list or a course ("Compulsory", "Optional" or "Pack")
     from the same study year from another direction will be chosen.
**   A course from the recommended list will be chosen.
*** On request.
   Note: As far as assessment practice is concerned, (E) means examination and (C) means continuous assessment

As mentioned above, in 2005 a new curriculum has been introduced, for the License-Master-Doctorate system, according to the Bologna Declaration. The License level curriculum has been designed and, at this moment, it is studied by students from the first, second and third year. This curriculum is detailed below.

Field: Electronic Engineering and Telecommunications

No.	Teaching Line	C	S	L	P	Ex	Cr.
	First Year - First Semester						
1	Calculus	2	2			E	4
2	Algebra and Geometry	2	2			E	4
3	Mechanical Engineering Fundamentals	2		1		DE	3
4	Computer Practice	2		2		DE	4
5	Electrical Circuits	2	1	1		DE	5
6	Materials, Components and Electronic Technology	2	1	1		E	4
7	Foreign Languages*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	12	9	5		26	29

	First Year - Second Semester						
1	Special Mathematics	2	2			E	4
2	Computer Aided Mathematics	2	1	1		DE	4
3	Physics	2	1	1		E	4
4	Optoelectronic and Electronic Devices	3		2		E	6
5	Computer Programming	2		2		DE	4
6	Electrical and Electronic Measurements	2	1	1		E	4
7	Foreign Languages*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	13	8	7		28	31

*A foreign language is chosen from: English, French or German.

Field: Electronic Engineering and Telecommunications

	Second Year - Third Semester						
1	Digital Integrated Circuits	2		2			4
2	Computer Networks Architecture	2		2			4
3	Fields and Electromagnetic Waves	2	1	1			4
4	Signals and Systems	2	1	1			4
5	Culture and Civilization	1	1				2
6	Fundamental Electronic Circuits	2		2			5
7	Computer Aided Design	2		2			4
8	Physical Education		1				1
9	Practical Training						2
	Total	13	4	10		27	30
	Second Year - Fourth Semester						
1	Microeconomics	2	1				4
2	Signal Processing	2		2			5
3	High Frequency Techniques	2	1	1			4
4	Digital Processing Systems	2,5	0,5	2			5
5	Analog Integrated Circuits	2		2			4
6	Object Oriented Programming	2		2			4
7	Electronic Circuits Project				2		2
8	Physical Education		1				1
9	Practical Training						2
	Total	13	2	9	2	26	30

Field: Electronic Engineering and Telecommunications - Specialization: Applied Electronics

	Third Year - Fifth Semester						
1	Management and Marketing	2	2	0	0	DE	4
2	Electronic Measuring Instruments	2	0	2	0	E	4
3	Radio Communications	2	0	2	0	DE	4
4	Power Electronics	2	0	2	0	E	4
5	Information Theory and Coding	2	1	1	0	E	4
6	Data Acquisition Systems	2	0	2	0	E	4
7	Basics of Flexible Intelligent Systems	2	0	2	0	DE	4
8	Practical Training					C	2
	Total	14	3	11	0	28	30

	Third Year - Sixth Semester						
1	Decide on a teaching line from another specialization	2	0	2	0	E	4
2	Programmable Logic Systems	2	0	1	1	DE	6
3	Electromagnetic Compatibility	2	0	2	0	E	4
4	Construction and Technology of Electronic Equipment	2	0	2	0	E	4
5	Switching Power Electronics	2	0	2	0	E	4
6	Virtual Instrumentation	2	0	1	1	DE	6
7	Practical Training					C	2
	Total	12	0	12	0	24	30

Field: Electronic Engineering and Telecommunications - Specialization: Applied Electronics

No	Teaching Line			C	S	L	P	T	Cr
	Fourth Year - Seventh Semester								
1	Electronic and Telecommunications Testing Equipment			2		2		E	4
2	Software for Electronics and Telecommunications			2		1	1	DE	5
3	Modelling and Simulation			2		1	1	E	5
4	Electronic Driving Systems	Micro electronics	Sensors and Transducers	2		2		DE	4
5	Electronic Interfacing Equipments	VHDL	Signal Processors	2		2		E	4
6	Decide on a teaching line from another specialization			2		2		E	4
7	DSP Project						2	DE	4

	Total			12		10	4	26	30

	Fourth Year - Eighth Semester								
1	External course			3	1,5	1,5		E	4
2	Decide on a teaching line from another specialization			3		3	0	DE	6
3	Automation	VLSI Circuits Design	Automation	3		3		E	4
4	Biomedical Electronics	Micro Electrome-chanical Systems	Distributed Control Systems	3		3		E	4
5	Software project						2	E	4
6	Diploma preparation								15
	Total			12	1,5	10,5	2	26	30

Field: Electronic Engineering and Telecommunications - Specialization: Techniques and Systems for Telecommunications

No	Teaching Line	C	S	L	P	T	Cr
	Third Year - Fifth Semester						
1	Management and Marketing	2	2			DE	4
2	Electronic Measuring Instruments	2		2		E	4
3	Radio Communications	2		2		E	4
4	Power Electronics	2		2		E	4
5	Information Theory and Coding	2	1	1		E	4
6	Data Communications	2		2		DE	4
7	Telecommunications Circuits	2		2		DE	4
8	Practical Training					C	2
	Total	14	3	11	0	28	30
	Third Year - Sixth Semester						
1	Decide on a teaching line from another specialization	2		2		E	4
2	Decision and Estimation in Information Theory	2		1	1	DE	6
3	Television Systems	2		2		E	4
4	Telephony Transmission	2		2		E	4
5	Digital Switching Systems	2		2		E	4
6	Data Bases	2		1	1	DE	6
7	Practical Training					C	2
	Total	12	0	10	2	24	30

Field: Electronic Engineering and Telecommunications - Specialization: Techniques and Systems for Telecommunications

	Fourth Year - Seventh Semester							
1	Electronic and telecommunications testing equipment			2		2		E	4
2	Software for electronics and telecommunications			2		1	1	DE	5
3	Modelling and simulation			2		1	1	E	5
4	Radio Communications 2	Communications Protocols	Multimedia Technologies	2		2		DE	4
5	Integrated Digital Networks		Computerized Graphics	2		2		E	4
6	Decide on a teaching line from another specialization			2		2		E	4
7	DSP Project		Development Project				2	DE	4
	Total			12		10	4	28	30
	Fourth Year - Eighth Semester								
1	External course			3	1,5	1,5		E	3
2	Decide on a teaching line from another specialization			3		3		E	3
3	Optical communications	Network security	Audio and video production	3		3		E	4
4	Mobile communications	Networks Optimisation	Audio and video compression	3		3		E	4
5	Software project						2	DE	4
6	Diploma preparation								15
	Total			12	1,5	10,5	2	24	30

Field: Electronic Engineering and Telecommunications – in English

No.	Teaching Line	C	S	L	P	Ex	Cr.
	First Year - First Semester						
1	Mathematics I	2	2			E	4
2	Mathematics II	2	2			E	4
3	Physics	2	1	1		DE	5
4	Electrical Circuits	2		2		DE	5
5	Introduction to Computer Programming	2		2		DE	4
6	Culture and Civilization	1	1			E	2
7	Second Language*		2			DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	12	9	5		26	29

	First Year - Second Semester						
1	Mathematics III	2	2			E	4
2	Mathematics IV	2	1	1		DE	4
3	Materials Science	2		2		E	4
4	Mechanics	3		2		E	4
5	Electronic Devices	2		2		E	4
6	Applied Computer Programming	2		2		DE	4
7	Experimental Data Processing	1	1			DE	2
8	Physical Education		1			DE	1
9	Second Language*		2			DE	2
10	Practical Training					C	2
	Total	13	8	7		28	31

*A foreign language is chosen from: French or German.

Field: Electronic Engineering and Telecommunications – in English

	Second Year - Third Semester						
1	Electronic Circuits	2		2		E	5
2	Electrical Engineering Fundamentals	2	1	1		DE	4
3	Signals and Systems	2	1	1		E	4
4	Digital Integrated Circuits	2	1	1		E	4
5	Computer Aided Design	2		2		E	4
6	Electrical and Electronic Measurements	2	1	1		DE	4
7	Second Language			2		DE	2
8	Physical Education		1			DE	1
9	Practical Training					C	2
	Total	13	4	10		27	30
	Second Year - Fourth Semester						
1	Analog Integrated Circuits	2	1	1		E	4
2	Microeconomics	2	1			DE	3
3	Computer Networks Architecture	2		2		E	4
4	Object Oriented Programming	2		2		E	4
5	Signal Processing	2		2		E	5
6	Microprocessors and Microcontrollers	2		2		E	5
7	Electronic Circuits Project				2	DE	2
8	Physical Education		1			DE	1

9	Practical Training					C	2
	Total	13	4	9	2	28	30

Field: Electronic Engineering and Telecommunications – in English

	Third Year - Fifth Semester						
1	Electronic Instrumentation	2		2		E	4
2	Radio Communications	2		2		DE	4
3	Virtual Instrumentation	2		1	1	E	4
4	Information Theory and Coding	2	1	1		E	4
5	Data Communications	2		2		E	4
6	High Frequency Techniques	2		2		DE	4
8	Management and Marketing	2	2			DE	4
9	Practical Training					C	2
	Total	14	3	10	1	28	30
	Third Year – Sixth Semester						
1	Opt.1 Electromagnetic Compatibility or Digital Switching Systems	2		2		E	4
2	Programmable Logic Systems	2		1	1	DE	5
3	Power Electronics	2		2		E	4
4	Embedded Systems	2		2		E	4
5	Digital Telephony	2		2		E	5
6	Audio and Video Systems	2		2		DE	4
7	Engineering Ethics and Communications	1	1			DE	2
8	Practical Training					C	2
	Total	13	1	11	1	26	30

3.2. The "Master" level

This programme is intended for the best graduates of the "Diploma (Licensed) Engineer" level with the purpose of training young engineers for research activities. Only graduates of the "Diploma (Licensed) Engineer" level with a final grade of 8/10 can be admitted to this level.

Thus, the teaching staff treats the educational activity at this level with increased care. From the graduates of this level, young engineers are selected to be the next generation of professors and research staff of our faculty.

The goals of this programme are:

• to accustom the young engineers with permanent intellectual activity;

• to raise the scientific curiosity of the students, but also to get them used to the stress and accuracy of scientific research;

• to give students the opportunity to work individually, as well as in a team;

• to get students accustomed to research activity;

The structure of this programme is similar to that of the "Diploma (Licensed) Engineer" programme. Its main features are:

• deep individual study;

• one-year period of study (extended to 2 years starting from 2006 and for the LMD system);

• the students (young engineers) graduate this level with a dissertation.

Each of the three faculty departments offers at least one "Master" degree programme:

• **Applied Electronics:**
  - *"Electronics of Intelligent Industrial Systems" (EIIS),*
  - *"Advanced Design and Testing Techniques in Electronics" (ADTTE).*

• **Communications:**
  - *"Signal Processing in Telecommunications Networks" (SPTN)*
  - *"Traitement du Signal"* (Signal processing), in French *(TS)*

• **Measurement and Optical Electronics:**
  - *"Electronic Instrumentation"(EI)*

Number of students 2006/2007

	Total number		Graduated	Withdrawn
	First year	Second year		
EIIS	18	-	-	-
SPTN	16	-	-	-
TS	15	-	-	-
ADTTE	16	-	-	-

Number of students 2007/2008

	Total number		Graduated (2008)	Withdrawn
	First year	Second year		
EIIS	17	18	13	5
SPTN	18	16	12	9
TS	16	13	5	11
ADTTE	18	11	8	5
EI	15	-	-	5

Number of students 2008/2009

	Total number		Graduated	Withdrawn
	First year	Second year		
EIIS	30	13		
SPTN	26	10		
TS	15	11		
ADTTE	26	14		
EI	19	10		

Curriculum for the Academic Year 2007-2008

Electronics of Intelligent Industrial Systems

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
I	Fuzzy Systems. Applications in Automatic Control	2	0	0	1	8
	Neural Networks Applications	2	0	0	1	8
	Functional Parameters Optimization of Energy Conversion Electronic Systems	2	0	0	1	8
	Computer Aided Design of Application Oriented Integrated Circuits	1	0	0	2	6
II	Statistical Signal Processing	2	0	2	0	10
	High Frequency Power Processors. Analysis and Modelling	2	0	1	1	10
	Real Time Systems	2	0	1	1	10
III	Design and Testing of Embedded Systems	2	0	0	1	8
	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Power Active Filters with High Reliability	2	0	1	0	8
	Flexible Systems	2	0	1	0	6
IV	Elaboration of the M.Sc. Thesis					30

Signal Processing in Telecommunications Networks

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
I	Advanced Techniques in Telecommunications Networks	2	0	2	0	11
	Detection and Estimation in Radiolocation	2	0	2	0	11
	Image Processing	2	0	2	0	8
II	Data, Voice and Image Network Communications	2	0	2	0	10
	Statistic Signal Processing	2	0	2	0	10
	Mobility and Security in Radio Networks	2	0	2	0	10
III	Multimedia Signal Processing	2	0	2	0	11
	Advanced Techniques in Telecommunications	2	0	2	0	11
	Biomedical Signal Processing	2	0	2	0	8
IV	Elaboration of the M.Sc. Thesis					30

Electronic Instrumentation

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
I	Optoelectronics and High Frequency Instrumentation	2	0	1	0	7
	Biomedical Signal Processing	2	0	1	0	8
	Measurements in Radio-frequency	2	0	2	0	8
	Advanced Techniques in Measurement	1	0	1	0	7
II	Test and Measurement Interfacing Systems	2	0	2	0	10
	Statistical Signal Processing	2	0	2	0	10
	Virtual Instrumentation	2	0	0	2	10
III	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Image Processing	2	0	2	0	8
	Spectral Analysis	2	0	1	0	8
	Management of Design and Research	1	1	0	0	6
IV	Elaboration of the M.Sc. Thesis					30

25

Signal Processing (*Traitement du Signal - in French*)

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
I	Mathematical Morphology	2	0	2	0	10
	Adaptive Signal Processing	2	0	2	0	12
	Image Processing	2	0	2	0	8
I	Statistical Signal Processing	2	0	2	0	10
	Wavelet Functions Theory	2	0	2	0	10
	Time-Frequency Representations	2	0	2	0	10
III	Modern Telecommunications Techniques	2	0	2	0	8
	Neural Networks Applications	2	0	2	0	11
	Biomedical Signal Processing	2	0	2	0	11
IV	Elaboration of the M.Sc. Thesis					30

Advanced Design and Testing Techniques in Electronics

Sem.	Course Title	Structure [hours/week]				Credit points
		C	S	L	P	
I	PCBA Design and Manufacturing	1	0	2	0	8
	Radio-Frequency Measurements	2	0	2	0	8
	Modern Programming Techniques	1	0	1	0	6
	Digital Communications	2	0	1	0	8
II	Test and Measurement Interfacing Systems	2	0	2	0	8
	Statistical Methods for Process Control	2	0	2	0	8
	Virtual Instrumentation					10
	PCBA Design and Manufacturing (project)	0	0	0	2	4
III	Algorithms and Techniques for Modelling and Simulation	1	0	1	1	8
	Design and Testing of Embedded Systems	2	0	1	1	8
	Electromagnetic Compatibility	2	0	1	0	8
	Management of Design and Research	1	1	0	0	6
IV	Elaboration of the M.Sc. Thesis					30

3.3. The "PhD Engineer" level

The Ph.D. degree in Electronics and Telecommunications is a specialized degree, the highest that can be attained in a course of study at our faculty. Its purpose is to certify the qualities of "Scientific Researcher" of the participant in this programme.

The first step of this study programme is the admission examination. After passing it, the candidate must sit for three or four further qualifying examinations in specific subjects. Having successfully passed these examinations, the doctoral candidates must present two or three essays about their research activity at the meetings of the faculty, thus giving others the opportunity to learn about their research activity and to debate upon their scientific interests. Candidates can complete the Ph.D. degree in three to six years (limited to three years in the LMD system). The last step of this programme is the elaboration and oral defence of the Ph.D. thesis.

The goals of this educational programme are:
• to familiarize the candidates with the latest results in their field of study. The thesis must provide original contributions to the research field;
• to develop the theoretical background and practical skills of the candidates with respect to the research field and their original thinking manner;
• to disseminate the preoccupations of our research staff on national and international scale.

Since 1998, some of our Ph.D. students have been preparing their thesis in a co-tutelary system, having two Ph.D. advisors, one from our faculty and one from abroad (usually from a western European university).

PH.D. ADVISORS

1. Scientific supervisor: *Prof. dr. ing. Virgil TIPONUŢ*

   PhD students
   ➢ Ciprian GAVRINCEA: *Researches On A Neural Network Implementation For Processing Signals Generated By The Muscle System*
   ➢ Alexandru DARIE: *Optimizing the Performance of a Mobile Robot Society*
   ➢ Liviu LUCACIU: *Contributions To Biometric Systems Development And Implementation*
   ➢ Marian BURSAŞIU: *Contributions To The Optimization Of Neural Network Applications Development.*
   ➢ Alin BRÎNDUŞESCU: *Contributions To The Biological Signals Simulation Using Artificial Neural Networks*
   ➢ Ionuţ MIREL: *Methods For Digital Video Images Processing*
   ➢ Călin LAR: *Contributions To Sensorial Data Fusion*

➢ Sorin POPESCU: *Optimization Of The Electrical Welding Process By Means Of Artificial Neural Networks*
➢ Laviniu ȚEPELEA: *Human-Machine Interface.*
➢ Lucian BUGLEA: *Smart Transducers Array*
➢ Philipp ROEBROCK: *Multi Sensor Controlled Assembly And Application With Manipulators*
➢ Ioan GAVRILUȚ: *Contributions To Autonomous Mobile Robot Navigation Using CNN*
➢ *Daniel IANCHIS*
➢ *Zoltan HARASZY*

2. Scientific supervisor: *Prof. dr. ing. Tiberiu MUREȘAN*

    PhD students
➢ Petru PAPAZIAN: *Intelligent Subsystems For Optimal Control Of Technological Processes*
➢ Solomon MIMIS: *Integrated Circuits for Transmission Bit Error Rate Measurement*
➢ Dan Mircea ANDREICIUC: *Analysis And Correction Methods For Positioning And Orientation Of Mobile Industrial Robots*
➢ Sebastian TIPONUȚ: *Researches Regarding The Implementation Of Embedded Systems Using Predefined Templates*

3. Scientific supervisor: *Prof. dr. ing. Mircea CIUGUDEAN*

    PhD students
➢ Aurel FILIP: *Researches On CMOS Frequency References*
➢ Marllene DANEȚI: *Propagation Time Estimation Algorithms For Noise Sources Location*
➢ Beniamin DRAGOI: *Researches On CMOS Integrated Digital Correlator Conception And Design*
➢ Radu MIHAESCU: *Telecommunications-Systems Integrated Optimum Structures Based On Mobile Cellular Automatic Devices*
➢ Iosif MUDRA: *Researches On CMOS Integrated Fast Synchronous Comparators*
➢ Bogdan MARINCA: *Ultrasonic Investigation Optimization By Algorithms Implemented In Dedicated Integrated Circuits.*

4. Scientific supervisor: *Prof. dr. ing. Viorel POPESCU*

    PhD students
➢ Mircea BĂBĂIȚĂ: *Reaserches On AC–DC Converters*
➢ Cornel GLISICI: *Contributions Regarding Improved Capabilities Of Uninterruptible Power Supplies*
➢ Corina IVAN: *Energy Parameters Optimization In DC-DC Converters*

- Marin TOMŞE: *Contributions To Theoretical And Experimental Studies Of Inductive Heating Power Supplies*
- Daniel ALBU: *Contributions Regarding Improved Capabilities Of Switched Mode Converters With PFC Applications*
- Dorin CIZMAŞIU: *Power Factor Control In AC-DC Conversion Systems*
- Lucian PĂUN: *DC-DC Converters With Optimized Energy Parameters*
- Adrian ŞCHIOP: *Contributions To Theoretical And Experimental Studies Of Power Converters With AC Motor Drive Applications*
- Cristian VRÂNCILĂ: *Theoretical And Experimental Contributions Regarding Active Power Filters*

5. Scientific supervisor: *Prof. dr. ing. Horia CÂRSTEA*

   PhD students
- Dumitru MĂRGELOIU: *Contributions To The Improvement Of Electronic Equipment For Monitoring And Control Of Low And Medium Voltage Power Grid Parameters*
- Ovidiu MIŢARIU: *Contributions To The Improvement Of Auto Testing Equipment In Digital Data Conditioning And Transmission*
- Corneliu TRIPA: *Contributions To The Development Of Fault Diagnose And Identification Tests In Applied Electronics Equipment*
- Mircea RIF: *Automated System For Data Acquisition, Processing And Management In Industry*
- Mircea MIHĂESCU: *Contributions To The Development Of Dynamical Diagnose And Reconfiguration Tests In Digital Fault Redundant Systems*
- Liviu ION: *Contributions To The Development Of Digital Regulation In Electrically Driven Industrial Processes*
- Andy BERCOVICI: *Contributions To The Increase Of Reliability In Digital Electronics Equipment*
- Cornel GLĂVAN: *Contributions To Increased Security Of Digital Transmissions In Special Applications*
- Liviu CHIŞ: *Contributions To Pattern Recognition Test Development In Automated Visual Control*
- Călin SÂRBU: *Contributions To Predictive Test Development Concerning Electrostatic Discharge In Electronic Industry*
- *Paul CONSTANTINESCU*
- *Daniela MIHET*
- *Silvana-Oana POPESCU*

