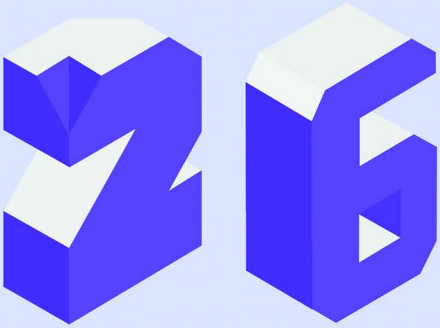
"GHEORGHE ASACHI" TECHNICAL UNIVERSITY OF IAŞI
FACULTY OF ELECTRONICS, TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY
&
POLITEHNICA UNIVERSITY OF BUCHAREST
FACULTY OF ELECTRONICS, TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY
CENTER FOR TECHNOLOGICAL ELECTRONICS AND INTERCONNECTION TECHNIQUES

INTERCONNECTION TECHNIQUES IN ELECTRONICS

International Student Professional Contest

The 26th Edition, Iași, 25th-28th April 2017



TIE

DESIGN OF ELECTRONIC MODULES & ASSEMBLIES

www.tie.ro

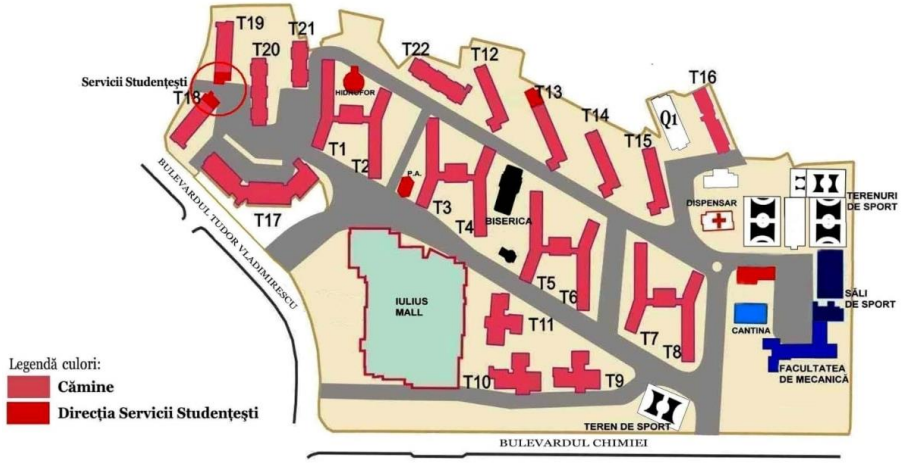
A WAY to turn your HOBBY into PROFESSION

Promoted by IEEE CPMT HU&RO Joint Chapter

Students accomodation:

Student dorm T20

Tudor Vladimirescu Campus, Aleea Prof. Vasile Petrescu,
Bd. Tudor Vladimirescu 109-111, Iaşi



Event location:

TUIASI Building A

Bd. Carol I nr.11A, Iaşi

Editors:
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TIE

A WAY to turn your HOBBY into PROFESSION

The Convention of Electronic Packaging Community

www.tie.ro

The 26th Edition, Iaşi, April 25th – 28th, 2017

Organized by:

Gh. Asachi Technical University of Iaşi
Faculty of Electronics, Telecommunications and Information Technology
http://www.etti.tuiasi.ro/

Politehnica University of Bucharest
http://www.upb.ro
Faculty of Electronics, Telecommunications and Information Technology
http://www. electronica.pub.ro
Center for Technological Electronics and Interconnection Techniques
http://www.cetti.ro

Association for Promoting Electronic Technology APTE
http://www.apte.org.ro

and supported by:

EPETRUN (Electronic **P**ackaging **E**ducation **T**raining and **R**esearch **U**niversity **N**etwork**)**

Electronic Packaging Education Training and Research University Network

TIE Event Program

TIE & TIEplus

Last year, approximately in the same period of the year, in Suceava, we celebrated one quarter of a century from the beginning of TIE. This event offers to the students from Faculties of Electronics in Romania, participants to the final stage, the opportunity to be certified by the industry, as PCB designers, in accordance with the requirements of the electronic industry, at present an increasing industry in our country. Today, after 26 years since the first edition of TIE, the Romanian academic environment involved in education and training of the future electronic engineers is facing a new challenge. Together with representatives of the electronic industry, a new extracurricular activity is building up, focused on PCB virtual prototyping.

During the last decade, the complexity of electronics increased significantly. Thanks to the integrated circuits manufacturing facilities, the functional and geometrical characteristics of the ICs require new PCB design consideration. The working frequencies already exceeded the GHz domain, some applications being in tens of GHz. Today, PCB designers must face many challenges, like high frequencies, thermal dissipation, miniaturization of the packages, sometimes thousands of I/O and many others. Under such circumstances the PCB becomes a very complex passive electronic component, dedicated to a well-defined application. Taking into account that, sometimes, the PCB structure is distributed on many conductive layers, the resulted electronic component represents, consequently, a very complex passive electronic network. In addition, this network includes many parasitic effects (resistive, inductive or capacitive) and can strongly influence the electrical signal flow, and lead to mal functionalities of the final electronic product. Of course, it is possible to avoid, during prototyping, all malfunctions, but such an approach brings supplementary development costs and increases the time to get the product on the market.

Fortunately, the existing design environment, based on powerful computing resources and high performance modeling and simulation CAD programs, offers the possibility to verify, even during the development phase, the resulted PCB, before to be manufactured. Such kind of verification is focused on the signal and power integrity analysis. In other words, in the simulation process is also included the parasitic effect that occurs during the operation of the PCB.

The new event, named TIEplus, wants to represent a concrete result of the very good collaboration between the academia and the electronic industry in the shaping of the education and training for the future electronic engineers. To this edition, the participants (undergraduate, master and Ph.D. students or young postdocs), are coming from different electronics faculties across Romania.

To the start of TIEplus event a great contribution, beside academia and industry, is playing by companies like ANSYS or CST which offer to students, free of charge, very powerful design environment.

I tried, in a few words, to offer a very brief picture regarding the TIEplus event underlining the importance for the electronic industry to have future high skilled engineers able to perform topics like Signal and Power Integrity analysis.

Maybe, for a better understanding of what represents today, in 2017, the TIE event, it is useful to underline the existing activities during the entire period. Besides, with TIE and TIEplus, there are held two important workshops. One focuses on Human Resources development topics and the second one is oriented on technical aspects related to PCB design. The first one is organized directly by the electronic industry representatives in Romania and gathers many General Managers and HR Managers from the main electronic companies existing in Romania as well as the Deans and/or Department from the electronic faculties of the country. In these faculties, more than 95% of the undergraduate, master or Ph.D. students are educated and trained. The topics of the workshop are concentrated on the strategic partnership between the industry and the educational environment to shape suitable human resources for the electronic industry.

It is impressive to see how, the very modest event, which has begun 26 years ago, with approx. 15 persons from a single electronic faculty, today, brings together, about 150 peoples, representing in fact the entire electronic academic environment of the country and the representatives of important electronic High-Tech companies.