6. Scientific supervisor: *Prof. dr. ing. Ioan NAFORNIŢĂ*

   PhD students
- Mirela BIANU: *Contributions On Adaptive Signal Processing In Telecommuni-cations*

- Ciprian DAVID: *Contributions On Fault Detection Using Image Processing Techniques*
- Romulus REIS: *Non-Stationary Signal Description By Non-Parametrical Methods*
- Janos GAL: *Contributions On The Use Of Kalman Filters In Telecommunications*
- Marius SALAGEAN: *Non-Stationary Signal Description By Non-Parametrical Methods*
- Andy VESA: *Improvement Of Digital Radio Systems Detection*
- Mircea COSER: *Systems Optimization Using TRIZ Techniques*
- Teodora PELA: *Traffic Optimization On Metropolitan Area Networks*
- Adina DABA: *Non-Stationary Signal Description By Non-Parametrical Methods*
- Florin Dumitru CHIS: *Improving Security Level In Broadband Networks*
- Arpad IOZSA
- Mirela MIOC
- Ioan-Marius BUCIU: *Human Face Analysis (cotutela with prof. Ioanis PITAS - Aristotle University of Thessaloniki)*
- Daria-Ioana BATIU

7. Scientific supervisor: *Prof. dr. ing. Miranda NAFORNIŢĂ*

    PhD students
- Horia BALTA, *Hierarchical coding for spread spectrum transmission systems*
- Radu LUCACIU, *Optical communication systems with OCDMA*
- Maria KOVACI, *N-PSK multiresolution modulations in the COFDM hierarchical systems*
- Mirela VIOR, *Quality transmission improvement using turbo codes*
- Sorin POPA, *Synchronization techniques improvement for radio channel transmission systems*
- Marius OLTEAN, *Radio channel equalization using cyclic prefix*
- Florin Lucian MORGOS, *Radio channels equalization techniques improvement*
- Florin VANCEA, *Data Protection in Communication Networks*
- Călin SIMU
- Norbert EZRI
- Marin MANGRI

8. Scientific supervisor: *Prof. dr. ing. Alexandru ISAR*

    PhD students
- Ioana FIROIU (ADAM): *De-Speckling Of Sonar Images By Multi-Resolution Filtering*
- Cristina STOLOJESCU: *Data minning in communications*
- Mircea BORA: *WiMAX technologies*
- *Lucian ARDELEAN*

9. Scientific supervisor: *Prof. dr. ing. Corneliu I. TOMA*

   PhD students
- Andreea GĂLEANU: *Contributions To Performance Improvement Of The GSM System*
- Artur MULLER: *Contributions In Implementing Multimedia Databases, With Local And Remote Access*
- Mirela IOANEŞIU: *Contributions To Network Security By Using Virtual Private Networks (VPN)*
- Daniel C. HAIDUC: *Contributions In The Colour Digital Reproduction Field*
- Radu TĂNASE: *Ultrasound Electronic Systems For Movement Evaluation In The Fluid Environment*
- Mihai I. ONIŢĂ: *Video Communications In Multimedia Applications*
- Mircea TOMOROGA: *Contributions To Conception And Design Of Analogue Integrated Circuits In CMOS Technology*
- Florin-Josef LĂTĂREŢU: *Contributions To Intelligent Telecommunications Network Achievement*
- Daniela Narcisa FUIOREA – BULUCEA
- Alin SCOROŞANU
- Radu CLESIU
- Gheza Dohi TREPSZKER

10. Scientific supervisor: *Prof. dr. ing. Marius OTEŞTEANU*

    PhD students

- Georgiana SÂRBU-DOAGĂ, first year student
- Hay BOENKE, *Hierarchical object localization for robotic bin picking*
- Daniel POPA, first year student
- Ion-Cosmin DITA,

11. Scientific supervisor: *Prof. dr. ing. Radu VASIU*

    PhD students

- Iasmina ERMALAI, *Contributions to the Use of New Information Technologies in e-Learning*
- Cristian TECU, *Contributions to the Use of Video, Photo and Audio Applications in Professional Presentations*
- Andrei TERNAUCIUC
- Virgil ROTARU
- Bogdan DRAGULESCU
- George MULEC

➢ Andrei RUSAN
➢ Michaela CALOTESCU

12. Scientific supervisor: *Prof. dr. ing. Sever CRIŞAN*

    PhD students
➢ Octavian LUCA: *Spectral Analysis Of Bioelectrical Signals*
➢ Ovidiu VETREŞ: *Perturbations Study Of Low Frequency Electromagnetic Fields*

13. Scientific supervisor: *Prof. dr. ing. Alimpie IGNEA*

    PhD students
➢ Liliana STOICA: *Contributions To Digital Signal Processing*
➢ Ciprian DUGHIR: *Contributions To Antenna Calibration*
➢ Cristina VĂLIU: *Contributions To The Nonlinearities Study Of High-Frequency Circuits*
➢ Cora IFTODE: *Electromagnetic Field Effects On Living Organisms*
➢ Gabriel GĂSPĂRESC: *Perturbation Monitoring In Electrical Networks*
➢ Adrian MIHĂIUŢI: *Contributions To Antenna Calibration*
➢ Doru Lucian COCOŞ: *Neural Networks And Fuzzy Logic Applications To Electronic Meter Calibration*
➢ Teodor PETRIŢA, *Contributions to radiofrequency disturbances monitoring*
➢ Raul IONEL: *Algorithms For Noise Sources Detection Using Virtual Instrumentation*
➢ Michael KLEINKES (Germany): *Mathematical Analysis Of Off-Line Programmed Robots In Industrial Application Cells Monitoring*
➢ Tudor-Marius ZIMAN
➢ Alexandru-Vlad DEHELEAN

PHD THESIS DEFENDED

➢ Marin TOMŞE: *Contributions to theoretical and experimental study of inductive heating power supplies*, Scientific supervisor Prof.dr.eng. Viorel POPESCU

➢ Corina-Mirela IVAN**:** *Contributions concerning analysis and modeling of switching power converters,* Scientific supervisor Prof.dr.eng. Viorel POPESCU

➢ Radu-Dan MIHĂESCU**,** *Design of a branch current reference for CMOS integrated circuits*, Scientific supervisor Prof.dr.eng. Mircea CIUGUDEAN

➢ Ioan BUCIU, *Human Face Analysis*, PhD advisor: Prof. dr. eng. Ioan NAFORNITA and Prof.dr.eng. Ianis PITAS (Aristotle University of Thessaloniki)

➢ Ciprian DAVID, *Détection d'hétérogénéités linéaires dans les textures directionnelles– Application à la détection de failles en sismique de réflexion*, PhD advisors:

Prof.dr.eng. Ioan NAFORNITA and prof.dr.eng. Yannick BERTHOUMIEU (Université Bordeaux I)

➢ Corina NAFORNITA, *Contributions to digital watermarking of still images in the wavelet transform*, PhD advisors : prof.dr.eng. Monica BORDA (Tehnical University of Cluj-Napoca) and prof. dr. eng. Alexandru ISAR

➢ Horia BALTA, *Contribuţii la dezvoltarea şi proiectarea turbo-codurilor binare şi nebinare* PhD advisor: Prof. dr. eng. Miranda NAFORNITA

➢ Raul Ciprian IONEL**,** *Contributions to noise sources detection algorithms using virtual instrumentation*, prof.dr.eng. Alimpie IGNEA

4. Research

The research activity is performed within two Research Centres and by various research teams, as follows:

4.1 Intelligent Industrial Electronic Systems - IIES Research Centre

The director of the IIES Centre is Prof. dr. ing. Mircea CIUGUDEAN.
 Web page: http://www.etc.upt.ro/ea
 E-mail: mircea.ciugudean@ etc.upt.ro
The Centre functions in accordance with the CNCSIS certificate, nr. 106/CC-C/11.05.2001.

Research Field

The Centre performs research and design activities in domains such as:
 - ➢ **Integrated Circuits Design**
   Keywords: ASIC, VLSI, DA, arithmetic coprocessor
 - ➢ **Robotics**
   Keywords: sensor, robot, transducers, industrial robot driving
 - ➢ **Neural Computing and Intelligent Sensors**
   Keywords: intelligent sensors, artificial neural networks, sensor data processing
 - ➢ **Power Electronics**
   Keywords: power converters, power quality, harmonic pollution, power factor correction, soft switching, chaos.
 - ➢ **Electronic Packaging and Testing**
   Keywords: CAE, CAD, CAM, test sequence-generation, self-testing design, test points, EMC, logic analysis, spectral analysis

RESEARCH PROJECTS, CONTRACTS AND GRANTS

INTERNATIONAL PROGRAMMES

1. LEONARDO DA VINCI Community Vocational Training Action Programme *E-learning Distance Interactive Practical Education (EDIPE)* CZ/06/B/PP-168022

Programme:	**LEONARDO DA VINCI CZ/06/B/PP-168022**
Total value:	25,000 EURO.
Director:	Prof.dr.eng. Dan LASCU
Members:	Prof.dr.eng. Viorel POPESCU
	Assoc.prof.dr.eng. Mihaela LASCU
	Assoc.prof.dr.eng. Adrian POPOVICI

	Lect.dr.eng. Dan NEGOIȚESCU
	Assoc.prof.dr.eng. Adrian POPOVICI
	Assist.eng, Mircea BĂBĂIȚĂ
Partners:	Technical University of Brno, SK
	Technische Universiteit Delft, NL
	Technische Universität Wien, AT
	Institut für Elektrische Antriebe und Maschinen, Wien, AT
	Ruhr Universität Bochum, D
	National Technical University of Athens, GR
	Institut National Polytechnique de Lorraine, FR
	Budapest Muszaki es Gazdasagtudomanyi Egyetem, HU
	Fakulta elektrotechniky a informatiky Technická univerzita V Košiciach, SK
	Trencianska Univerzita Alexandra Dubceka v Trencine, SK
	University of Maribor FERI, SL
Contact person:	Prof.dr.eng. Dan LASCU
	Tel: +40 256 403343
	E-mail: dan.lascu@etc.upt.ro

FIELD AND PROGRAM DESCRIPTION

So far the E-learning and Distance-learning via the Internet, is focusing on information delivery where typically multi-media rich web pages are offered to the student sitting at home in front of the computer, taking lessons in a certain subject, while keeping contact to other students and teacher via e-mail, chat-rooms, on-line tests, etc.

Other issues focus on the style of teaching under the impression of extensive usage of multi-media like videoclips, audio or "slide shows" in the classroom or via distance (Internet). Advanced material use interactivity and combination of text explaining the theory with interactive programs that allow student to do little experiments via a simulator or solving some engineering problems. The rapid changes in society and technology have also generated a demand for more flexible engineers having many more qualifications than just a high level of technical or scientific specialisation. The drawback of a pure theoretical approach in undergraduate electrical engineering (EE) curriculum is that there is paid less attention to the phenomena that loom by laboratory experiments and exploration of system components. The result of this, in combination with the rapid development of computer applications, is that hands-on and laboratory experience vanished and computer simulations are getting more and more attention.

However, it is crucial to let students have some real practice. The real experiment gives the

students a sense of practical testing and they can also see the influence of the second/higher order effects, real time effects, effect of parasitics which are difficult or impossible to be simulated perfectly. The reason is that the simulation is always based on more or less simplified model. Therefore it is important to give to the students a real world experience.

However, to build an experiment is expensive and it is impossible for an educational institute to have the complete scale of experiments. From the learner point of view, there is a need for easy accessible hardware experiment. The hardware experiment should therefore be redesigned such that they also can be accessed on the Web. This way the advance in ICT will be combined with the real practical experience.

The proposed virtual or distance laboratory does not present any web-based simulation. It is a real electro-technical experiment conducted in the laboratory but remotely accessed, controlled and monitored by web-based tools. The experiment is either conducted online or based on recorded valued (virtual experiment). It allows students to perform experiment safely, without a guidance and official working hours in the laboratory are not limiting the users. The students can also experience the appearance of the measurement instrument, the electronic components and many more factors such as lay-out. The facility is useful for today's requirement of teaching in the Internet.

The experiments should be not only analysis oriented (to measure and see the results) but also synthesis oriented. It should involve a design aspect. Therefore the measurements are designed as a project with educational philosophy. The technology of such integration is planned to be realised within framework of the project. First of all the technology of such an integration and guidelines to achieve distance Interactive Practical Education will be defined. With this new e-learning tool this technology will be applied to the basic fields of applied electrical engineering starting from fundamentals of EE, through electronics, power electronics, applications of power electronics, dynamics of electro-mechanical systems, including industrial application of electrical drives, motion control and also complex drive systems will be addressed. A complete set of 18 different interactive design oriented virtual or distance laboratories will be prepared with the active participation of the educational expert. This technology will enable us to transfer results of different sectors of education and it will revolutionize education as it is today.

During the kick-off meeting hold in Vienna on November 30th – December 1st the project web page, evaluation group, dissemination plan, financial management, contents of the materials, selection of software for distance practicals management and a workshop on profect oriented and design oriented education were established.

1. *SIARAS, Skill-based Inspection and Assembly for Reconfigurable Automation Systems*
Programme:	EU Sixth Framework Programme
	FP6- 017146, 2007
Total value:	1,000,000 EURO (35,000 EURO for UPT, 4,000 EURO
	for ETc).
Director:	Prof. dr. ing. Ivan BOGDANOV

Members:	Prof. dr. ing. Tiberiu MURESAN
	Prof. dr. ing. Virgil TIPONUT
	Prof. dr. ing. Vasile GUI
	Prof. dr. ing. Alimpie IGNEA
	Prof. dr. ing. Dan STOICIU
	S.l. dr. ing. Cătălin CĂLEANU
	As. ing. Dan ANDREICIUC
Partners:	1. Fraunhofer Gesellschaft, Germany
	2. Asentics GmbH & Co.KG, Germany
	3. ABB Automation Technologies AB, Germany
	4. Sick AG, Germany
	5. Inos Hellas SA, Greece
	6. Lunds Universitet, Sweden
	7. "Politehnica" University of Timişoara, Romania
	8. S.C. Robcon SRL, Romania
Contact person:	Prof. dr. ing. Ivan Bogdanov
	Tel: +40-256-403338
	E-mail: ivan.bogdanov@etc.upt.ro

FIELD AND PROJECT DESCRIPTION

The project focuses on the novel concept of "skill-based manufacturing", i.e. production units, with embedded knowledge about their skills, being able to interact so as to solve a given manufacturing task. Given the situation of the existing highly automated manufacturing systems, the automate design and/or the reconfiguration of the known manufacturing systems have to be achieved.

ACTIVITIES AND RESULTS

➢ Modelling the skills of the system components (actuators, sensors, robots, machines, machine components);
➢ Matching and modelling of production tasks;
➢ Creating two main servers: the Skill Server and the Task Server for the main data bases;
➢ Skill-Mining;
➢ Automated design of systems configuration.

RESEARCH PROJECTS

1. CNCSIS grant A, 98GR/11.06.2008 Tema 10 cod CNCSIS 351
Image quality improvement in sonar systems by speckle noise reduction

| *Total value*: | 10,000 RON |

Director: Prof.dr.eng. Dorina ISAR
Members: Prof.dr.eng. Sabin IONEL
                   Prof.dr.eng. Andrei CÂMPEANU
                   Prof.dr.eng. Alexandru ISAR
                   Lect.dr.eng. Cornel BALINT
                   Assist.eng. Sorin POPESCU
                   Assist.eng. Maria KOVACI
                   Assist.eng. Andy VESA
                   Assist.eng. Marius SĂLĂGEAN
                   PhD Stud. Ioana ADAM

FIELD AND GRANT DESCRIPTION

The images obtained using a set of sound or ultrasound transducers such the SAR images used in aerial navigation or the sea floor images acquired with sonar or the echo graphic images are perturbed by a multiplicative acquisition noise, called speckle noise. For the correct interpretation of the information contained in these images, the enhancement of the quality of those images, based on the rejection of the speckle noise is required. For this purpose the wavelets theory is used more often today. An algorithm dedicated to the reduction of the speckle noise has the following steps: the speckle noise is transformed into an additive noise by the computation of the logarithm of the acquired image; the discrete wavelet transform of the obtained result is then computed; then the non-linear filtering of the new result is performed, reducing the noise; the inverse discrete wavelet transform is then computed and the anti-logarithm of the new result is computed. So, the noise-free estimation of the acquired image is obtained. The purpose of our grant submission is to match this denoising algorithm to the specificities of the sea floor images acquired with sonar images: the statistics of the information contained, the statistics of the speckle noise, the time required for acquisition. The results obtained will be used for the realization of some computing programmes dedicated to the use of geologists for the interpretation of sea floor images, to study the tectonic changes, for the appreciation of the age of different components or of the relief modifications tendencies or for the ecology or military control of different regions. The performances of those programmes will be superior to the performances of the programmes already conceived, affecting less the statistics of the useful image contained into the images to be processed, being faster and using less memory.

ACTIVITIES AND RESULTS

Our researches concentrated this year on the choice of the best wavelet transform for sonar image processing. At the beginning we had used the enhanced diversity wavelet transform, DEDWT, invented in our research team few years ago. Using this transform we decreased the sensitivity of the discrete wavelet transform with respect to the mother wavelet involved. Some diversification mechanisms were developed in the paper "Alexandru Isar, Sorin Moga, Corina Naforniţă, Marius Oltean, Ioana Adam, *Image Denoising Using Wavelet*

Transforms With Enhanced Diversity, Proceedings of International Conference Communications 2006, Bucharest, June, 3-4, 2006."

The theoretical proof for the synthesis of partial results used in DEDWT computation can be found in "Quinquis A., Isar D., Isar A., *Multi-scale MAP Denoising of SAR Images*, Proceedings of IEEE International Conference Oceans'06, Boston, USA, September 20-23", because SAR images represent a more general case that SONAR images.

Later we found more useful a complex wavelet transform, namely the double tree complex wavelet transform, DTCWT. Its use for denoising SONAR images is treated in the paper "Alexandru Isar, Dorina Isar, Ioana Adam, *Denoising Sonar Images*, Proceedings of The Romanian Academy, Series A, Volume 7 , Number 2 May - August 2006, pp. 1-14", where we presented a comparison between our results and the results obtained using classical filters for SONAR images denoising, i.e. Lee and Frost filters. Discussing the subject whit the members of a research team from IFREMER Brest in France we agreed that the results obtained using DTCWT are better because it is a translation quasi-invariant transform with an enhanced directional selectivity. But the complex transform is very sensitive with the choice of wavelet mother. Consequently we proposed ourselves another objective: the design of diversity enhanced complex wavelet transform. The one-dimensional form of this transform, invented in our research team, was published in Proceedings of International Symposium ETc 2006:

"I. Adam, M. Oltean, M. Bora, *A New Quasi Shift Invariant Non-Redundant Complex Wavelet Transform,* Proceedings of International Symposium ETc 2006, September 21-22, 2006, Timişoara".

2. Intelligent three phase ac power supply,
104/ 28.09.2007, ANCS – ID1178

Total value:	816,611 RON
Director:	Prof. dr. ing. Viorel POPESCU
Members:	Prof. dr. ing. Dan Lascu
	Conf. dr. ing. Adrian Popovici
	S.l. Dr. ing. Dan Negoiţescu
	As. ing. Mircea Băbăiţă

3. *Code2Mob*, Application for coding / de-coding 2D bar codes to access Web services on mobile telephones / platforms

Total value:	516,466 RON (48% SIPS, 30% UPT, 28% ATS).
	(196,015 for 2008)
Director:	Prof.dr.eng. Horia Calin CARSTEA
Members:	Drd.eng. Daniela Mihet

	Drd.eng. Paul Constantinescu
	Dr.eng. Marius Rangu
	Conf.dr. Romeo Negrea
	Drd.eng. Stefan Dumitru
	Eng. Stefan Antoniu
Partners	1. SIPS Design SRL, Deva, Romania, Coordinator of project
	2. Politehnica University of Timisoara (UPT), Romania, Partner 1
	3. Advanced Technology Systems SRL (AST), Targoviste, Romania, Partner 2

*Programme: The project represents a **contribution to the implementation of the National Strategy** for Research, Development and Innovation (RDI) and it corresponds to the aim and objectives of Program 4 of The National Plan for Research, Development and Innovation II for 2007-2013*

FIELD AND GRANT DESCRIPTION
Creating and implementing a platform for mobile telephony. By the Code2Mob application a platform will be implemented which will use the 2D bar codes to access Web Services in SOA architecture, on the mobile telephone. The 2D bar codes will be read with the help of the video camera of the mobile phone. The innovation consists exactly in porting SOA and the Web Services on mobile phones, thus opening unlimited uses of these services. Through the project the platform for Mobile telephony and two demonstrative applications will be created, in two different fields: m-Learning and m-Marketing.

ACTIVITIES AND RESULTS
➢ Execution Phase 1: Analysis of SOA and Web Services, Analysis of 2D barcode
➢ Execution Phase 2, Mathematic Model of 2D barcode, Risk Analysis, Encoder/Decoder Algorithm, WS-SOA-Server's Analysis and Implementation, Market Analysis for Mobile Applications and 2D barcode
➢ Execution Phase 3: Experimental Model for Encoder/Decoder, Specifications of Reader/Writer and Architecture of System, Specification Server GalssFish,

Contact person:
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E-mail: horia.carstea@etc.upt.ro

Research in *NEURAL COMPUTING AND INTELLIGENT SENSORS*

The research group is coordinated by Prof. dr. ing. Virgil TIPONUŢ and includes three assistant professors from the Department of Applied Electronics, eight post-graduates from

other universities in Romania and industrial companies (Romania, Canada, USA), who are developing their PhD thesis.

FIELD DESCRIPTION

➢ VLSI Implementation of Cellular Neural Networks (CNN)

➢ Applications of CNN in Intelligent Sensors

➢ Applications of CNN in Robotics (Mobile Robots and Colony of Interacting Robots)

The research activities are also focused in the field of Computational Intelligence (CI) applications. Using CI paradigms, problems like biometrics - face detection and recognition, time series prediction or autonomous mobile robot navigation are tackled. For coding purpose, mainly MATLAB and C are employed.

Hardware/Software resources:
➢ General purpose PC compatible computers
➢ DSP boards from Texas Instruments
➢ Microconverter boards from Analog Devices
➢ Software development tools
➢ Prototyping facilities

RESEARCH TEAM

Prof. dr. ing. Alexandru GACSADY
S.l. dr. ing. Catalin CALEANU
S.l. ing. Aurel FILIP
S.l. ing. Calin LAR
S.l. ing. Ioan GAVRILUT
As. ing. Laviniu TEPELEA

Contact person
Prof. dr. ing. Virgil TIPONUT
Tel: +40 256 403337
E-mail: virgil.tiponut@etc.upt.ro

Research in *POWER ELECTRONICS*

The main research themes investigated are:

➢ Improvement and development of new high-frequency PWM and resonant DC-DC converter topologies,

➢ Elaboration of new power factor correction circuits,

> New control techniques for power factor correction circuits, using classical solutions or neuro-fuzzy controllers,

> Research on AC-AC matrix converters and the corresponding control methods,

> Improvement of electrical drives using active power filters and fuzzy regulators,

> Research regarding topologies and operation improvement of active power filters,

> Development of experimental prototypes for different circuits derived from theoretical research.

As technical support, the research team uses six PCs, design and simulation software for power electronics, two power analyzers and many other power electronic devices.

At present, the research team efforts are focused on creating a power quality test centre, according to European regulations.

Research in *ELECTRONIC PACKAGING AND TESTING*

The research group in this domain is coordinated by Prof. dr. ing. Horia CÂRSTEA, and includes two assistants and three graduated students. The group established relationships with several regional powerful companies in the electronic packaging field, like SOLECTRON, ABB, TELCO and NOVAR. Also, the group has preferential relations with ALCATEL Network Systems, Romania in the field of testing electronic equipment.

4.2 The Research Center on Instrumentation, Measurement and Electromagnetic Compatibility (IMCEM)

The director of the IMEMC research center is Prof. dr. ing. Alimpie IGNEA.
   Web page: http://www.meo.etc.upt.ro/imcem/
   E-mail: alimpie.ignea@ etc.upt.ro

The Centre functions in accordance with The CNCSIS certificate, nr. 102/CC-C/11.05.2001. IMCEM belongs to the Department of Measurements and Optical Electronics, Faculty of Electronics and Telecommunications. For the Electromagnetic Compatibility field, IMCEM is part of the Multi-User Research Base "National Interuniversity Centre for High Voltage Engineering and Electromagnetic Compatibility".

The main research and development areas are:

> *Electric and Electronic Measurement and Instrumentation*: improving measurement methods, sensors and transducers;

➢ *Electromagnetic Compatibility*: EMC measurements and tests at high frequencies, electromagnetic supervision;

Main activities since the creation of the centre:

➢ IMCEM endowment with high specialized equipment for measurements, tests, and education through a TEMPUS programme, a Multi-User Research Base grant and other sources;

➢ the achievement of scientific and development research objectives through grants and scientific research contracts, consulting activities, technical expertise, technical assistance, design; ANTSI, CNCSIS grants were obtained and local collaboration with Siemens VDO Automotive and Solectron exists, to be continued and extended;

➢ Identification of new partners and research programmes.

Research in *SIGNALS SPECTRAL ANALYSIS AND SYNTHESIS WITH APPLICATIONS TO DIGITAL MEASURING SYSTEMS*

KEYWORDS: Data acquisition, spectral estimation, neural networks, digital synthesized AC calibrators.

FIELD DESCRIPTION

The standardization of digital measuring systems is one of the basic operations in measuring techniques. The standardization problem is more difficult when a higher resolution measuring device is used. Consequently, digital processed signals for standardization are used frequently. Their spectral content is revealed through spectral analysis.

RESEARCH TEAM

➢ Prof. dr. ing. Liviu TOMA: *Data Acquisition Systems. Microprocessor Systems Architecture, Digital Processing Structures*

➢ Prof. dr. ing. Traian JURCA: *Electronic Measuring Instruments. Precision Instrumentation. Programmable Measuring Systems*

➢ Prof. dr. ing. Dan STOICIU: *Electronic Measuring Instruments. Metrology, Quality and Reliability. Electronic Measurements, Sensors and Transducers*

➢ Prof. dr. ing. Aldo De SABATA: *Adaptive Methods in Measurements. Signal Processing*

➢ S.l. dr. ing. Septimiu MISCHIE: *Electrical And Electronic Measurements. Programmable Measuring Systems. Precision Instrumentation*

➢ As. dr. ing. Robert PASZITKA: *Microprocessor Systems Architecture. Data Acquisition Systems*

Research in *ELECTROMAGNETIC COMPATIBILITY*

KEYWORDS: Electromagnetic compatibility, EMC directives, immunity to electromagnetic interferences, conducted and radiated emissions, shielding, grounding, site surveys.

FIELD DESCRIPTION

The main directions in research-development are: improving measurement methods, sensors and transducers, EMC measurements and tests at high frequencies, electromagnetic supervision.

ACTIVITIES AND RESULTS

The research in this field provides means and equipment for EMC and educational improvement in EMC design. It intends to minimize conducted and radiated emissions and to suppress electromagnetic interferences, performing the tests and verification in connection with the electric, electronic and radio equipments in accordance to EMC directives.

Research Contracts and Grants

1. *Platform for Study of Physical, Energetic, Electrical, Electronic and Chemical Concurrent Phenomena that Occur in the Thermo-Solar Conversion Process and in the Photo-Voltaic Effect. Automation of Functioning and Exploitation of Solar Assets Based on Thermo-Solar and Photo-Voltaic Conversion*

Duration:	three years, 2006-2008
Total value:	Total value of the project: 4,232,764 RON
	Total value granted by the Ministry of Education and Research: 3,385,000 RON
	Total value from "Politehnica": 700,000 RON
	Value for the Faculty of Electronics and Telecommunications in 2008: 407,736.5 RON
Director:	Prof. dr. ing. Nicolae ROBU, Rector of the "Politehnica" University
	Chief of the Electronics Laboratory: Prof. dr. ing. Aldo De SABATA

PROJECT OUTLINE

Research on the use of new sources of energy and quality of the environment are developing at a high pace in the European Union at present. For example, a 5.5 million EURO Energetically Independent Solar House has been built in Germany, at Freiburg. In all countries of the EU, an intense campaign is led in order to draw attention of and to educate the public on energy problems such as decreasing home and industrial power consumption and the accountable use of classical energy resources.

In order for the know-how and experience gained at the "Politehnica" University of Timişoara in the field of alternative sources of energy to be applied effectively, it is necessary to educate students and staff in solar techniques. In this way, our research in this inter- and multi-disciplinary field can be developed further, by taking advantage of opportunities provided by accessing the European Union.

The efficiency of solar panels varies between 30 and 50%, and it is considered good, the efficiency of photovoltaic panels is between 9 and 24%, and it is considered satisfactory, the efficiency of thermal stocking is about 60%, the efficiency of electrical stocking is approximately 80%. The efficiency of stocking as hydrogen reaction heat is larger than 96%, and the efficiency of nano-structured cells is about 4%.

Consequently, it is necessary to create diathermal materials with very high transmittance in the visible domain, athermal materials with very high absorption properties on a large wavelength spectrum, insulating materials with very low thermal conductivity, selective layers, antireflection layers, semiconductor materials with efficiency of 30%, nano-structured cells with efficiency of about 12%.

The "Politehnica" University of Timişoara built its Solar House as an energetic system in 1982-1986. The asset, built by self-funding, was designed by specialists from the Civil Engineering Faculty, and it consists of two floors and basement. In order to minimize thermal losses, the best construction materials that could be found at that time were used.

We want to create a platform of five integrated, electrically connected laboratories around the Solar House, at five faculties: Energy, Automatics, Electronics, Architecture and Civil Engineering, and Physics. The purpose is to create, study, and measure new materials, measure solar radiation in our region, design new structures of solar architecture, find new ways of thermal and electrical stocking of solar energy, design and built home and industrial solar energy systems. We propose to introduce new subjects for license, master, and doctoral students.

These objectives can be achieved by the rehabilitation of the Solar House and of its energetic chain based on thermo-solar conversion and photo-voltaic effect, by the creation and connection of the five laboratories, and acquisition of modern equipment.

The University might have financial benefits by providing spectro-photometric measurements and customized solar design.

We can introduce now 12 new license laboratory subjects, e.g. *Solar Energy Supplied Electrolysis*. We can introduce at this moment 14 master laboratory subjects, e.g. *Study of an Integrated Thermal-Photovoltaic System*. For the PhD school we can introduce now 4 themes, e.g. *Complete Analysis of the Energy Chain in a Photovoltaic Panel*. We have now 13 research subjects pending by lack of funding, e.g. *Creation of New, High Transmittance Materials*. We have 12 new chapters to be introduced for the Master/PhD school.

The Platform facilities will be used for research, design of solar systems and buildings, publishing of books and papers in journals, organization and participation at national and international conferences and exhibitions, license, master, and doctoral schools on alternative sources of energy, public demonstrations, home and industrial solutions and design.

2. *Partnership grant for projects execution Nr.3/21039/2007, Researches concerning the elaboration and promotion for solar architectural solar solutions for PV systems integrated in buildings.*

Funding:	State Budget – Ministry of Education, Research and Youth, Partnership
	Programmes in Priority Domains
Duration:	36 months
Total value:	360,000 RON
	Value 2008 for UPT:113,230 RON
Director:	Prof. dr. ing. Traian JURCA
Contraction:	Trading Society for Research, Design and Equipment Production and Automation
Partnership::	P3 "Politehnica" University of Timişoara
Members:	Prof.dr.eng. Alimpie IGNEA
	Prof.dr.eng. Liviu TOMA
	Prof.dr.eng. Aldo DeSabata
	Prof.dr.eng. Dan Stoiciu
	Prof.dr.arhitect. Smaranda BICA
	Conf. dr. eng Mihaela LASCU
	Lector dr. Ioan LUMINOSU
	As. eng. Ciprian DUGHIR
	As. arh. Claudiu SILVASAN
	As. arh. Razvan OPRITA
	As. dr. eng. Robert PAZSITKA
	As. eng. Gabriel VASIU
	As. eng. Cora IFTODE

FIELD AND GRANT DESCRIPTION

The major purpose of the project is to demonstrate the efficiency of integrating various PV elements in buildings, to test them and to make them known so that they can be used on a large scale. The project is focused on the promotion of new architectural concepts which include active solar systems (photovoltaic generators) or passive solar systems (lighting systems). The proposed actions will contribute to the sustainable development of the national energy system by promoting the distributed photovoltaic systems, in accordance with the Government global objective to promote renewable energy sources in Romania. The advantages of using the distributed solar architecture are more conspicuous in the case of large network-connected PV systems, such as the PV systems in the urban area, installed on the buildings façades or roofs. These are complex installations with a high number of PV modules and they are incorporated under various angles and directions.

ACTIVITIES AND RESULTS

a. Surveys, research and solutions regarding the solar architecture in Romania.
b. Surveys, measurements and technical solutions for the pilot installations with integrated photovoltaic systems;
c. Construction of two demonstration pilot photovoltaic installations monitored at the West University Timisoara (UVT) and at the University of Architecture and Urban Planning "Ion Mincu" (UAUIM), Bucharest;
d. Experiments, tests and outcome analysis.
e. Large-scale dissemination, including: the development of a products presentation book, development of a market survey, short training activities for students and organisation of a competition, *"Solar House",* development of other dissemination materials, such as: brochures, posters, scientific articles presented at both national and international events, and last, but not the least, creation of a website by which all information activities, training and the promotion of the concept of solar architecture will be achieved.

Contact person:
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3. Contract *19496/18.11.08 Study of the renewable energy potentioal in the Department of Timiş***, in the framework of** *PHARE CBC Ro-Hu 2006, contract RO-2006/018-446.01.01.01.07*
Value: 17,017 RON
Members of the research group:
    Prof. Dr. Eng. Aldo De Sabata, director
    Prof. Dr. Eng. Ivan Bogdanov

Beneficiary**:** Town of Jimbolia, Mayor's Office

ACTIVITIES AND RESULTS

The requirements for a complete evaluation of renewable energy potential in jud. Timiş have been identified and stated.

RESEARCH TEAM

➢ Prof. dr. ing. Alimpie IGNEA: *Electrical And Electronic Measurements. Measurements In Industrial Processes. Measuring Systems In Electromagnetic Compatibility. Antenna Calibration. Nonlinearities study of high frequency devices*

➢ Prof. dr. ing. Mircea CHIVU: *Electrical And Electronic Measurements. Measurement of Electrical and Non Electrical Quantities. Television Channels Broadcasted Via Satellite*

➢ Prof. dr. ing. Aldo De SABATA: *Microwave and Optoelectronics Measurements. Antenna Calibration*

➢ Conf. dr. ing. Mihaela LASCU: *Measurement of Electrical and Non Electrical Quantities. Measurement in Industrial Processes. Virtual Instrumentation*

➢ Conf. dr. ing. Daniel BELEGA: *Measuring Systems in Electromagnetic Compati-bility. Instruments for Measurement. Digital Processing Systems*

➢ As. ing. Ciprian DUGHIR: *Electromagnetic Supervision of Sites. Antenna Calibration*

Research in *SENSORS AND TRANSDUCERS*

KEYWORDS: Piezoelectric sensors, optical crystals, optical effects, piezoelectric crystals, bulk waves, surface waves, sensor arrays

FIELD DESCRIPTION

Optoelectrical and piezoelectric crystals are frequently used in practice. Due to their property of converting optical and mechanical signals, these materials are suitable for manufacturing transducers.
Theoretical and experimental approaches have been made on current measuring and magneto-optic and piezoelectric sensors. An I^2C interface has been experimented.

RESEARCH TEAM

➢ Prof. dr. ing. Sever CRIŞAN: *Optical Electronics, Electrical Measurement, Sensors and Transducers*

➢ As. ing. Emil LUZAN: *Measurement of Environmental Factors, Measurement of Electrical and Non Electrical Quantities*

➢ S.l. dr. ing. Adrian VÂRTOSU: *Microwaves, Microwaves and Optoelectronics Measurement, Television Channels Broadcasted Via Satellite.*

INTERNATIONAL PROGRAMMES

1. COST 2100 International Program
Prof. Dan STOICIU is representative of the "Politehnica" University of Timişoara.

2. Socrates/Erasmus mobility program 2006/2009
Director: Prof. dr. eng. Dan STOICIU
Members: Prof. dr. eng. Aldo DE SABATA
        Assoc prof. dr. eng. Mihaela LASCU
        Lecturer. dr. eng. Lucian JURCA
Partners : IUT Rennes 1, France

3. Socrates/Erasmus mobility program 2006/2009
Director: Aldo DE SABATA
Partners : Politecnico di Torino, Italy

4.3 Other research groups

Research group in Signal Processing

Research fields

➢ Adaptive signal processing
➢ Image processing
➢ Digital watermarking
➢ Time-frequency representations
➢ Wavelets theory applications
➢ Multiresolution analysis
➢ Nonlinear signal processing
➢ Neural networks
➢ Coding
➢ Compression
➢ Communication networks

Keywords

Signals Circuits and Systems, Adaptive Signal Processing, Time-Frequency Representations, Wavelets Theory and Applications, Nonlinear Signal Processing, Neural Networks, Image

Processing, Microwave Technique, Theory of Information and Coding, Data Transmission, Modern Communication Networks, Telecommunication Circuits, Digital Signal Processing, Digital Watermarking, Data Transmission on Radio Channels, Mobile Radio Communications

Research and Educational Projects, Contracts and Grants

1. Program ANCS 77/CP/I/13. 09.07
Improvement of research & development facilities in the field of communications at the Faculty of Electronics and Telecommunications, Politehnica University of Timisoara, CDC

Value: 1,312,842 RON
Director: Prof.dr.eng. Ioan NAFORNITA
Members: Prof. dr. ing.Corneliu TOMA
            Prof. dr. ing. Miranda NAFORNIȚĂ
            Prof. dr. ing. Alexandru ISAR
            Prof. dr. ing. Andrei CÂMPEANU
            Prof. dr. ing.Marius OTEŞTEANU
            Prof. dr. ing.Vasile GUI
            Prof. dr. ing.Radu VASIU
            Prof. dr. ing. Adrian MIHĂESCU
            Conf. dr. ing. Eugen MÂRZA
            Conf. dr.Florin ALEXA
            Conf. dr. ing. Lorin FORTUNA
            Conf. dr. ing.Corina BOTOCA
            Conf. dr. ing. Georgeta BUDURA
            Asist. drd. ing. Călin SIMU
            S.l. dr. ing Cornel BALINT.
            S.l. dr. Ing. Muguraş MOCOFAN
            S.l. dr. ing Horia BALTĂ
            As. drd. ing. Maria KOVACI
            As. drd. ing. Radu LUCACIU
            As. dr. ing. Nicolae MICLĂU
            As. drd. ing. Janos GAL
            As. drd. ing. Gheorghe-Daniel POPA
            As. drd. ing. Marius OLTEAN
            As. drd. ing. Andy VESA
            S.l. dr. ing. Corina NAFORNIȚĂ
            As. drd. ing. Marius SĂLĂGEAN
            S.l. dr. ing. Marian BUCOS
            As. dr. ing. Ciprian DAVID
            As. drd. ing. Mihai ONIȚĂ

The goal of this project is the endowment of the research & development laboratories of the Communications Department, Faculty of Electronics and Telecommunications (Politehnica University of Timişoara) with modern equipment. These laboratories have as objective the main branches of this particular important R&D domain from the National Strategy entitled *Information Technology and Communications*. This is one of the most dynamical fields of R&D at the present moment in Romania; it has a contribution of over 10% in the Gross National Product (GNP). The level of development from the west region of the country tends to be closer in this case to the global medium level. An important trend in the field is the development of integrated systems that transmit and process all types of data and information. Both the technology and the technical standards organizations are driving toward integrated public systems that make virtually all data and information sources around the world easily and uniformly accessible. Such a system allows integration of services such as telephony, television, and data communications. Computer networks are being widely used as architecture of a communications system. From an R&D point of view, we have seen a trend of designing and making 3G equipment described by UMTS or WiMAX standards. These standards integrate the newest results obtained in fundamental sub-domains with advanced technologies, developed in applications sub-domains. For instance, some of this equipment uses OFDM transmission – which is derived from a fundamental sub-domain – Signals Circuits and Systems, and/or turbocoding (Theory of Information Transmission). Such an association ensures high performance at the physical layer (1st level from the OSI model), as described by Claude Shannon at the beginning of XXth century. Implementing of functions from superior layers of the OSI model is adapted to new performance obtained at the physical layer with the use of protocols like Mobile IP or IPSec. With this project, improvement of the equipment will be made in eight research labs, where the following disciplines are developed: Signal Circuits and Systems, Theory of Information Transmission, Computer networks architecture, Data communications, Telecommunications Circuits, Network Protocols, Telecommunications Traffic, Optimizing telecommunications networks, Software for Telecommunications, Internet Data Security, Integrated digital networks, Systems for Digital commutation, Radio Communications, Multimedia.

We have in our research team specialists and researchers in the field. The Scientific Secretary of the Politehnica University of Timisoara, Prof. Radu VASIU, the Dean of the Faculty of Electronics and Telecommunications, Prof. Marius OTESTEANU as well as the Head of Department from the Communications Dept., Prof. Ioan NAFORNITA are a part of this team.

The team has seven Ph.D. advisors.

Estimation of the results from this program:
1. New investments in the infrastructure of Research-Development-Innovation 2576,455 thousands RON
2. Medium usage of equipment: 75%

3. Value of investment in infrastructure and communications services 1717,6 thousands RON
4. The number (percentage) of research members to have access at online scientific resources 100%
5. The number of supported entities needed for improvement of offered services capacity = 8.

ACTIVITIES AND RESULTS

New investments in the infrastructure of Research-Development-Innovation were made. The value of the contract for the year 2008 was 1312842 RON.

The lab of Signals and Systems developed a contract with a telecommunications industry leading firm, Alcatel-Lucent, with a value of 54000 RON. The acquisitions for the entire department of Communications, made throughout 2008, consisted of:

➢ System for controlled access for eight laboratories, using card access, card access and PIN code or only PIN code, memory of 1000 transactions, Qty: 1, 8800 RON
➢ Scanner/copy machine/printer HP/LaserJet 3035, format A4, resolution 1200x1200 dpi, interface USB 2.0, volume 75000 pages/month, Q 7051A, 6885, Qty: 1, 6885 RON
➢ Smart boards with intelligent screen CCD, Panasonic UB5315-G, diagonal 61'', Qty: 6, 27833 RON
➢ Equipment for video-conference, POLYCOM, connected to PC, ImageShare II, maximum transfer via IP – 2 Mb/s, integrated video camera video, Qty: 7, 172200 RON
➢ Video camera Canon DM-XM2, resolution 3 CCD, optical zoom 20x, digital zoom 100x, Qty: 1, 8476 RON
➢ Printers HP LaserJet P2015N, monochrome, resolution 1200x1200, Q7553A/X, Qty: 6, 6613 RON
➢ Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, Qty: 32, 72582 RON
➢ Monitors, 19'' YAKUMO XPT, LCD, TFT, 500:132 pieces, 27187 RON
➢ Antivirus software, NOD 32 Antivirus, Qty: 32 licenses, 4576 RON
➢ Laptop, Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Memory RAM-1x512 MB, Hard disk-40 GB, Qty: 32, 128000 RON
➢ PDA, OS: Microsoft Windows Mobile 2003, memory slots SD, Mini SD, touch-sensitivity display-minimum 3,0'', USB 1.1 Client, Integrated IrDA (SIR) , Serial RS232, integrated GSM/GPRS, integrated GPS, receiver Bluetooth, integrated camera Built-in SXGA, 1.3 MP, resolution 1280x1024, Qty: 32, 73600 RON.
➢ Scanner, HP ScanJet 5530, resolution 2400 dpi, Qty: 6, 6029 RON.

The acquisitions for the laboratory of **Information Theory and Coding (room B219)** made throughout 2008 consisted of:

➢ Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, 2M, LGA, 15 pieces, 34023 RON
➢ Monitor, 19" YAKUMO XPT, LCD, TFT, 500:1, Qty: 16, 13600 RON
➢ Server IBM System X3400-797514G, Qty: 1, 4800 RON
➢ Antivirus software, NOD 32 Antivirus, Qty: 16 licenses, 2290 RON
➢ License software Matlab/Simulink Classroom, Qty: 10 licenses, 7811 RON
➢ Laptop Intel, Processor-Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Qty: 1, 4000 RON
➢ Video projector, NEC VT-47, Microportable, SVGA 800x600, 1500 ANSI lumen, contrast 400:1, weight 2.9 kg, Qty: 1, 3700 RON
➢ Tripod projection screen 1,25*1,25 m, Qty: 1, 250 RON
➢ USB wireless adaptor, AirLive Turbo G USB adapter, 2X speed of 11g, 802.11e&WMM, Qty: 16, 944 RON
➢ Microwave Technology Training System (8090), Qty: 1 license, 50000 RON

The laboratory of Information Theory and Coding (room B219)

The acquisitions for the laboratory of **Radio communications (room B714)** made throughout 2008 consisted of:
➢ Programmable Oscilloscope OD582, Qty: 3, 29998 RON
➢ Programmable frequency generator 2GHz, GR205, Qty: 1, 19999 RON
➢ Spectrum analyzer, AE967, Qty: 1, 32371 RON
➢ Radiofrequency analyzer, AC725, Qty: 1, 24928 RON
➢ Equipment for studying the systems of telecommunications, EC796, Qty: 1, 8970 RON

The laboratory of Information Theory and Coding (room B219)

➢ Systems for studying TV antenna, EA815G, Qty: 1, 25904 RON
➢ Dipole antenna, AM03, Qty: 2, 1195 RON
➢ Equipment for research in digital telecommunications, EF970E, OP97001, OP97002, Qty: 1, 42672 RON
➢ Equipment for research in analogue telecommunications, KL900A, Qty: 1, 13382 RON
➢ Equipment for research in analogue telecommunications, KL900B, Qty: 1, 10581 RON
➢ Equipment for studying the systems of emission reception AM/FM, KL900C, Qty: 1, 5977 RON

The laboratory of Radiocommunications (room B714)

- Equipment for research in Bluetooth transmission, BT2001, Qty: 1, 17986 RON
- AM/FM 108 radiokit, Qty: 20, 7900 RON
- Matlab/Simulink Classroom, 10 users, software license, Qty: 1, 9000 RON
- LabView software license, Qty: 1, 9000 RON.

The laboratory of Radiocommunications (room B714)

B712b-The research laboratory

Expected/estimated Profit:
1. Each lab will develop a contract with a telecommunications industry leading firm for instance, Alcatel-Lucent, with expected value of 5000 euro per year;
2. Each lab will win one CNCSIS funded research grant with an expected value of at least 30000 RON/year

B712a-Research laboratory

Potential beneficiaries:

- Post-universitary courses – Matlab: Alcatel-Lucent, Solectron, Siemens, Kathrein
- Conferences, workshops, summer schools – teaching staff from other technical universities
- Equipments – suppliers, service
- Publishing houses where books will be edited
- Partner laboratories
- Ph.D. students that will successfully complete their doctoral studies.

2. CNMP PN II, nr. 51-102, Title: *New piezoelectric sensors based on α-quartz type materials, for safety and quality control food industry*

Value: 2.000.000 RON
Director: Lect. dr.eng. Nicolae MICLĂU
Members: PhD Stud. Alexandru BOLTOSI
            Tehn. Virgil POPOVICI

FIELD AND GRANT DESCRIPTION

The current project follows as objectives solving the next underlined scientific and technological problems, pursuing the main objectives of Program 4:

- Obtaining new piezoelectric single crystalline materials of higher quality, such as α-Quartz $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe), using hydrothermal crystal growth method at high pressures and temperatures, in alkali and acid medium.
- Designing, creating and testing the new improve piezoelectric sensor perceptible to ammonia or organic amines and also the control and monitoring apparatus.

- Creating and improving a prototype of the piezoelectric sensor, perceptible to ammonia or organic amines and also the control and monitoring apparatus suitable for food industry.
- Informing the business media on partial and final project results.
- Scientific excellency elicitation and international projects cooperation extension

Achieving such aims would lead to a further more development of piezoelectric sensors field, by implementing a novel single crystalline piezoelectric layer based on new α-Quartz type materials, superiors as quality to classic α-Quartz, and also by a practical extension of these materials in quality control and food security.

Also, the project strongly seeks realizing and developing a regional partnership among reference national research and development institutions specialized in synthesis and material characterization, electronic, agronomy and food industry processing technology

ACTIVITIES AND RESULTS

On national and international level of research in the field of piezoelectric sensors, the project aims to accomplish the following activities:

- increasing the performances of piezoelectric sensors (nanogrames sensibility), by obtaining single crystal α-Quartz type plates materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe) using hydrothermal crystal growth method at high pressures and temperatures, in alkali and acidic medium.
- Increasing the efficiency of piezoelectric sensor in detection of ammonia and organic amines followed as a result of food alteration.
- Decreasing the size of the sensor and costs.
- Realizing and patenting a piezoelectric prototype sensitive to substances associated with food alteration.
- Extending the applicability of new and improved piezoelectric sensors in the detection of pathogen micro-organisms associated with food alteration.
- *Industrial research results:*

R1. Bibliographic study on piezoelectric materials, "state of art" evaluation on processing technologies and sensors applications.

R2. Projects on laboratory technologies suitable for growing single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe), and piezoelectric sensor perceptible to ammonia or organic amines;

R3. High quality α-Quartz type piezoelectric single crystals;

R4. Single crystal oriented piezoelectric plates cut from bulk high quality single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe);

R5. Quantification of structural and piezoelectric proprieties of single crystal oriented piezoelectric plates cut from bulk high quality single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe);

R6. Piezoelectric sensor perceptible to ammonia and organic amines and control and monitoring apparatus;

R7. Experimental prototype which quantify the influence of chemical composition, structural parameters, crystallographic axes, quality, plates thickness and the influence of the nature of sensitive material to ammonia and organic amines on to the performances of the piezoelectric;

R8. Preliminary experimental study on the sensibility of the prototype to pathogen micro-organisms from food;

- *Laboratory research results:*

R9. Project of novel piezoelectric sensor based on new α-Quartz type materials perceptible to ammonia and organic amines, project on control and monitoring apparatus;

R10. Prototype of novel piezoelectric based on new α-Quartz type materials perceptible to ammonia and organic amines, project on control and monitoring apparatus;

R11. National patent and EPO.

- *Support activities results:*

R12. Interactive web page of the project;

R13. Scientific paper published in ISI indexed reviews, sustained by national and international conferences;

R14. National and european projects propositions;

R15. Study support, monographies, published materials;

R16. Master and doctoral thesis papers;

R17. Forming and specializing courses specially dedicated to young researchers, students, master and doctoral students in the field of piezoelectric sensors related to food industry.

R18. Workshop and yearly conferences dedicated to economic medium.

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3. CNCSIS grant A, contract no. 98GR/11.06.2008, CNCSIS code 342, Title: *Neural Networks Based System For The Diagnosis And Prognosis Of Urological Deseases*

Value: 20000 RON
Director: Assoc.prof.dr.eng. Corina Botoca
Members: Prof.dr.eng. Gui Vasile, UPT
            Assoc.prof.dr.eng.Budura Georgeta, UPT
            Assoc.prof.dr.eng.Alexa Florin, UPT
            Assoc.prof.MD.Bucuras Viorel, UMF
            Assoc.prof.MD.Dema Alice, UMF
            Lecturer MD.Botoca Mircea, UMF
            Asist eng. Miclau Nicolae, UPT

Ass. MD.Cumpanas Alin, UMF
Ass. MD.Bardan Razvan, UMF
MD.Dragoi Razvan, UMF

FIELD AND GRANT DESCRIPTION

Thematic area: Advanced informatics systems and models for the assistance of medical diagnosis and preventive medicine. The deseases diagnosis and prognosis are usually realized by analyses and processing of clinical information. When the volume and the variety of the information become too demanding for the clinician, the need for supportive statistical prediction methods emerges. When the classical methods, like statistical modeling, are failing, due to the computational complexity and to the long processing time, the neural networks (NN) could offer effective solutions, being able to perform real-time prediction of the deseases diagnosis and prognosis of a particular patient.

Our project developed and validated a neural integrated system, in an adequate programming medium, capable to offer solutions to some urological problems. The proposed system is a package of complex analyses and evaluation programs, similar with the evaluation-decision model from the clinical medicine.

The system inputs are variables carefully selected, with different weights, obtained from the real situations and readily comparable with the real, functional, clinical models. In order to collect the clinical data necessary to develop a diagnosis and prognosis system for urology, clinical trials have been completed, on patients with prostate cancer, bladder cancer, kidney cancer, benign prostatic hyperplasia and urinary lithiasis. The project data base acquired is unique in the country and has a special importance for the urological and oncological research. Models of clinical urological applications have been developed using various NN architectures, such as multilayers perceptrons, radial basis function NN, competitive NN and recurrent NN. A comparison of the performance of different NN architectures and training algorithms has been accomplished and the model with the best accuracy/complexity ratio was selected, in each particular case, in order to be integrated into our diagnosis and prognosis system.

The experience acquired by the team was and will be shared with other interested research teams, forming a national research community in the field of neural networks applications in medicine.

ACTIVITIES AND RESULTS

The research team has completed during this year the data base for the neural system. A rigorous comparative study on the performance of different NN architectures and training algorithms has been performed in order to establish the best structure in each of urological diagnosis or prognosis application.

Scientific contacts with researches having the same preoccupations have been maintained by the participation of some researches to the "The 23rd EAU. Congress", which took place in Milan, Italy between 25-30 March 2008. The project manager has participated to a course having a subject similar with our project theme "Predictive Modelling in Prostate Cancer" 17-19 April, Venice, Italy. This mobility was partially sustained from the project resources. Also others two members of the team participated to the above mentioned course and have established new scientific contacts with researchers having similar preoccupations.

The team researchers were partially financially sustained to pay the dues to international organizations, respectively at the IEEE, EAU and SIU from the project resources. This gave easy access to prestigious publications permitting an up to date documentation.

Some chemical and laboratory materials necessary for the clinical trials have been acquired.

It is on the way of publishing a book entitled "Atlas of macro- and microscopically images from the tumour urological pathology. Methods of images processing and interpretation" authors. A. Dema M. Botoca, V. Bucuras, A. Cumpanas, R Bardan, C.Botoca, V. Gui, F.Alexa, Politehnica Publishing House, 2008, ISBN 978-973-625-563-2. The images book represents a novelty in the medical literature in the country. This book offers to the ones interested a collection of typical and also exceptional images from the uro-neoplasycal pathology, acquired during the research. The chapter of images processing is addressing to the students and engineers interested in developing applications in computer assisted medicine.

During 2008 two licence papers concerning the bladder and kidney pathology and a dissertation on the cancer staging using neural networks were conceived.

The research team have sustained and published a number of 12 papers to national and international conferences, in prestigious revues, mentioned in scientific data bases recognised by the international scientific community.

4. CNCSIS grant TD (PN2 program), code 403, contract no 1/01.10.2007

Radio channels transmission optimization techniques.
Value: 42,498 RON (28332 on 2008)
Director: Teach assistant Marius Oltean
Members: -

FIELD AND GRANT DESCRIPTION

The wireless access techniques have known an impressive expansion in the recent years. Most of these solutions rely on the muti-carrier approach for signal transmission at physical layer. The most successful muti-carrier version is Orthogonal Frequency Division Multiplexing (OFDM), used by a large number of standardized solutions, such as WiFi, WiMAX, DAVB etc.

Despite its indubitable advantages, OFDM shows some drawbacks too. Recent research has shown that, by associating the multi-carrier concept and the wavelet signals, some of the OFDM's classical drawbacks can be counteracted. Several versions of new transmission technique, referred to as wavelet modulation (or Wavelet OFDM) were proposed in the recent years. Most of the research activity associated with this grant is focused on the study of this modern multi-carrier approach.

ACTIVITIES AND RESULTS

The main objectives of the research in this year were focused on the following directions
➢ A comparison between the classical version of OFDM and the wavelet modulation
➢ An extensive study of WOFDM from the BER performance point of view, in various types of channels
➢ An empirical study whose objective was to reveal how, and to what extent, some parameters of the WOFDM transmission can impact the system's performance (namely the wavelets mother and the number of Inverse Discrete Wavelet Transform iterations)

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5. *CNCSIS grant TD-24, nr. 189/09.10.2007 Contributions to the application of Kalman filtering in communications*

Value: 35.400 RON (*28.320 for 2008*)
Director: Assist. eng. Gal Janos

FIELD AND GRANT DESCRIPTION

Polynomial phase signals (PPS) are frequently encountered in many signal processing applications such as in radar, sonar, laser velocimetry or telecommunications. There are non-stationary signals having a fast-varying instantaneous frequency. The estimation of the parameters of PPS signals affected by additive Gaussian noise has received considerable interest in signal processing literature and several methods formulated as linear system identification problems, have been used to solve the problem. These approaches admit the solution in the form of a linear Kalman filter which is the optimal tracking algorithm when the signal models are assumed linear and both state and observation noise are additive and Gaussian.

A linear state model can be obtained by the approximation of Tretter which regards as uncorrelated both amplitude and phase components of the gaussian noise.

As the Tretter linear state model works satisfactorily as far as the signal-to-noise ratio (S/N ratio) exceeds 13dB, at lower levels of S/N ratios will be used nonlinear state models and Extended Kalman Filtering (EKF) procedures which considers a local linearization that uses a first order Taylor expansion of nonlinear equations.

This research gives a new state space model of variable amplitude polynomial phase signals that allows better performances for EKF algorithm than the old linear Kalman method. The robust EKF implemented on this model extends the range of performances of Kalman algorithms in the polynomial phase estimation from a S/N ratio of 13dB to 5dB.

ACTIVITIES AND RESULTS

I considered an estimation method based on an approximate linear state space representation of the polynomial phase signal. This approach offers the opportunity to use a nonlinear but exact measurement equation and guide the estimation of the states of these signals to an extended Kalman filtering algorithm. Procedure simulations were made on linear and quadratic phase modulation signals with time-varying amplitude and are consistent with the theoretical approach. The results given by this new algorithm are compared with the performances of a standard Kalman technique.
Some diversification results were developed in the paper "Gal Janos, Campeanu Andrei, Nafornita Ioan, *Identification of Polynomial Phase Signals by Extended Kalman Filtering*, EUSIPCO 2008, 16th European Signal Processing Conference, 25-29 August, 2008, Lausanne, Switzerland"

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6. Alcatel-Lucent Timisoara, contract: 1984910/4945, 2008
Interference Reduction in WiMAX Technology

Value: 54000 RON
Director: Prof. dr. eng. Alexandru ISAR,
Members: Assist. Prof. Horia Balta,
Assist. Maria Kovaci,
Assist. Marius Oltean,
Assist. Marius Salagean.

FIELD AND CONTRACT DESCRIPTION

WiMAX represents the last network communication technology. Despite its revolutionary advancements, the performance of this new technology is penalized by the presence of interferences. The goal of this contract is the identification of the interference sources, the definition of a new signal quality measure which takes into account the interferences, the signal to interference plus noise ratio (SINR), the estimation of the effects of interferences in the reduction of performance (for example the influence on traffic) and the identification of the solutions to reduce the interference.

ACTIVITIES AND RESULTS

First we have made a theoretical analysis, reported into the document: "M. Kovaci, H. Balta, M. Oltean, M. Salagean, A. Isar, *How could be better defined an effective CINR for multi-carrier modulation user in order to effectively determine the link error performance obtained ?*". We exploited the results by publishing some revue articles: "M. Oltean, M. Kovaci, H. Balta, A. Campeanu, *Multy Binary Turbo Coded WOFDM Performance in Flat Rayleigh Fading Channels*, ACTA Technica Napocensis, 3/2008, 9-14" and "H. Balta, D. Bosneagu, M. Kovaci, M. Oltean, *A Study of the Permutation Schemes Used in the Mobile WIMAX*, ACTA Technica Napocensis, 3/2008, 15-18".

Next we have conceived a physical level WiMAX network simulator in Matlab.

Finally, we have studied the traffic of a WiMAX network and we have written the rapport "I. Firoiu, C. Stolojescu, A. Isar, *Forecasting of WiMAX BS Traffic: Observations and Initial Models*".

INTERNATIONAL CONTRACTS AND GRANTS

1. IFREMER Brest France, contract d'étude: 2007 3 30742142

Débruitage des images SONAR

Value: 15000 Euro
Director: Assoc. prof. dr. eng. Sorin MOGA,
Members: Prof. dr. eng. Alexandru ISAR.

FIELD AND CONTRACT DESCRIPTION

The images obtained using a set of sound or ultrasound transducers such the sea floor images are affected by a multiplicative acquisition noise, called speckle. For the correct interpretation of the information contained in these images, the enhancement of the quality of those images, based on the rejection of the speckle noise is required. For this purpose the wavelets theory is used more often today. An algorithm dedicated to the reduction of the speckle noise has the following steps: the speckle noise is transformed into an additive noise by the computation of the logarithm of the acquired image; the discrete wavelet transform of the obtained result is then computed; then the non-linear filtering of the new result is performed, reducing the noise; the inverse discrete wavelet transform is then computed and the anti-logarithm of the new result is performed. So, the noise-free estimation of the acquired image is obtained. The purpose of this contract is to match this denoising algorithm to the specificities of the sea floor images: the statistics of the information contained, the statistics of the speckle noise, the time required for acquisition. The results obtained were integrated into a software product, called SONARSCOPE, commercialized by IFREMER Brest, which is used by geologists for the interpretation of sea floor images, to study the tectonic changes, for the appreciation of the age of different components or of the relief

modifications tendencies or for the ecology or military control of different regions. The SONARSCOPE performances are superior to the performances of other software products already conceived, affecting less the statistics of the useful image contained into the images to be processed, being faster and using less memory.

ACTIVITIES AND RESULTS

Our researches concentrated last year on the choice of the best wavelet transform for sonar image processing. Our first choice was the Double Tree Complex Wavelet Transform (DTCWT). The results obtained were reported in the papers: "Sorin Moga, Alexandru Isar, *SONAR images despeckling using a Bayesian approach in the wavelet domain*, Proceedings of SPIE Conference Photonics Europe, Vol. 7000: Optical and Digital Image Processing, 700029 (Apr. 25, 2008), Strasbourg, France, ISBN: 97808194 71987" and "A. Isar, S. Moga, D. Isar, *Denoising Images Using a New Type of Bishrink Filter*, accepted for publication in Revue Roumaine de Sciences Techniques-Electrotechnique et Energetique".

We have also conceived a new implementation of the Hyperanalytic Wavelet Transform (HWT), which denoising properties are comparable with the properties of the DTCWT. The results obtained in image watermarking using this new implementation were reported at the same international conference "Corina Nafornita, Ioana Firoiu, Jean-Marc Boucher, Alexandru Isar, *A new watermarking method based on the use of the hyperanalytic wavelet transform*, Proc. SPIE Europe: Photonics Europe, Vol. 7000: Optical and Digital Image Processing, 70000W (Apr. 25, 2008), Strasbourg, France, ISBN: 97808194 71987".

The corresponding algorithms were included into a second variant of SONARSCOPE. We have conceived the documentation for this new variant. In this respect we have proposed a diploma project theme, which was selected by Lucia Cerghizan, former student at the master Traitement du signal. She made this project at Telecom Bretagne, cooperating with the specialists from IFREMER Brest. She also organized interviews with the beneficiaries of the first variant of SONARSCOPE, to identify its drawbacks. At this occasion it becomes clear the necessity of a new graphical interface, with a better semantic organization. We have identified solutions based on the last variant of Matlab to build faster the new graphical interface, using Java. Lucia Cerghizan was employed at the end of her contract in France in the department of computers at Telecom Bretagne.

Research group in Image Processing and Multimedia technologies

Research Fields

- ➢ Television and Digital Television
- ➢ Image Compression
- ➢ Digital Image Processing
- ➢ Motion Analysis
- ➢ Pattern Recognition
- ➢ Interactive Multimedia Techniques

- ➢ Media Streaming
- ➢ Multimedia Databases
- ➢ Internet Security Techniques
- ➢ E-learning
- ➢ Advanced learning technologies

WWW, Hypermedia and Internet

Keywords

Image Processing, Sound Processing, Multimedia, Image Compression, Interactive Applications, Web Services, E-learning

Research and Educational Projects, Contracts and Grants

1. CEEX Project, Contract Nr. CEX 60 / 28.07.2006,

Title:	***Control and Monitoring from the Distance System for Intelligent Buildings „COMODICI",***
Value2008:	150,000 RON
Period:	**2006-2008, UPT partner**
Director:	Prof. dr. ing. Radu VASIU
Members:	Prof. dr. ing. Radu VASIU
	S.l. dr. ing. Mugur MOCOFAN
	As. ing. Constantin M. BUCOS
	As. ing. Mihai ONITA
	PhD student Iasmina ERMALAI
	PhD student Andrei TERNAUCIUC
	PhD student Cristian TECU
	PhD student Bogdan DRAGULESCU
Partners:	Technical University of Cluj-Napoca
	"Transilvania" University of Brasov
	Siemens PSE Brasov

FIELD AND GRANT DESCRIPTION: Intelligent buildings apply technologies to improve the building environment and functionality for occupants/tenants while controlling costs. Improving end user security, comfort and accessibility all help user productivity and comfort levels. The owner/operator wants to provide this functionality while reducing individual costs. Technologies make this possible. An effective energy management system, for example, provides lowest cost energy, avoids waste of energy by managing occupied

space, and makes efficient use of staff through centralized control and integrating information from different sources. An efficient integrated system enables a modern, comprehensive access and security system to operate effectively and exchange information with other building systems. Fully integrated functionality includes the ability to open doors, notify responsible staff of unwanted intrusions and ensure that lighting, fire and other building management systems are informed of staff that arrive or depart the building. This information can then be used to manage the local environment and the resulting energy usage. Life safety systems, notably fire systems, are heavily regulated by stringent code requirements. These requirements do not, however, prevent the information from a fire system being provided to other systems. This opportunity can be exploited to open doors and illuminate a building when fire alarms are received. Transducers (detectors) can measure many building parameters, e.g., vibration, strain and moisture, to continually monitor the building's infrastructure condition. To integrate these systems and exchange information effectively, a ubiquitous and reliable communications infrastructure is needed. These systems are typically managed by personal computers (PCs) using data processing communication techniques and both wired and wireless communication technologies. The key communications issues are redundancy, resilience, security and the assurance for all users that "their data" is secure. Integration considerations may be addressed through standards and conventions, or manufacturers' protocols. Since proprietary solutions permeate the industry, total interworking is currently unattainable, but the future will require full interoperability, with information exchanged among all systems, hence we will need technologies that translate

2. CEEX Project, Contract Nr. CEX 05-D8-77 / 19.10.2005,

Title:	***Foresight Scenarios for the Romanian Economical Sectors with Inovation Potential in the View of the Year 2020 „INOVFOR",***
Value 2008:	190,000 RON
Period:	**period 2005-2008, UPT coordinator**
Director:	Conf. dr. ing. Marian MOCAN
Members:	Prof.dr.eng. Radu VASIU
	Prof.dr.eng. Corneliu TOMA
	Assoc.lect.eng. Diana ANDONE
	Lect.dr.eng. Mugur MOCOFAN
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	PhD student Iasmina ERMALAI
	PhD student Andrei TERNAUCIUC
	PhD student Cristian TECU

Partners:	I.N.C.S.M.P.S. Bucharest
	I.P.A. SA Bucharest
	CURS SA Bucharest
	INOE Bucharest

FIELD AND GRANT DESCRIPTION: The main goal of the project is to elaborate a National Strategy for Research – Development – Innovation, and according to that to develop a R&D National Plan for the period 2007-2013. This plan will be correlated with:

- the general external and security policy objectives, aiming to asses Romania as a power and stability factor in the Black Sea and the Balcan Peninsula area;
- the necessity of European integration, with minimal costs, having in view the strengthening of the Romanian economy in order to face the competition on the new market;
- the strengthening of the functionality of the specific economical mechanisms of an emerging market;
- the creation of the premises to decrease the differences between Romania and the other members of the European Union;
- the move towards an economy based on knowledge;
- the necessity to create the premises for the development of the domestic market, the increase of the work opportunities and of the professional training, the amelioration of the working conditions, of the health and living conditions for the population, the creation of the local brands and trade marks;
- the creation of a scientific and technological stock, concentrated to the areas with good opportunities to make the most from the human capital;
- the design of the institutional system and of the regulations able to allow the sustainability, the development, the use and the efficiency of the scientific and technological capital, as determined;
- the coherent development of the resources and their correlation to the need of scientific and technological capital, for the areas with development potential.

The project's objectives are:
- to make an analysis of the strong points, of the weak points, of the effective and potential opportunities, of the effective and potential factors of risk resulting from the economical evolution on long term, medium term and short term
- to develop a strategy and a potential national plan for R & D
- to make proposals able to create the framework and the instruments needed for valorising the existing opportunities, for translating some potential opportunities into effective ones, for minimizing the existing risks and for preventing the identified potential risks

- to elaborate the main scenarios for the Romanian economical and social development until 2020, as a premise for the elaboration of a consolidated foresight endeavour, made up from „critical domains / technologies"
- to elaborate the National Plan for research – development – innovation, that will include the means and ways to encourage and support the critical domains / technologies, the modalities for their effective implementation, the monitoring and evaluation tools, the financing mechanisms and resource allocation principles, the modalities to promote excellence.

Project details can be found at:
www.cm.upt.ro/inofvor

3. CEEX Project, Contract Nr. CEX 05-D8-5/ 10.10.2005,

Title:	***Development of the Concept of Social Responsibility in the Romanian Companies, in the European Context „RSE & UE",***
Value2008:	60,000 RON
Duration:	2005-2008, UPT partner
Director:	Conf. dr. ing. Marian MOCAN
Coordinator:	I.N.C.S.M.P.S. Bucharest
Members:	Prof.dr.eng. Radu VASIU
	Assoc.lect.eng. Diana ANDONE
	Lect.dr.eng. Mugur MOCOFAN
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	Eng. Iasmina ERMALAI
Partners:	I.P.A. SA Bucharest
	CURS SA Bucharest
	INOE Bucharest

FIELD AND GRANT DESCRIPTION: The Lisbon Agenda (2000) establishes as the main strategic objective that „the EU should become the most competitive and dynamic knowledge based economy in the world, capable of sustainable economical growth, with more and better work places and with a bigger social cohesion". The project represents an effective contribution to the implementation of those desires.

The project objectives are:
- Realization of a report about the existing situation at international level, including in the EU, referring to the concept of social cohesion

- Design of information instruments for documentation, communication, collaboration and implementation of some activities
- Elaboration of some empirical analyses regarding the existing situation in Romania, including the external dimension (Corporate Social Responsibility – CSR)
- Elaboration of a methodology for the investigation of the internal dimension of IRS/CSR in Romania
- Elaboration of a methodology for the investigation of the dimension of IRS/CSR at the level of organisation in Romania
- Evaluation of the dimension of the economical, social and environmental aspects, at the elvel of organisation, in Romania
- Evaluation of the impact of IRS/CSR towards the competitivity, occupational quality, inclusion and social cohesion
- Determination of some directions of perspective in applying IRS/CSR in Romania, in European context.

Project details can be found at:
www.cm.upt.ro/rse&ue

4. PNCD II project nr. 11-057/14.09.2007:

Title:	**Bio-medical signal acquisition and remote transmission over mobile computing equipments BIOMED-TEL**
Value 2008:	20,000 RON
Director:	Prof.dr.ing. Radu VASIU
Members:	Prof.dr.eng. Corneliu TOMA
	Assoc.lect.eng. Diana ANDONE
	Lect.dr.eng. Mugur MOCOFAN
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	PhD student Iasmina ERMALAI
	PhD student Andrei TERNAUCIUC
	PhD student Cristian TECU
	PhD student Bogdan Dragulescu
Partners:	Transilvnia University of Brasov
	Technical University of Cluj-Napoca
	Siemens PSE Brasov
	IBCI – Institute for Cardiovascular Diseases Iasi

FIELD AND GRANT DESCRIPTION:

Cardiovascular affections are a prime cause of mortality and morbidity in Romania. The risk of cardiovascular morbidity and mortality remains high despite the attempts of correcting the cardiovascular risk factors. In the field of cardiovascular pathology the death risk by cardiovascular or vascular-cerebral accident persists even after the patients have left the hospital. Monitoring the health condition of these and the analysis of evolution trends of the biophysical and biochemical parameters represents an essential prevention factor.

The project envisages research, design and implementation of a flexible and self-adapting system for the monitoring of biological signals. Research and design activities will be oriented towards developing a system architecture and organization for remote monitoring and creating the interfaces for acquisition, monitoring and remote transmission to a hospital unit (hub). The signals acquired from the patient include: heart bio-potentials, blood pressure, blood O2 concentration, heart and breath rate, temperature, blood glucose concentration etc. The mobile computing equipments (MCE) integrated in the systems will be: Personal Digital Assistant (PDA), and/or „smart phones" (mobile phones MP).

The project will use hard – and software platforms (PDA and MP) of broad usability, which correspond to the requirements of the application in terms of computing power and also by their low price. Based on intelligent interfaces that will be designed, the system will automatically integrate the sensors in „plug & play" mode and also adapt its communication strategy with the hub/dispatcher for cost minimization and for ensuring the reliability and availability of the data link. It cannot be neglected, that this system development strategy will offer high versatility and scalability and will allow for expanding project results beyond the field of remote medicine.

The project will develop and integrate two categories of **intelligent interfaces**: 1. specific to signal **acquisition** from sensors placed on the patient and 2. **communication** – dedicated (by wire or wireless) necessary for warning/alert messages transfer and also for data transfer to the hospital hub. Remote data-transmission will allow for communication technologies, like: Near Field Communication (RFID, ZigBee, RuBee, Bluetooth), remote wireless: GSM/GPRS, EDGE, UMTS, Wi-Fi, WiMax as well as the wire based ISDN and Ethernet.

The project is relevant to research direction *"1 – Information and communication Technology"*, theme priority: "*1.6. Technologies for distributed systems and embedded systems"*, aimed at developing of new technologies for integrated systems based on biomedical sensors networks (specific objective 1.6.14). The project objectives envisage also the development of applications for communication and computing embedded systems (specific objectives 1.6.17 and 1.16.16) ensuring local data processing and transmission to the hospital hub.

The purpose is to develop new technologies for integrated systems based on intelligent sensor networks for monitoring biological signals, remote transmission and processing for prevention and diagnosis. Envisaged are both theory development of architecture and organization of the systems for intelligent sensor networks (wire based or wireless) as well as practical implementation and testing of the mobile monitoring system carried by the patient. The proposal has innovative characteristics: the architecture and organization; the

„plug&play" interfaces in compliance with the IEEE 1451 standard; the integration based on widespread platforms (PDA, MP); processing, analysis and detection of alerts using also „artificial intelligence" methods, development of strategies allowing for high reliability of the data link with the hospital hub, all these are characteristics of a modern and extremely useful solution for the developments in the field of bioengineering. The project will create the conditions for radically improved material bases required for the monitoring of the main biological parameters of the patient in the ambulatory which will increase the efficiency of the medical art, especially prevention, reduce the costs of medical assistance and extend the experimental base, very necessary in the field. Also, the formative component, especially by integrating young researchers in a field with real prospects contributes to the relevance of the project.

MAIN ACTIVITIES:
- Analysis of the current world wide developments in the field of ambulatory monitoring of biological parameters acquired signals of processing techniques and methods, instrumentation and dedicated sensors. The stress will be laid on advanced signal processing techniques for preventing or early detection of the patient's health state deterioration;
- Definition of the full specifications – hardware and software for the monitoring application;
- Development of system architecture and organization, adequate for monitoring;
- Design of acquisition and communication interfaces at MCE in accord with the specification including those regarding energy consumption minimization;
- Development of acquisition, processing, analysis, storage/archiving, alert and communication MCE programs with the hub for the acquired signals;
- Training of the young researchers, result dissemination and increase of team visibility for attracting new partners and creating accession conditions to European funds;

Development of the material research bases of the partners and subsequently of interdisciplinary research laboratories: electronics, medicine, telecommunication in the four university centers. It is envisaged that these will function financially autonomous which will allow for the permanent updating of the proposed system.

5. PNCD II project nr. 3598 / 2007

Title:	**Efficiency Increasing of the Support Processes for International Transfer on Managerial Know-How in the Applicative Research and Innovation Field - WINMAN**
Value 2007:	19,000 RON
Director:	Prof.dr.ing. Radu VASIU
Members:	Prof.dr.eng. Corneliu TOMA
	Assoc.lect.eng. Diana ANDONE

	Lect.dr.eng. Mugur MOCOFAN
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	PhD student Iasmina ERMALAI
	PhD student Andrei TERNAUCIUC
	PhD student Cristian TECU
Partners:	Academy of Economic Studies
	Institute of National Economy
	"Politehnica" University of Bucharest
	Centre for Industries and Services Economy
	Bridgeman SRL
	Commercial Academy Satu Mare
	Artifex University

FIELD AND GRANT DESCRIPTION

The coherent contribution to the triangle competitivity – technological transfer – research-innovation supposes the elaboration of new methods and processes for knowledge management for the research activities. The recognition of the role of technology transfer mechanisms and / or of the know-how elements is more an more underlined by the academic areas, by the partnerships between research – industry – financial services companies. The role of the new technologies in improving the productivity and the competitivity of different economical sectors / economic clusters / or even national economies takes to the reconfiguration of the traditional relations between the research results suppliers and the final beneficiaries of those results. The XXI-st century Romania is still characterized by significant gaps regarding the technical efficiency, delays and disfunctionalities in resource administration for the adoption of new technologies in the industry. It is absolutely necessary to correlate, on short term, the requirements related to the increase of the absorbtion capacity of the European founds and the necessity to increase economic performance. Consequently, new decision making models are required, to the benefit of the industrial companies in the field of human resources development for Romania as a whole.

The consortium of the WINMAN project has the purpose to elaborate and to propose models for managerial processes and practical methods related to different aspects of the research activities: managerial transformation based on innovation strategies, technological transfer as support for knowledge based developments, intellectual property rights implementation in the research strategy, innovation support as source of competitivity advantages, human resources management in R&D activities.

MAIN ACTIVITIES:

- Analysis of the risk factors in the evolution of the international technology transfers, especially at the level of small and medium enterprises in Romania;
- Realization of new models for the technology transfer processes in the field of international know-how management, according to the specific Romanian conditions (business intelligence)
- Re-engineering of the processes related to Intellectual Property, with the goal to involve universities as main actors in the field
- Creation of an intuitively and interactiv instrument on the web (e-business portal), able to support the use of the models of international know-how management
- Initiation of new collaborative business processes in the field of technological transfers, able to stimulate innovation in Romania.

6. CNCSIS grant CODE 17, type TD

Title:	***Dinamical scene analize with 3D sensors***
Value 2007:	15,630 RON
Director:	PhD student Georgiana SIMION

FIELD AND GRANT DESCRIPTION

The TD grant offered by CNCSIS aims to support young PhD students in their research activity.
The project goal is to recognize hand gestures.

ACTIVITIES AND RESULTS

First of all the hand must be detected and tracked. The Cam Shift tracker was optimized and more attention was paid to the features extraction. The challenge was to find the relevant features and how to use the information provided by them.

Using sparse features and compositional techniques hand gestures were recognized. Complex images can be represented as a composition of simple parts. Using sparse features and the relations between them it is possible to deal with occlusion. A model for the specific application was implemented .

This work's results were validated by writing and publishing two articles at international conferences:
1. Popa D., Simion G., Gui V., Otesteanu M. "Real Time Trajectory Based Hand Gesture Recognition", WSEAS Transactions on Information Science & Applications, Issue 4, Volume 5, April 2008
2. Simion G., Gui V., Otesteanu M., Popa D., David C., "Hand Edge Detection for Gesture Analysis in a Sparse Framework",Buletinul stiintific al Universitatii Politehnica din Timisoara,Tom 53(67),Fascicola 2, 2008, pp. 155-160, ISSN 1583-3380

7. CNCSIS grant CODE 16, type TD

Title:	***Robust techniques in image registration***
Value 2007:	15,630 RON
Director:	PhD student Daniela FUIOREA-BULUCEA

FIELD AND GRANT DESCRIPTION

KEYWORDS: Image registration, robust estimation, mean shift, similarity transforms, video sensors.

The aim of this project is to propose and test a new method of feature based 2D image robust registration is proposed. The image distortion is modeled as a similarity transform with four parameters, estimated sequentially by 1D transforms, resulting in an increased sample density as compared to 4D space processing. By adopting a mean shift estimator, advantages of RANSAC and M-estimators can be combined within a single and sound theoretical framework. Based on this method, the projects is proposing to use image registration techniques to solve node localization problem in a Wireless Sensor Network based on video sensors. Moreover, the proposed solution adds video-field overlap estimation to classical spatial localization. Several registration algorithms are analyzed and tested for performance evaluation.

ACTIVITIES AND RESULTS

The research concentrated this year on the the features optimization selection, in order to realize the image registration. Sensor localization is required by most Wireless Sensor Networks applications. Considering application for video surveillance, localization includes not only spatial coordination but also cameras direction and video-field overlap estimation. The paper "D. Fuiorea, V. Gui, D. Pescaru, P. Paraschiv, I. Codruta, D, Curiac, C. Volosencu, Sensor node localization using SIFT algorithm, Proceedings of the 9th WSEAS Int. Conf. on AUTOMATION and INFORMATION (ICAI'08), Bucharest, Romania, June 24-26, 2008, pp.436-441, ISBN: 978-960-6766-77-0, ISSN: 1790-5117" presents a novel technique for localization in a Video-based Wireless Sensor Network using image registration that involves SIFT algorithm for automatic features selection. Experimental results show the estimation accuracy and time efficiency comparing with manual solution.

The next step is testing the performances of the proposed robust method in a wireless sensor network and finding sensors localization based on robust image registration and matching points. The paper "D. Fuiorea, V. Gui, D. Pescaru, C. Toma, Comparative study on RANSAC and Meanshift algorithm, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Electronics and Telecommunications, ISSN 1583-3380, sept. 2008" presents a comparative study between two important robust methods: the RANSAC algorithm and the mean shift algorithm. These methods are used in an image registration

technique. The purpose is to demonstrate that mean shift could replace with success the RANSAC algorithm. These techniques are analyzed and tested for performance evaluation. The articles published at conferences and the research papers presented in the department are reflecting the results in this domain.

8. CNCSIS grant CODE 15, type TD

Title: ***Contributions to the use of new informational technologies in the eLearning process***
Value 2007: 15,630 RON
Director: PhD student Iasmina Leila ERMALAI

FIELD AND GRANT DESCRIPTION
The TD grant offered by CNCSIS aims to support young PhD students in their research activity.
The project consists of integrating new informational technologies within the Distance Learning Center platform, viewed as an important source of eLearning at our university. Delivering educational content on mobile devices is the improvement brought to the existing platform.

ACTIVITIES AND RESULTS
The first stage of the research concentrated on discovering the students' needs and their availability to the new internet technologies. Based on the results drawn from this study, a few solutions were proposed and integrated on the existing Distance Learning Center's platform. Podcasting, as a solution for delivering content to mobile students, was one of the technologies implemented. For a greater adaptability, a modular approach was chosen. Podcasting added a mobile component to the existing platform, transforming the process from eLearning to mLearning.
This work's results were validated by writing and publishing two articles at international conferences:
1. Publishing learning content on mobile devices, Iasmina Ermalai, Andrei Ternauciuc, Mihai Onita, Radu Vasiu, Virtual University 2008 Conference, Bratislava, Slovacia, December 11-12, ISBN-978-80-89316-10-6, INSPEC Accession Number: 10146005
2. Mobile Virtual Communities, Marian Bucos, Iasmina Ermalai, Mihai Onita, Andrei Ternauciuc, Radu Vasiu, ELSE "eLearning and Software for Education", Bucharest, April 17-18, 2008

International Contracts and Grants

1. Socrates Erasmus Curriculum Development project: *International On-Line Master in Multimedia (IMM – CD)*

Value 2008: 40,600 EUR

Director:	Prof.dr.eng. Radu VASIU
Members:	Prof.dr.eng. Nicolae ROBU
	Assoc.lect.eng. Diana ANDONE
	Lect.dr.eng. Mugur MOCOFAN
	Assoc.lect.eng. Daniel HAIDUC
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	Iasmina ERMALAI, PhD student
Partners	Univ. of Nice, FR
	JME Associates, UK
	Univ. of Technology, Kaunas, LT
	E-Collegium, Budapest, HU
	Univ. of Godollo, HU
	Mimoza Kft, Budapest, HU
	Univ. of Zvolen, SK

FIELD DESCRIPTION

The scope of the project, which is funded by the European Commission for 2 years (Oct. 2004 – Sept. 2006) is to introduce an International on-line Master degree in Multimedia. The consortium of participants established an International Academic Board that is responsible for establishing the curricula and for checking the quality of the courses. Each partner university takes part to the course development, the allocation of courses being done based on competition. Some of the courses might be allocated for development to recognized experts in e-learning from USA, Finland and Greece.

After course development, the degree program will run through e-learning, tutoring being realized on-line by the course developers. The partner universities will ensure local support centres, in order to allow face-to-face meetings for the students they enrolled. Final examination will be done through face-to-face examination done by the course leaders, the only participants to the degree program that will have to travel internationally.

"Politehnica" University of Timisoara is the program coordinator and contractor.

Further details on the project can be found at:
www.immaster.net

2. Leonardo da Vinci II project: *E-REPORT. Transnational virtual study circles: e-learning supports for tutorship and learning groups*

Value 2008:	75,000 EUR

Director:	Prof.dr.eng. Radu VASIU
Members:	Assoc.lect.eng. Diana ANDONE
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Lect.dr.eng. Matei TAMASILA
	Eng. Iasmina ERMALAI, PhD student
	Eng. Cristian TECU, PhD student
	Eng. Andrei TERNAUCIUC, PhD student
	Eng. Marius CONDREA
	Lucia RAZMERITA, journalist
Partners	Università degli Studi di Palermo, IT
	University of Salzburg, AT
	Confederación Empresarial de la Provincia de Alicante – COEPA, ES
	Gotland University, Gotland, SE
	Karolinska Institute, Stockholm, SE

FIELD DESCRIPTION

E-REPORT project will contribute to set up a communitarian repertory of reference material with regard to the development of innovative methods and best practices in the field of e-learning system for VET (universities and vocational institutes). Particularly, the project is aimed at setting up the basis for the constitution of a transnational virtual study circle.

This demands a comprehensive and transnational approach that implies:

- analyses of the educational and training needs in the field of e-learning;
- international comparison of the quality and the quantity of the existing online courses provided by both universities and vocational institutes;
- international comparison between contents, methods and services adopted in this field in order to standardize them;
- the elaboration of a shared repertory of contents, methodologies, services and training tools;
- the testing and validation of this repertory to a significant sample of the final users of the project's output;
- the promotion of processes of virtual mobility among european students and teachers/trainers;
- the transnational communication and exchange between universities and vocational centres, public and private;

- the ongoing valorisation and dissemination of the results during the project, involving the final users of the outputs

3. LLP project: *"VICADIS – Virtual Campus for Digital Students",* Agreement **2007-2611/001-001,** Project number **134039 - LLP - 1 - 2007 - 1 - RO - ERASMUS - EVC**

Value 2007:	365,747 EUR
Director:	Prof.dr.eng. Radu VASIU
Members:	Assoc.lect.eng. Diana ANDONE
	Lect.dr.eng. Mugur MOCOFAN
	Assist.eng. Marian BUCOS
	Assist.eng. Mihai ONITA
	Eng. Marius CONDREA
	Lucia RAZMERITA, journalist
	Cristian TECU, PhD student
	Iasmina ERMALAI, PhD student
	Andrei TERNAUCIUC, PhD student
	Bogdan DRAGULESCU, PhD student
Partners	University of Palermo, Italy
	Baltic Education Technologies Institute, Lithuania
	University of Miskolc, Hungary
	Oulu University of Applied Sciences, Finland
	University of Brighton, UK
	VISIONI Di Caro arch. Ernesta, Italy
	Euro-Contact Business School, Hungary
	BRIDGEMAN SRL, Romania
	JME Associates Ltd, UK

FIELD DESCRIPTION

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and ensuring the interoperability between the different eLearning environments used in the partner universities.

Aims of the project:

• To overview and implement emerging tools and technology commonly referred to as "social software" that can create personal as opposed to institutional learning environments, as well as the mobile learning tools

• To support practitioners in becoming aware of the new features of the digital students, to learn to effectively use and develop resources with new digital technologies and new communication tools in ways that are aligned with what they want to achieve educationally.

• To provide the organisational and technical framework for the development of an interoperable virtual campus

• To make available a virtual campus based on Open Educational Resources which will offer a free, open personal learning environment

• To improve the quality of education in eLearning by international co-operation and by new methodological approach to learning. The project intends to develop an interoperable virtual campus, not a new one to replace the existing ones used in the universities, and to provide a new methodology based on modern techniques of education such as open sources, adaptability and interactive learning.

• To evaluate, test and transfer the ICT tools, pedagogical methodology and the Set of Guidelines to other education and training areas and throughout Europe.

The main scope of ViCaDiS is to provide an accessible and attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. By providing students the tools which they use anyway extensively outside the institutional framework of learning (wiki, blogs, forums, IM, podcasting, RSS) ViCaDiS will support the learning attractiveness of the university curricula, will improve the quality of the learning process by encouraging the exchange of information/knowledge between students from different universities, and will reduce university drop-out or student de-motivation for learning. It will also produce an instructional or pedagogical shift inside the universities eLearning moving the focus from the education materials and technology to the user- student, to user generated content.

In ViCaDiS, a wide range of ODL actors from EU and CEE countries will focus on developing an innovative approach for enhancing international eLearning by moving the strength from the institutional learning environment to the personal learning environment (PLE) which focuses on students. It will also produce an instructional or pedagogical shift inside universities eLearning moving the focus from the education materials and technology to the user-student, to user generated content.

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and to ensure the interoperability between the different eLearning environments used in the partner universities.

The goal of ViCaDiS is to create an attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. An innovative multilingual ICT-based environment

unique in Europe (as an international virtual campus), it will incorporate several open educational resources (library, glossary, external links, student projects, course activities), open educational tools (wiki, blog, forum, calendar, podcasting, instant messaging communication, audio-video conferencing over IP,

RSS, mobile text messaging, mobile accessibility to ViCaDiS) and will promote social networking as an instructional method.

The project **workpackages** are:

- Developing and testing of the ViCaDiS scenario
- ViCaDiS tools design and implementation
- Piloting/testing and evaluation of ViCaDiS
- Evaluation and elaboration of the Set of Guidelines
- Exploitation of ViCaDiS
- Dissemination and Awareness raising of ViCaDiS
- Project management of ViCaDiS

The main **outcomes** of the project are:

➢ open personal learning environment methodology
➢ ViCaDiS scenarios
➢ ViCaDiS multilingual virtual campus: online environment and mobile environment based on Open Educational Resources
➢ Multilingual web portal
➢ Multilingual Set of Guidelines (on paper, CD and online)
➢ ViCaDiS evaluation
➢ Promotional and multiplication materials

5. Publications

5.1 Papers

1. oana Ionel, Sabin Ionel, Francisc Popescu, Gelu Padure, Luisa Isabel Dungan, Daniel Bisorca, *Method for determination of an emission factor for a surface source*, Journal of Optoelectronics and Advanced Materials - Rapid Communications, JOAM-RC, Cod CNCSIS 431 şi acreditată ISI (cat. A), Vol. 2, Nr. 12, 2008 p.851-854, ISSN: PRINT: 1454 - 4164, ON-LINE: 1841 – 7132

2. I Jivet, B Dragoi, *On-electrode autonomous current generator for multi-frequency,* EIT Physiological Measurement,Institute of Physics Publishing, England, 29 (2008) S193–S201 Vol 29(2008) S193-201 , ISSN 0967-3334, ISSN 1361-6579

3. R.Mihaescu, M.Ciugudean, *Second-order temperature - compensated total – current Reference,* Proceedings of the 12-th WSEAS International Conference on Circuits, p.119-124, ISBN 978-960-6766-82-4

4. C. D. Căleanu, V. Tiponuţ, I. Bogdanov, I. Lie, *Emergent Behaviour Evolution in Collective Autonomous Mobile Robots,* WSEAS International Conference on SYSTEMS, Heraklion, Crete Island, Grecia p.428-433, ISBN 978-960-6766-83-1

5. Ioan Lie, Virgil Tiponuţ, Ivan Bogdanov, Sabin Ionel, Cătălin Daniel Căleanu, *Data Acquisition System for Heat Costs Allocation,* Proceedings of the 12th WSEAS International Conference on CIRCUITS, Heraklion, Greece, July 22-24, 2008, p.163-168, ISBN 978-960-6766-82-4

6. I Jiveţ, A Brinduşescu, I Bogdanov, *FPGA Implementation of Image Morphological Decomposition with Reconstruction*, Proceedings of 12th International Confeence on Circuits, Heraclion 2008, p.385-391, ISBN 978-960-6766-82-4

7. I Jivet, A Brindusescu, I Bogdanov, *A Perception Oriented Formal Model for 3D Sensors,* Proceedings of 12th International Confeence on Systems, Heraclion 2008, p.227-234, ISBN 978-960-6766-83-1

8. V. Tiponut, S. Popescu, I. Bogdanov, C. Caleanu, *Obstacles Detection System for Visually Impaired Guidance*, Heraklion, Greece, July 22-24, 2008, p.345-349, ISBN: 978-960-6766-83-1 ISSN: 1790-2769

9. Dan Negoiţescu, Dan Lascu, Viorel Popescu, Corina Ivan, *Chaotic Behavior of the Buck-Boost Converter under Current-Mode Control,* Proceedings of the 12th WSEAS International Conference on Circuits, p.125-130, ISBN 978-960-6766-82-4

10. Ioan Lie, Virgil Tiponuţ, Ivan Bogdanov, Sabin Ionel, Cătălin Căleanu, *A Low Cost CPLD-Based Ultrasonic Flowmeter,* WSEAS Transaction on Circuits and Systems, Issue 3, Volume 7, March 2008, p.102-108, ISSN 1109-2734

11. Ciprian Seiculescu, Ioan Lie, Aurel Gontea, *PWM encoding method for wireless communication in sensor networks*, WSEAS Transaction on Circuits and Systems, Issue 4, Volume 7, April 2008, p.194-202, ISSN 1109-2734

12. I Jivet, B Dragoi, *Performance Analysis of Direct Digital Synthesizer Architecture with Amplitude Sequencing,* WSEAS Transaction on Circuits and Systems, Issue1, Vol.7, Jan. 2008, p.1-6, ISSN 1109-2734

13. I. Jivet, B. Drăgoi, *FPGA Implementation of the Curve Generator Algorithm for H/W Acceleration Applications,* WSEAS Transaction on Circuits and Systems, Issue1, Vol.7, Jan. 2008, p.7-12, ISSN 1109-2734

14. I. Jivet, A. Brindusescu, *Real Time Representation of 3D Sensor Depth Images*, WSEAS Transaction on Circuits and Systems, Issue5, Vol.7, May 2008, p.65-72, ISSN 1109-2734

15. I. Jivet, A. Brindusescu, I. Ivan, *Static and Dynamic Abstract Formal Models for 3D Sensor Images*, WSEAS Transaction on Circuits and Systems, Issue9, Vol.7, Sept. 2008, p.844-854, ISSN 1109-2734

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6. Other activities

Our Faculty and its staff are deeply interested in maintaining the existing relationships with other Universities and promoting new ones.

6.1 The International Symposium of Electronics and Telecommunications - "ETc 2008"

The symposium is organized within our faculty every two years, since 1994, and has increased continuously in quality and quantity of submitted papers. This year, the Symposium took place in 25 and 26 September. The International Scientific Committee acceped 99 papers for presentation and publication out of 125 submitted, resulting a rejection ratio of 17%. Details can be found at http://www.etc.upt.ro/conferinta/home.php. The contents of the Symposium

Proceedings are listed below. Full text can be downloaded from http://shannon.etc.upt.ro/bulletin/pdf/2008vol53_67no1.pdf

Abstract - An original voltage multiplier circuit will be presented. The circuit is implemented in m 35 0 μ CMOS technology and, in order to improve its frequency response, it is based exclusively on MOS transistors working in saturation region. The utilization of a FGMOST (Floating Gate MOS Transistor) for replacing the classical MOS devices allows obtaining an important reduction of the circuit complexity and, as a result, of the silicon occupied area. The SPICE simulation using the previous mentioned technological parameters confirms the theoretical estimated results, showing an excellent linearity of the new proposed CMOS voltage multiplier circuit.
Keywords: equivalent FGMOS device, linearization technique, multiplier circuit, second-order effects

Abstract – The paper presents a new version of the generalised hybrid method for the analysis of the analog circuits with strong nonlinearities, driven by signals with widely separated frequencies. The key idea is to formulate the circuit equations by using multiple time variables, which enable an efficient representation of this kind of signals. Using multiple time-scale the differential algebraic equations (DAE) describing the nonlinear analog circuits are transformed into multitime partial differential equations (MPDE). An illustrative example is presented.
Keywords: Hybrid method, Nonlinear analog circuits, Steady-state analysis

Abstract – Fluid media (clean hot water or steam) mainly distributes thermal energy to the points of consumption. The energy manager is not only interested in the total energy required but also in the consumption of the individual heat consumers and the flow of energy in the plant in general. As a result in this paper we describe an ultrasonic heat energy meter and an AMR system for this heat energy meter

Abstract – A comparative study between three power converter configurations has been made: three-phase, six-pulse, full bridge diode rectifier, RNSIC-2 and ARNSIC-2. The study is focused in the harmonic currents contents, cost, size, and safe functionality.
Keywords: power electronics, converter, harmonic current contents

Abstract – *The paper presents a method for the vectorial self - control of an induction motor supplied by a PWM inverter with IGBT transistors. Very good performances are obtained. Considering the dynamic regime for the induction machine, its equivalent circuit is presented according to the suggested method. To analyze the performances obtained with the proposed control technique, transient response simulation results are given, in comparison with SPWM control technique.*
Keywords: *pulse width modulation, inverter, induction machine, dynamic performances*

Abstract – Natural gas is a non-regenerable energy source. For this motive it must be managed properly to protect it for future generation. Proper management of natural gas reserves requires submetering. Submetering of natural gas consumption and revenue collection is traditionally accomplished using diaphragm gas meter. To resolve some problem of revenue collection new technologies liken automatic meter reading is implemented. In this context we at AEM Luxten Lighting Co produce a radio module for automatic gas meters reading and the reading system for this gas meters.
Keywords: *flowmeters, diaphragm gas meter, natural gas submetering, radio module for gas meters reading.*

Abstract – The paper compares the operating regimes of the large power transformer units, as they are defined in CEI 60354 and CEI 60076-7, indicating the differences between them. The modification of the operating conditions with the load connected to the secondary winding of the transformer unit is underlined.

Further, the paper presents the software applications for evaluating the operation of the transformer in different regimes, their maximum loading limits, as well as the maximum loading time, according to the thermal models presented in the two standards.

Keywords: large power transformer units, operating regimes

Abstract – The paper presents three central units (UCV- 01, UCV-02, UCV-01XA) used both in experimental systems for engineering education and in data acquisition distributed systems in energetics. UCV-01 or UCV-02 is organised around a microcontroller from the 80C552 family, and UCV-01XA is configured around a P51XAS3 microcontroller (Philips Semiconductors). These central units are very flexible, with excellent control possibilities in various industrial applications. Two applications in engineering education and some experimental results are also summary presented in the paper.
Keywords: central unit, microcontroller, data acquisition system, sensor, measuring system.

Abstract – In this paper is presented a translinear topology suitable for static and dynamic analog signal

processing at very low supply voltage. The one variable objective functions, firstly are rational approximated, then decomposed in partial fractions and finally implemented with CMOS translinear networks. Such functions processing have small computational time and leads to the implementations with controllable errors. This topology will be used in structural synthesis program, named TLSS, for automate synthesis of translinear circuits.
Keywords: analog signal processing circuits, translinear circuits, CMOS integrated circuits, low power circuits.

Abstract – The paper presents a solution for transforming a fully synchronous socket based design into a GALS structure that eliminates the need for a global clock, thus reducing the power consumption. The

solution presents a set of asynchronous wrappers that transforms the standards synchronous interface into an asynchronous one while provide a stoppable clocking solution to further reduce the consumed power. The solution was proved in simulation using a communication system with one master and multiple slaves.
Keywords: OCP, GALS, asynchronous wrapper

Vitaly Levashenko - Test Pattern Generation Multiple-Valued Logic Circuits **54**

Abstract – In this paper we present a test pattern generation tool for combinational Multi-Valued Logic
(MVL) Circuits. Test generation using deterministic algorithms is highly complex and time consuming. New approaches are needed to augment the existing techniques, both to reduce execution time and to
improve fault coverage. Genetic Algorithms (GA's) have been effective in solving many research and optimization problems. Since test generation is a search process over a large vector space, it is a best candidate for GA's. The GA evolves candidate test vectors and sequences, using a fault simulation to compute the fitness of each candidate test.
Keywords: Multi-Valued Logic Circuits. Test   generation. Genetic Algorithms

Ruxandra L. Costea, Corneliu A. Marinov - Time-Problem in Hopfield Neural Networks with Parasitic Capacitances **58**

Abstract –A continuous time neural network of $O(N^2)$ interconnections is considered. A maximum selector is built by a proper choosing of parameters. It processes a sequence of lists and the speed is a performance criterion. The main point here is a formula for the processing time which takes into account the parasitic capacitances between inputs.
Keywords: neural networks, winner-takes-all, Hopfield networks, parasitics, time evaluations.

Elena Zaitseva, Yurj V. Pottosin, Vitaly Levashenko - Failure Analysis of Logical Network
.... **61**

Abstract - Measures for logical network failure are considered in paper. They are Dynamic Reliability
Indices (DRIs) and Reliability Function (RF). The DRIs allow investigating the influence of one gate breakdown to failure of logical network. Methods of Logical Differential Calculus and structure function of a logical network are used for calculation of these indices. The RF is a probability of logical network failure and it is calculated by special form of structure function. Algorithms for DRIs and RF computation are proposed in paper.
Keywords: Reliability Analysis, Dynamic Reliability Indices, Reliability Function

Adrian Şchiop, Viorel Popescu – About Modulation Strategies in Single-Phase Flying Capacitor Multilevel PWM Inverter **67**

Abstract – In this paper the modulation strategies for single-phase multilevel PWM inverter with flying capacitors are analyzed. Some of the modulation strategies give self balancing voltage of flying capacitors, others do not. The analyzed strategies are: phase disposition PWM method, phase-shifted PWM method, the saw-tooth rotation PWM method and the carrier redistribution PWM method. The results are

obtained through simulation..

Keywords: flying capacitor, single-phase multilevel PWM inverter, modulation strategies

Rusalin Lucian R. Păun - Improved performances AC – AC Single-Phase Converters...... **73**

Abstract - This paper propose a new control technique for single – phase AC – AC Converters with a good dynamic response, a good output characteristic, a good power-factor correction(PFC) and a small number of components. A power factor correction rectifier and an inverter with the proposed control scheme has been designed and simulated using Caspoc2007, validating the concept.
Keywords*: AC-AC single – phase converter, power factor correction, PWM rectifier.*

Daniela P. Popescu, Denisa Gh. Ruşinaru - Modern techniques and alternatives for generative learning applied in engineering academic education **77**

Abstract –The unprecedented, aggressive institutional competition and quickly changing students instructional expectations make it clear that we are assisting to a new phase in higher education. The engineering domains must fulfill specific needs for developing intuitive and easy-to-use teaching and learning instruments. In this paper, the authors outline the necessity to engage the students into an interactive learning process, generative of knowledge. Course-management tools and efficient instruments allowing to the teachers to build online course material, adjusted to specific and local students' needs, appear as necessary in assisting of this objective.
Keywords: *generative learning, engineering education, professional skills, communication abilities*

Cosmin Popa - CMOS Voltage References with Improved Temperature Behavior Using Subthreshold-Operated MOS Devices.. **83**

Abstract-Original implementations of CMOS voltage references will be presented. In order to improve the thermal behavior of the proposed structures, superiororder curvature-correction techniques will be described and analyzed. The first technique is based on the correction of the nonlinear temperature dependence of the gate-source voltage by a proper biasing of MOS transistor, the second method uses the compensation of the temperature dependence of the gate-source voltage of a MOS transistor biased in weak inversion using an operational amplifier and a correction current, while the last technique exploits the temperature characteristic of an original asymmetrical differential amplifier for implementing the superior-order curvature-correction. The low-power characteristic of the voltage references will be achieved by a subthreshold operation of MOS devices, the low-voltage operation being obtained by particular design techniques.
Keywords: temperature dependence, superior-order curvature-correction techniques, CMOS VLSI design

Abstract - Fuzzy logic command is a valuable option instead of traditional methods for resonant inverters command. This method assumes simple mathematical operations and requires only understanding of system behavior and identifying the rules after which this system work. This paper presents a comparison between four variants of fuzzy logic controller designated to command the resonant inverters on induction heating applications. The comparison is achieved based on computer simulations using MATLAB/SIMULINK software.
Keywords: *resonant inverter, fuzzy logic controller*

Abstract – According to RBF neural network theory, it is well known that the (recognition) performances of these architectures depend a lot by the positioning method of centers into input dataspace. Using the affiliation of genetic algorithms to the class of the global searching techniques, and their ability to offer very good results in solving of complex optimization problems, it is justified the attempt to select RBF neural network centers through a suitable genetic procedure.
Keywords*: RBF neural network, genetic algorithm, pattern recognition*

Abstract – The static and dynamic characteristics of buck converters are well known for a long time. An easy approximation results in a first order transfer function in discontinuous conduction mode (DCM). Based on the description in DCM in time domain the controller is designed to compensate a load step using a nonlinear algorithm for the calculation of the duty cycle. The result is a controller with dead beat characteristic. Because in theory the controller needs only one clock cycle for compensation the controller is a member of the one-cycle controllers.
Keywords*: nonlinear control, dead beat controller.*

Abstract – The present article is proposing to show the way how the deforming regime, which affects the current at the output of a three-phased bridge rectifier, influents the current, absorbed by the rectifier from the supply, inducting in the point of the supply an nonsinusoidal regime.
Keywords*: power electronics, bridge rectifier, deforming regime*

Abstract – This paper presents a new design approach which generates high-order electrically tunable HF ICcompatible filters. The realized circuits are composed only from CMOS linear transconductance elements and grounded capacitors. We propose a new CMOS universal multiple inputs biquad filter cell, which permits independent electric controls of filter parameters. Several of these biquad cells are incorporated in a low-sensitivity coupled-biquad structure in order to realize an active HF filter. This structure implements a node-voltage simulation of an equivalent LC ladder passive filter. A fifth-order lowpass filter is simulated with the end to demonstrate the performances of CMOS linear transconductors in the achievement of HF high-orders filters.
Keywords: CMOS technology, active biquads, active filter synthesis.

Abstract – In this paper two new cosine windows of 5 and 6 orders are proposed for dynamic testing of analog to- digital converters (ADCs) by means of the energybased method. These windows are very suited for dynamic testing of high-resolutions ADCs (16-20 bits). The effectiveness of each window in spectral leakage reduction is evaluated by means of the parameter neff defined in [1]. The frequency responses and the main characteristics of the windows are presented. Carried out simulations confirm the effectiveness of each window.
Keywords: *cosine windows, leakage effect, energy-based method, estimation of the ADC effective number of bits (ENOB).*

Abstract − This paper presents a generalization of the concept of adapted filter to a frequency modulated signal. This generalization is inspired by the timefrequency representations theory. A new time-frequency filter is proposed, the tracking filter. Its properties are shortly described.
Keywords: *time-frequency, adaptive, filter, chirp*

Abstract – A novel wide-band planar antenna for multistandard mobile handsets is proposed and analyzed in this paper. Operating in a wide-band (890-4100 MHz) with voltage standing wave ratio (VSWR) lower than 2:1, it covers most of the communications systems: Global System for Mobile Communication (GSM), Global Positioning System (GPS), Digital Communication System (DCS), Personal Communication System (PCS), Universal Mobile Telecommunication System (UMTS), Wireless Local Area Network (WLAN), Worldwide Interoperability for Microwave Access (WIMAX), etc. Having a small size (40 x 50mm) it can be mounted inside a mobile handset.

Abstract – *This paper presents a comparison of spiral inductors, modeled in ASITIC and Cadence Spiral*
Inductor Modeler, with inductors form austriamicrosystems 0.35μm CMOS technology. The maximum Q-factor comparison for given shape and dimensions of inductor has been done with two inductors made using normal top metal and two inductors using thick top metal. The obtained results show advantages and drawbacks modeling inductors this way. Despite the limitations, the accuracy of the results that these tools provide makes them useful as a first approximation step in the design of an inductor.
Keywords*:* radiofrequency integrated circuit (RFIC), spiral inductor, ASITIC, Cadence, eddy current, Qfactor.

Abstract – *This paper describes an implementation method of a virtual signal generator for flicker modeling, with graphical user interface, build in Matlab environment using an integrated codec or a sound card, the advantages and the disadvantages of this solution, in the actual context of increasing of the interest for ensure power quality.*
Keywords*:* flicker, power quality, electromagnetic compatibility, sound card.

Abstract – *The goal of this paper is to introduce the control of a DC motor with a S7-200 SIMATIC PLC via a PWM signal. Experimental result has proven the validity of the setup.*
Keywords*:* programmable logic controller, pulse width modulated signal, DC motor, algorithm.

Abstract. *The development of artificial systems capable to mimic the human body rise fascinating problems regarding its capability of manipulating things. In order to obtain a human hand prosthesis easy to use, light and cosmetically appealing, one have to study the natural hand and to obtain its kinematical model. Also, the dynamic modeling of the human hand is necessary because its normal physiological motions require dynamics. The human hand is a mechanism having many degrees of freedom, so the obtained system of differential equations, modeling the hand, is very complex and imposes a numerical solution. These models can be used as a solid base to design satisfactory human hand prostheses. The paper presents a dynamical model of the human hand used to create a hydraulically based design for a human hand prosthesis.*

Abstract. To replace the lost hand of a patient with a prosthesis able to provide the same capabilities is one of the most challenging problem of rehabilitation and medical engineering. There are many solutions, but none of them close enough to the natural hand. The present paper offers a model of the human hand, actuated hydraulically. The model is capable to insure the prehension function, while being a low cost solution for the Romanian market.
Keywords*:* data acquisition, human hand prosthesis, hydraulic actuation

Abstract – This paper presents the contribution of the authors regarding the implementation of a maximum power point tracking embedded system for photovoltaic panels. This system optimizes the conversion of the electrical energy supplied by photovoltaic panels into DC energy. The DC-DC converter used in this application must be controlled so that to extract the maximum power yielded by the panel but in the same time to assure the requested output voltage for the DC load. The key device in this system is a midrange 8 bit microcontroller that consist acquisition, command and control hardware resources.
Keywords*:* maximum power point tracking, photovoltaic panel, embedded system, DC-DC converter

Abstract – In this work a new compact scheme of a branch-current reference is proposed, composed of two cross-connected classical current mirrors: a modified Wilson mirror and a Widlar mirror. This referencesource type can be connected to a charge with grounded or connected to voltage-supply end only by a supplementary mirror branch. The first and secondorder thermal-compensation conditions are deduced. The design and the simulation results are included. The second-order thermal-compensation reference-source performances are: a reference-current maximum variation of 0.9% across a temperature range of 0 - 100oC and a „supply regulation" of 4550ppm/V.
Keywords*:* CMOS analog integrated circuits, current references, temperature compensation.

Abstract – *A new compact total-current reference source is proposed here, which is composed of two cross-connected classical current mirrors: a modified- Wilson mirror and a Widlar mirror. This type of current reference can be interconnected simply, serially, with a charge having one grounded or connected to the voltage supply end. The first and second-order current-thermal-compensation conditions are deduced. The source design and simulation results are presented. The second-order thermal-compensation source has the performances: maximum current variation of only 0.5% across the temperature range 0...100oC and a supply regulation of only 1670ppm/V.*
Keywords*: CMOS analog integrated circuits, current references, temperature compensation.

Abstract – *The hardware cost of the FATI relational fuzzy inference system can be reduced using the decomposition technique. In the paper has been proposed a modified Gupta's decomposition method expanded on linguistic level. It allows reducing hardware cost of the implementation of the FITA or FITA/FATI fuzzy inference systems. It can be implemented as a hardware unit in an FPGA structure to decrease an initialization time of the FPGA–FIS system.*
Keywords*: Fuzzy Rule, Fuzzy Relation, Relational Decomposition, Linguistic Decomposition, Fuzzy Inference Algorithm, FPGA, Decomposition Management Unit.

Abstract – *The paper presents the idea and practical solution how to implement the well-known and widely used VME bus [2] for the need of the ISA bus that is used by the module of the single-board computer DIMM-PC. Such a solution was imposed by the desire to take advantage of perfectly developed and tuned hardware layer of the VME bus [3] for the needs of the both buses in questions. Thus, cross-assignment of individual lines of the ISA bus to corresponding lines of the VME bus is presented along with the architecture of the CPU based on the 80386 microprocessor that is used for the newly-designed single-board computer DIMM-PC. The major objective of the project is to present all the bus cycles, attributable to both ISA and VME buses on a single hardware platform.*

Abstract – *The improvement of techniques which allow pinpointing of leaks in pipe transportation networks is a priority for companies and authorities around the world. The flow of liquids (water) trough a pipe generates specific auditive (noise)*

signals. If the pipe has leakage points or other faults, then we face problems of liquid loss. The liquid which comes out of the pipe generates specific leak signals transmitted in the material of the pipe and in the liquid which is inside the pipe. These leak signals contain parasite information coming from other noise sources like pipe elbows or junctions. The signals must be filtered in order to determine the best frequency domain in which they should be analyzed and to remove any unwanted frequencies. The domain of interest must be the one where the signals are most coherent. At the same time, the limits of the filter must be determined in an automatic way in order to ease the work of the person who uses the application. After the domain of interest is found, the Cross Correlation Function (CCF) between the signals can be calculated in order to determine the delay between the two signals. This paper presents a way in which one can establish the frequency domain which is most suitable for analyzing leak signals. We are interested to show that the quality of the CCF grows after the automatic filtering process is used. The programs used in this paper were implemented with the help of Matlab 7.5 functions.

Keywords - leak detection, leak location, coherence, Matlab, automatic filtering, Cross Correlation Function.

Abstract – The paper presents the results of a prototype FPGA implementation of a morphological multiple dimensional kernel filter for images contrast enhancement. The main objective of the work was the optimization of the silicon area and frame throughput. Operation in real time was the second constraint of the target application. A mixed schematic and VHDL/Verilog description of the decomposition filters was synthesized. The performance of the architecture was found adequate for real time conditions of operation. An extension of the architecture with a soft microprocessor for contrast enhancement calculation is also presented.

Keywords: morphological image filtering, multidimensional kernel, FPGA implementation.

Abstract – The paper describes blended learning approach to teaching uncontrolled rectifiers. It is based on "Learning by Doing" paradigm supported by several learning tools: electronic course materials, interactive simulation, laboratory plants and real experiments accessed by Web Publishing Tools under LabVIEW. Studying and experimenting access is opened for 24 hours a day, 7 days a week under the Moodle booking system.

Keywords*:* Internet-based remote experimentation, autonomous learning environment, computer aided instruction, courseware, uncontrolled rectifiers.

Abstract – Signal integrity is a major concern when designing printed circuit boards for high speed digital applications, and crosstalk is one of the most important issues. Crosstalk is influenced both by the routing geometry and the electrical parameters of the drivers and receivers on the board, and in order to keep crosstalk noise under control, minimum clearances must be enforced between sensitive and aggressive signal traces. However, the relationship between the crosstalk requirements (in electrical terms – usually [mV]) and the physical design rules (in geometrical terms – usually [mm]) is not very obvious and in order to evaluate it, some form of analysis must be involved. This paper proposes an algorithm designed to automate this process, based on differential impedance equivalence, implemented as a SAX Basic script and embedded into PADS Layout Editor.
Keywords*:* PCB, PADS Layout, crosstalk, clearance, design rules, parallelism

Abstract – A solution for measuring the thermal energy based on an ultrasonic flowmeter and a resistance temperature detector is presented in this paper. The electronic module was build around a dedicated time to digital converter integrated circuit. Due to the TDC-GP2 implemented functionality, including precision temperature measurement, fire pulse generation, windowing and clock calibration it was sufficient to add a low power microprocessor MSP430 and a transducer dependant driver and receiver. A software application implements the SPI comunication, measurement cycle, data processing and the user interface
Keywords*:* ultrasonic flowmeter, heatmeter, resistance temperature detector, time to digital converter, SPI interface

Abstract- This paper presents an advanced production system integration techniques using neural networks for optimization purpose. One important aspect to consider when realizing the integration component between two or more systems is the data structure passing technique, taking into account specific system implementation issues like: data structures organization, storage, retrieval and dynamic requests. Nowadays there are many dedicated applications for specific business to consider, but when there is no such software application with all

required functionalities; integration between existing applications should be considered.

Abstract – Threat issues in specific applications of digital filters are investigated. Since these redundant faults tend to appear in the same general location as testresistant faults, the presence of many redundant faults can hide significant untested faults despite high overall test coverage. Classes of redundant faults that arise in digital filters are described and we propose a suite of technologies for identifying and eliminating the most common redundancies based on arithmetic optimization.

Abstract - Hardware in loop testing of integrated circuit used for power and energy measurements is presented in the paper. System is based on a DSP board, data acquisition card (DAQ) and PC computer with a realtime mathematical model. The aim of the paper is to provide measurement accuracy verification in the laboratory conditions and to simulate different disturbances (nonlinearity, high-order harmonics, phase unbalance, voltage sag, etc.) using modeled load.
Keywords - Power quality, Measurement, Integrated circuits, Real-time, Simulation.

Abstract - The time difference of arrival (TDOA) related to single input/two output systems has many practical applications. Using a kind of system identification applied to a water pipeline, this paper proves that the supposed linear relation between TDOA and the phase angle of the crossspectral power density of the output signals is valid only in a limited frequency range. This conclusion shows the importance of low frequency components in the measured leak signals for TDOA estimation and leak localization. The model proposed for system identification can be utilized with the main advantage of taking the correlation between the extraneous noise signals into account.
Keywords*: Water pipelines, Leak signals, Identification, TDOA, Cross-spectral power density*

Abstract – Printed Circuit Boards (PCBs) are more than just interconnection structures, but rather passive circuits that influence the quality of signals they

carry. Especially for high speed designs, the parasitic capacitances and inductances introduced by the PCB traces cannot be ignored, as they have a significant impact on both the signal integrity and electromagnetic compatibility of the designed circuit. This paper presents a new method for fast evaluation of those parasitics, which aims to offer the accuracy of field solving simulations at the speed of analytical estimations.

<u>Keywords</u>*:* PCB, parasitic, microstrip, stripline, statistically-enhanced analytical.

<u>Abstract</u> *– We propose a biometric system using two human recognition techniques, both of them using the same kind of supervised classifier. The first one represents a Eigenface based facial recognition approach, while the second is a text-independent speaker recognition method. A minimum mean distance classification technique is provided for person identification. Threshold-based verification approaches are used by both recognition methods.*
<u>Keywords</u>*:* face recognition, eigenvectors, eigenface, feature vector, training set, supervised classification, text-independent speaker recognition, mel-cepstral analysis.

<u>Abstract</u>*: ECG signal is a non-stationary signal meaning that it changes its statistical proprieties over time. Therefore, the most powerful tool for analyzing this type of signals is the wavelet theory. The aim of this paper is to classify the ECG signals belonging to a given database in four classes: one class for ECGs without noise and three classes corresponding to ECGs perturbed by three types of noise. The Discrete Wavelet Transform and Daubechies wavelets were used to filter and analyze the four types of signals. The ECG data is taken from the standard MIT-BIH Arrhythmia database, while the signals of noise belong to MIT-BIH Noise Stress Test Database. Various tests were elaborated in this sense and the method used was the descriptive statistics.*
<u>Keywords</u>*:* ECG signal, Daubechies wavelets, multiresolution analysis, statistical analysis.

Abstract - Four types of QPP (Quadratic Permutation Polynomial) interleavers for turbo codes that maximize the dispersion are proposed. These interleavers lead to superior performances, compared to the interleavers proposed by Takeshita for some lengths and some component codes of turbo codes.

Keywords*:* QPP interleaver, dispersion, turbo codes.

Abstract – Most automatic speech recognition work has concentrated on read speech, whose acoustic aspects differ significantly from speech found in actual dialogues. A primary difference between read speech and spontaneous speech concerns a high rate of disfluencies (e.g., filled pauses, repetitions, repairs, false starts). Filled pauses (e.g., "uh," "um"), unlike silences, resemble phones as part of words in continuous speech. In this paper the problem of detection of filled pauses in spontaneous speech and how this can be useful in automatic speech recognition are considered. The acoustic aspects of filled pauses in a widely-used SWITCHBOARD database are examined here, from the point of view of identifying them acoustically using a combination of duration, fundamental frequency and spectra.

Keywords*:* automatic speech recognition, conversational speech, SWITCHBOARD, disfluencies, filled pauses.

Abstract – In this paper a symmetric feedback implementation scheme of a two microphones speech enhancement is presented. This approach can be extended for a subclass of signal separations where the direct link is stronger than the interference link in the both channels. We consider the coupling systems modeled as a linear time-invariant Finite Impulse Response (FIR) filters and propose new instrumental variable-based adaptive filters solution to enhance the noisy speech. The optimum filter weight adaptation is based on two instrumental variable algorithms: the generalized least mean square (GLMS) algorithms and the overdetermined recursive instrumental variable (ORIV) algorithms. A comparative study with other adaptive algorithms is presented.

Keywords*:* speech enhancement, adaptive filters, instrumental variable, generalized least mean square, overdetermined recursive instrumental variable.

Abstract – In 2006, Ma et al. found flaws in the original and fixed versions of the PAP protocol by using a new knowledge based framework, and presented an enhanced PAP (M-PAP) protocol. In 2006 also, Yoon et al. proposed a secure password authentication protocol for wireless networks to fix the drawback of Ma et al.'s protocol. In this article, we will show that the Yoon et al.'s protocol is still vulnerable to both off-line password guessing attack and replay attack. We will present a new improved protocol to fix the flaw. As shown, the improved protocol is secure while the computation cost is quite low.
Keywords*:* Cryptography, Wireless network, PAP protocol, Off-line password guessing attack.

Abstract – Voice over IP (VoIP), also known as Internet telephony, is a form of voice communication that uses data networks to transmit audio signals. VoIP isn't secure since it uses the Internet to which many people connect simultaneously. In this paper, we designed and implemented a Wireless VoIP + OpenVPN system with which secure telephone calls are possible.
Keywords*:* VoIP, VPN, IPSec, Security, IEEE 802.11

Abstract - The rapid growth of computing, Internet and telecommunications systems have created a broad range of ways to communicate and access information. Voice over Internet Protocol is a solution that transports voice traffic over a data network as an alternative to the classic telephony. This paper addresses the issues of VoIP security and mobility through the integration of robust security features into a lightweight VoIP protocol that is tailored for mobile devices. A theoretical approach is realized with the development of a software prototype whose security and mobility properties are analyzed.

Abstract - Topography is basic to many earth surface processes. It is used in analyses in ecology, hydrology, agriculture, climatology, geology, pedology, geomorphology, and many others, as a means both of explaining processes and of predicting them through modeling. Through this paper we consider the implementation of an algorithm for representation of real elevation data in MATLAB. This algorithm takes the DEM (Digital Elevation Model) data and constructs a 1201x1201 elevation matrix corresponding to a tile of 1 degree latitude and degree longitude. The DEM data was obtained by NASA's SRTM mission in 2000 and was made publicly available in June 2004. This offers an

Abstract – This paper presents a part of a Simulink toolset, which is currently being developed. More precisely, it describes different subsystems for several functions present in the digital base band part of an IEEE 802.15.4 transmitter. The subsytems' speed as well as their complexity is taken into consideration for comparison. The entire model of the transmitter is developed under MATLAB/Simulink using the 7.3.0.367(R2006b) version.
<u>Keywords</u>: Simulink, IEEE 802.15.4, transmitter, toolset

Abstract – It has been widely acknowledged that Logarithmic Image Processing (LIP) models offer a new approach for image enhancement. In this paper, we compare the existing LIP models to a new, logarithmiclike model, by means of a modified contrast stretching method. The proposed approach exhibits significant improvements regarding the overall contrast and details visibility over a large set of biomedical applications.
<u>Keywords</u>: Logarithmic image processing model, contrast enhancement, biomedical image processing.

Abstract – The possibility to use the MV and LV electrical networks as a multi-purpose medium (for energy distribution/supply, voice and data transmission for the electricity company operating needs and for outside telecommunication services) is a consequence of the actual demands in the communications field. Design of a communication system respectively the power line communication networks planning mean to use a well channel modelling, taking into consideration the hostile properties of it. In this sense two possible methods for the power line communication channel modelling (Carson method and /or D'Amore & Sarto method) are taken into account. The "ParaComPLC" is a software program proposed as a useful "tool" for the analysis of the power line communication channel behaviour. The actual version of this program is addressed to the overhead lines.
<u>Keywords</u>: power line communication channel, modelling, broadband

Abstract – Facial expression recognition is a major task concerning human-computer interaction issue. Plenty of techniques were proposed to recognize an

expression either in still images or image sequences. However, most of them were applied for images recorded under controlled recording conditions. This paper aims at describing Gabor filters' application to extract facial features required to classify facial expression when the images are disturbed by various noise levels. The experiments indicate a satisfactory performance for Gabor filters when compared to another state-of-the-art method named principal component analysis (PCA).
Keywords*: facial expression recognition, noisy environment, Gabor wavelets*

Abstract – This paper is a comparative study between two important robust methods: the RANSAC algorithm and the mean shift algorithm. These methods are used in an image registration technique. The purpose is to demonstrate that mean shift could replace with success the RANSAC algorithm. These techniques are analyzed and tested for performance evaluation.
Keywords*: RANSAC, mean shift, image registration, robust estimation*

Abstract – Resources allocation in GSM/(E)GPRS networks is very important because they are designed to transmit mixed traffic (voice and data) with varying characteristics. Based on a bi-dimensional model developed for voice and data traffic we make a study regarding the blocking situations that occur due to the lack of resources or voice priority. Complete partitioning (CP) and Partial partitioning (PP) schemes for cells allocation are considered. Original formulas for data blocking probability and voice preemption probability are established in both cases based on the Erlang-B law.
Keywords*: GSM, (E)GPRS, modeling, blocking probability, Erlang-B law.*

Abstract – The discrete wavelet transform can be used to process continuous-time signals. To use it, the initialization errors must be minimized. This is the aim of this paper. The results are justified and are presented in a unitary manner. We give a strategy to accomplish this minimization. Some examples are presented. A superior bound of these errors is also presented.
Keywords*: discrete wavelet transform, initialization, continuous-time applications*

Abstract – The development of the mobile communications and the integrated services provided using the cellular networks has exploded in the last years, and

<u>Abstract</u> *– We propose a new method for image filtering and enhancement based on the use of partial differential equations (PDE) framework and of image fusion techniques. The restoration process is defined iteratively as a succession of diffusion and fusion steps; in each step the degraded image is first independently processed using a directional diffusion PDE tuned to different sets of parameters and then the results are combined through fusion. Fusion takes place at an intermediate results level through a weighted averaging/selection fusion rule. An experimental setup involving both synthetic and real images is used to illustrate the increased efficiency of the method for noise filtering with small scale detail, edge and junction preservation.*
Keywords*:* diffusion, orientation, fusion, restoration.

<u>Abstract</u> *– The presence of repeated sequences is a fundamental feature of genomes. The detection of tandem repeats is important in biology and medicine as it can be used for phylogenic studies and disease diagnosis. A major difficulty in identification of repeats arises from the fact that the repeat units can be either exact or imperfect, in tandem or dispersed, and of unspecified length. This paper presents results obtained by combining the modified product spectrum and grey level spectrograms with a numerical representation to isolate position and length of tandem repeats (TRs) in DNA sequences.*
Keywords*:* tandem repeats, genomic signal processing.

<u>Abstract</u>*- This paper will preset the digital part of a GPS based synchronization scheme developed for WiMAX base stations. The PPS obtained from the GPS receiver will discipline the VCXO oscillating frequency. The accuracy of the clock reference will be bounded by the PPS jitter. A digital method for reducing the PPS jitter will be described. Also a controlling algorithm of the VCXO when the PPS signal is lost will be presented. The digital part of the scheme will be implemented on FPGA.*
Keywords*:* GPS, synchronization, PPS, jitter.

Abstract – The normalized least-mean-square (NLMS) algorithm and the affine projection algorithm (APA) are the most common choices for echo cancellation. In this type of application, an adaptive algorithm with a constant step-size has to compromise between several performance criteria (e.g., high convergence rate versus low misadjustment). In this paper we present a class of variable step-size NLMS and APAs, which are designed to recover the near-end signal in the error of the adaptive filter. The simulation results indicate a robust behaviour of these algorithms against different types of near-end signal variations, including double-talk.
Keywords*: adaptive filtering, affine projection algorithm (APA), echo cancellation, normalize leastmean- square (NLMS), variable step-size.*

Abstract – We propose an alternative diffusion technique, starting from a tensor-based method that can perform both isotropic and anisotropic smoothing using as directional information the eigenvectors of the image structures. The method employs two tensors, a structure and a diffusion tensor respectively, the novelty consisting in the manner in which we design the diffusion tensor. The developed method allows a fast implementation and a reduced number of time iterations, being discretized by a trace-based method. Testing is performed both on synthetic and real images, with quality measurements and remarks.
Keywords*: diffusion, PDEs, trace operation, tensor fields, vector field visualisation.*

Abstract – The Home Agent (HA) is a key point when considering the performance of Mobile IPv6-based networks. This paper presents the first steps towards characterizing the load of a HA. This may be useful both for researchers that aim to propose novel architectures that improve the performance of the HAs and for ISPs willing to deploy Mobile IPv6. To achieve our goals first we analyzed the internal traffic of a medium-size department. Then we reviewed the existing models and we evaluated their applicability to this particular scenario. Our results showed that the estimated load of a HA serving a medium-size department (around 1500 hosts) is high with a maximum throughput of 262 Mbps.
Keywords*: Home Agent, Mobile IPv6*

Abstract – The raw data from a DNA microarray experiment is a scanned image of a microarray slide that has been subjected to an experimental process. The analysis of data involves an image processing task and has substantial impact on the accuracy and effectiveness of the subsequent gene expression and identification analysis. To extract data from the microarray, a spot localization has to be done. The current work proposes a method for microarray image gridding using a classical image processing algorithm, the Harris corner detector, with slight modifications.
Keywords*: microarray, gridding, corner detector

Abstract – One of the particle filtering uses is object tracking since this technique permits to deal with uncertainty over time met in real time image sequences framework. This uncertainty is as much nonmanageable that an object occlusion appears in images. In this paper, we propose an occlusion-handling scheme which significantly improves the tracking performance in presence of partial occlusion. The proposed technique is applied to track a single object in real greyscale image sequences. Results confirm tracking performance enhancement.
Keywords*: object tracking, particle filtering, occlusion

Abstract – In this paper we will present a part of the activity we carried within the framework of the IST WEIRD project, which aims to enhance the WiMAXbased architectures specifically for convergence layer and upper layers (for resource management and control), in order to support real-time applications. Our part in the project included: implementation of a testbed interconnected internationally with the other partners' testbeds, writing and testing software which allowed Quality of Service (QoS) enforcement over WiMAX, and validation of the setup.
Keywords*: WiMAX, testbed, QoS, validation

Abstract – Our work involves synthesis and FPGA implementation of high speed and high throughput Superscalar 'Set Partitioning in Hierarchical Trees' (SPIHT) algorithm for compression of natural images. Because of its inherent redundancy removal property among wavelet coefficients SPIHT is well suited for compression of both gray and color images. But the basic SPIHT algorithm uses dynamic data structures which hinders hardware realization. In our implementation we have

used modified SPIHT. Modifications are in two ways, one by using static (fixed) mappings which represent significant information and the other by inter-changing the sorting and refinement passes. The implementation involves pipelining and parallelism operations in SPIHT blocks and peripheral circuitry. The address generation unit is designed in such a way that the coefficients of different sub bands are accessed from memory efficiently and helps in achieving higher speed and throughput. A hardware realization is done in a Altera Cyclone II FPGA development board. Significant clock speed and throughput are obtained for a test image of size 128 x128 pixels.
Keywords*:* Compression, SPIHT, Pipeline, Parallel

Abstract – In this work a specialized technique to detect hand edges is presented. An optimized HSV to BW space transformation have been searched, with the objective of maximizing correct hand contour detection. The hands edges have been better extracted with our specific transformation and false hands edges have been removed.
Keywords*:* hand gestures, edge, sparse

Abstract – We proposed an end-to-end relative differentiation scheme to assure Quality of Services of IP network in a predictable manner, called network-wide proportional service. Quality of Service is applied to flow aggregates and the performance parameter of the classes is the goodput of these flows. We also present an algorithm, which computes the bandwidth of the flows required to sustain the model and the considered architecture. We verify then the proposed algorithm by simulations for both UDP and TCP traffic.
Keywords*:* Quality of Service, Differentiated Services, Proportional Services, UDP, TCP

Abstract – This paper presents an in-depth investigation of DWT- based OFDM, by analyzing the influence of the wavelets mother choice on the BER performance for the transmission in a flat fading channel. Simulations made show the importance of this parameter, especially if the channel is rapidly changing in time. The best results under the considered scenario are provided by the Haar wavelet, while for other families (Daubechies, Symmlet, Coiflet), the number of vanishing moments of the wavelets mother may be relevant to a certain extent.
Keywords*:* WOFDM, flat fading, wavelets mother

Abstract – *Wireless communications have seen a substantial improvement thru the development of some techniques which were proposed in order to obtain a growth of the data transfer rate, yet not implying a high consume of energy or a larger bandwidth. In this article we will analyze the influence which parameters of an array have upon the directivity obtained in this case. The performance evaluation is based upon computer simulation of the directivity pattern. We will consider as reference the linear array.*
Keywords*:* MIMO, linear arrays.

Abstract – *Kernel density estimation and mode finding techniques play an active role in solving contemporary computer vision problems, like edge preserving smoothing, segmentation, registration, motion estimation and tracking. The mean shift algorithm is a popular approach to locate density modes. Recently we proposed the multiscale mode filter, a generalization of the mean shift filter, which is able to avoid spurious modes while minimizing outlier sensitivity. In this paper we evaluate the effectiveness of the multiscale mode filter in edge preserving smoothing and image segmentation.*
Keywords*:* edge preserving smoothing, multiscale, mode location, mean shift, segmentation.

Abstract - *Recently, Douillard et al. proposed a new family of multi-binary turbo-codes based on the parallel concatenation of two constituent convolutional codes with multiple inputs that has better global performance than classical turbo-codes. The encoder is based on an rinputs linear feedback shift register (LFSR). In this paper, we show that the encoder can also be represented by the observer canonical configuration. This configuration is essential to reduce the computational complexity of the code design procedure especially for moderate codeword sizes. Indeed, in this context, an exhaustive search usually provides better results than the EXIT chart or similar optimization tools. We show that the second configuration reduces the computational complexity of the search up to 300%. Based on this strategy, we were able to design a rate-1/2 turbo-code with two inputs and memory m=3 which outperforms the turbo-code with same characteristics proposed by Douillard et al. by 0.25 decibels for a frame error rate of 10-4.*
Keywords*:* recursive and systematic multi-binary convolutional code, generator matrix, turbo-code.

Abstract – *In this paper we present a new technique for watermarking in the hyperanalytic wavelet domain. This has the advantage of better directional selectivity and shift invariance compared to the classical wavelet filter. The watermark is inserted into all levels of decomposition using a perceptual mask conceived by the authors. We compare this technique with two systems in the DWT domain, and show its superiority. We study the resistance of the three watermarking systems against various signal processing attacks and the recently proposed local desynchronization attack (DA), namely the local permutation with cancelation and duplication (LPCD) DAs. For LPCD DA, simulation results show that while the attacked watermarked images are visually similar with the watermarked ones, the correlation or similarly the Peak Signal-to-Noise ratio, between them is decreased, indicating the effectiveness of the attack. All three methods successfully detect the watermark, with superiority from the hyperanalytic wavelet domain. This leads to the conclusion that the Hyperanalytic Wavelet Transform (HWT) is well suited for increasing the payload and robustness.*
Keywords*: pixel-wise mask, robust watermark, wavelets, hyper analytic wavelet transform desynchronization attacks*

Marius Salagean - A New Processing Algorithm For the Time-Frequency Mathematical Morphology Operators Method **198**

Abstract – *The method uses the ridges extraction method from the time-frequency distribution based on mathematical morphology operators (TF-MO). The TFMO method for signals with highly non-linear IF corrupted by Gaussian white noise is not very adapted for IF estimation. In this paper is presented a new improved technique for IF estimation based on TF-MO method.*
Keywords*: Instantaneous frequency, time-frequency distribution, complex argument, mathematical morphology, signal analysis, image analysis.*

Vâtca Dan Stefan, Mocofan Muguras - Simulating a Load Balancing Implementation on Multiple Default Routes via Different ISPs... **202**

Abstract – *This paper shows a method of implementing and simulating a network in which traffic from an internal network is balanced across two Internet Service Providers to achieve higher service availability and also provide failover in case of lack of service from one provider. This method is very cost effective and also demonstrates a way of utilizing unused backup Internet connection lines.*
Keywords*: load balancing, failover, network simulation*

Simona Halunga, Ioana Marcu, Octavian Fratu - Performance Increase in Multiuser Detection Systems Using Convolutional Encoding... **206**

Abstract – *The paper aims to present the usage of turbo codes in multiuser detection systems. The result for bit error rate is shown here and they are obtained from Matlab simulation. Results for multiuser conventional detector, multiuser*

optimum detector as well as combination of turbo and multiuser detection are illustrated.
<u>Keywords</u>*: BER, conventional/ optimum detector, (non) orthogonal codes*

<u>Abstract</u> *– The paper is presenting a simulation procedure of the handover into Mobile WiMAX networks and its hybrid extension based on WiFi technology. The transmitted data jitter and the end-toend delay are analyzed.*
<u>Keywords</u>*: handover, WiMAX, QualNet*

<u>Abstract</u> *- this paper presents an architecture that tests the capabilities and potentialities of interworking between the DVB-T and WiMAX technologies in order to create an infrastructure that provides capabilities for multi-service development, using a single access physical infrastructure shared by multiple services. The present work describes the developed hybrid communications access network that use a regenerative DVB-T framework for enabling/ permitting/ promoting/ accepting different kind of providers to become co-equal users of the same infrastructure, through which they access (or provide) broadband connectivity to Internet for a large category of users. Based on this structure, a specific testbed has been implemented at University "Politehnica" of Bucharest using the interoperability capabilities of the 802.16d WMAN (WiMax) and DVBT. This work presents the specific aspects of the testbed implemetation and a number of tools and applications developed and tested.*
<u>Keywords</u>*: interworking, multicast, WiMAX, DVB-T, 3G.*

<u>Abstract</u> *– This paper describes properties of 3D laser sensors and the advantages and disadvantages of geometric setup of the camera and the laser source. These parameters are used to calibrate this setup to acquire 3D information with accurate distance measurements. With the described algorithm the three dimensional distance information can be obtained and the information can be merged to get a calibration transformation for future measurements.*
<u>Keywords</u>*: 3D laser scanning, laser range sensor calibration, 3D visualization*

<u>Abstract</u>*-In this paper, system performances of selection combining and correlated α-μ (Generalized Gamma) fading channels are analyzed. Fading between the diversity branches is correlated and distributed with α-μ distribution.Very useful*

closed-form expressions are obtained for the output signal's probability density function (PDF) and cumulative distribution function (CDF). The main contribution of this analysis for dualbranch signal combiner, is that it has been done for general case of α-µ (Generalized Gamma) distribution, which includes as special cases important other distributions such as Weibull and Nakagami-m (therefore, the One-Sided Gaussian and Rayleigh are also special cases of it), so our analysis has high level of generality.
Keywords: selection combining, α-µ distribution

Sorin Zoican - Normalized Least Mean Squared Adaptive Algorithm with Fractional Tap (FT) Length **234**

Abstract – This paper illustrates a new fractional tap length (FT) algorithm that improves the performance of the normalized least mean squared (NLMS) algorithms. The proposed algorithm, named NLMS-FT, is compared with an adaptive fractional tap length algorithm named NLMS-FT (adaptive length). The computational effort is similar for the proposed and adaptive tap length algorithms but the proposed algorithm has better performance in terms of tracking capabilities, speed of convergence and miss-adjustment. The proposed algorithm has the advantage that it is a less sensitive to its parameters (that is, it has fewer control variables to set). Therefore, the proposed algorithm is more robust than the adaptive tap length algorithm.
Keywords: NLMS, Fractional tap length, average squared error.

Dan Galatchi, Roxana Zoican - Routing Protocols for Multi-hop Wireless Networks **238**

Abstract: In this paper, we perform a simulation and performance study on some routing protocols for ad hoc networks. Distributed Bellman-Ford, a traditional tabledriven routing algorithm, is simulated to evaluate its performance in multi-hop wireless networks. In addition, an on-demand routing protocol (Dynamic Source Routing (DSR)) with distinctive route selection algorithm is simulated in a common environment to quantitatively measure and contrast their performance. The final selection of an appropriate protocol will depend on a variety of factors, which are discussed in this paper.

Radu O. Preda, Dragoş N. Vizireanu - High Capacity Digital Watermarking Algorithms for MPEG2 Compressed Video... **242**

Abstract – Video watermarking capacity is an evaluation of how much information can be hidden with in a digital video. In this paper we want to analyze the watermarking capacity for MPEG2 coded video using different blind watermarking schemes and introduce new watermarking algorithms with high watermarking capacity. The analyzed techniques are working in the spatial and DCT domain. We have tested the resistance of the watermarking algorithms against MPEG2

transcoding for different videos and improved the decoding BER using error correction codes.

Keywords*:* Digital Video Watermarking, Blind Detection, Spatial Embedding, Discrete Cosine Transform, MPEG-2 Compression.

Abstract – In this paper are given statistical characteristics of the signal at the output of macro diversity system which is made of two micro diversity systems in the presence of Ricean fading on the branches of micro diversity system and Log-normal shadow effect. Combiner of the macro diversity system is SC. For this macro diversity system the probability density function of the output signal and the joint probability density function of the output signal and their derivative are given.
Keywords*:* fading, shadow effect, diversity system, probability density function

Abstract – In this paper the receiver for the demodulation of M-FSK signals in the presence of Gaussian noise, intersymbol interference and log-normal shadowing is considered. The probability density function of M-ary FSK signal in the presence of noise, interference and fading is derived. The influence of the Gaussian noise, intersymbol iterference and log-normal fading to the communication systems can seriously degrade their performance.
Keywords*:* M-ary Frequency Shift Keying, Probability Density Function, Gaussian noise, Intersymbol Interference, Log-Normal Shadowing.

Abstract – This paper presents theoretical and practical aspects in conjunction with hardware implementation of wavelet transform using distributed arithmetic. Implementing the multiplier unit using distributed logic, the designer can save hardware resource. The solution presented in this paper is using MatLab-Simulink environment to implement the algorithm in FPGAs.
Keywords*:* FPGA, wavelet, distributed arithmetic

Abstract - This paper presents an algorithmic approach to degree reduction of interval Bezier curves. The four fixed Kharitonov's polynomi-als (four fixed Bezier curves) associated with the original interval Bezier curve are obtained. The four fixed Kharitonov's polynomials (four fixed Beezier curves) associated with the approximate interval Bezier curve are also found. The algorithm is based on the

matrix representations of the degree elevation and degree reduction processes. The computations are carried out by minimizing the L2 distance between the four fixed Beezier curves P_i^n of degree n and the four fixed approximate Bezier curves Q_m^i m degree m.

Keywords: computer graphics, signal and image processing, CAGD, communication systems.

Abstract - The main goals in developing new wireless communication systems are increasing the transmission capacity and improving the spectrum efficiency. Spacetime block coding (STBC) exploit the richly scattered wireless channel by transmitting redundant data streams from multiple antennas in order to improve the reliability of data transfer and greatly increase data transmission rates without additional radio resource requirements. Significant performance gain is achieved by varying some transmit parameters at almost no processing expense, while a simple, linear maximum decoding algorithm operates at the receiver.
Keywords: space-time block codes, diversity order, bit error rate

Abstract – Loosely Synchronized (LS) sequences having Interference Free Window (IFW) are considered to be good candidates for QS-CDMA systems. The recent LS sequence constructions have generated very small sets of sequences exhibiting IFW, thus making them suitable for lightly loaded QS-CDMA. In this paper, it is shown that under certain scenarios for generalized lightly loaded QS-CDMA, there exist traditional sequences, that give either comparable performance or outperform LS sequences, in terms of cross-correlation values. We have demonstrated our results, using short length sequences of length L=31, 32and 38. We have shown that for a QSCDMA system with 15 users, and with chip delays equal to IFW of LS sequences, subsets of WH and Oppermann sequences outperform family of LS sequences. Also, either they give comparable performance or outperform LS sequences, when compared for 8 user QS-CDMA system, with a single or two user delays, 1-3 chips outside the IFW of LS sequences. Moreover, to demonstrate our results we have compared BER of uplink QS-CDMA system in AWGN channel, using different sequence subsets and different scenarios.
Keywords: Bit Error Rate (BER), Interference Free Window (IFW), Loosely Synchronized (LS), Multiple Access Interference (MAI), Signal-to-Noise Ratio (SNR), Quasi-Synchronous CDMA (QS-CDMA), Zero Correlation Zone (ZCZ)

Abstract - High computational complexity is an important drawback of different signal processing algorithms and face many challenges in real-time applications .To enhance the speed of different arithmetic units in general and multiplications and additions in particular are therefore the most important issues in the current research areas . Double based number systems (DBNS)[1][11] gains its popularity for their capabilities of handling arithmetic operations efficiently. Even though DBNS schemes exhibit reasonably good performance for 8 bit multiplication , they are not efficient for higher bits that is they are not efficient to cover a large range of numbers .Here we introduce a new concept "Triple based Number Systems (TBNS)[2][3][4][5][12][15] for performance enhancement of the multiplier of the digital signal Processors. The principle of conversion of binary number to TBNS has been dealt here clearly. This number system has been dealt efficiently with in details and a comparison between TBNS and Double Base Number Systems (DBNS) clearly indicate the advantages of the former in terms of speed, hardware complexity and power dissipation. Different architectural models have been proposed.
Keywords*:* DSP , TBNS, DBNS , LUT.

6.2. Student Research Activities

The following graduation projects received maximum qualification:

Graduation projects

1. Silviu Gavrila, *Development of an Automatic Crash Simulation Box,* Mihai Drăgan, *Image registration for multiscale machine vision*, Diploma advisor Prof. dr. ing. Aurel Gontean.

2. Alexandru Patan, *Quality Assurance Metrics for Embedded Software*, Diploma advisor Prof. dr. ing. Aurel Gontean.

6.3 Social life

Our students have free access to the Central Library of the "Politehnica" University and to the library of the Electronics and Telecommunications Faculty. They can also consult each Department's Library.

The Central Library contains over 600,000 volumes and 2,800 subscriptions to technical publications.

We publish the Scientific Journal of the "Politehnica" University of Timişoara, being in charge with the section: "Transactions on Electrical Engineering, Electronics and Communication".

Our University, and the Library, too are connected to the Internet:
- **http://www.upt.ro** = The University Web site,
- **http://www.library.upt.ro** = The Library Web site.

The students can get accommodation in a student hostel under certain conditions. The accommodation offer consists of:
- one-room apartments,
- rooms with 4 beds, including bathrooms,
- rooms with 2 beds.

Our students have various offers of recreation, health and welfare such as:
- The Students' House with several departments for different activities, artistic groups and a writers' club.
- The "Politehnica" Sport Association which always reached high sports performance.
- Two sports arenas with: tennis courts, basketball, football and handball grounds, gym, nautical and horse racing bases.
- Medical assistance is provided in a consistent number of consulting rooms.

In our town there are also several social and cultural institutions, namely:
- The National Theatre with three sections: Romanian, German and Hungarian,
- The Opera House,
- The Philharmonic Orchestra.

For further information on leisure opportunities offered by the town of Timişoara, please visit: http://www.romaniatourism.com/timisoara.html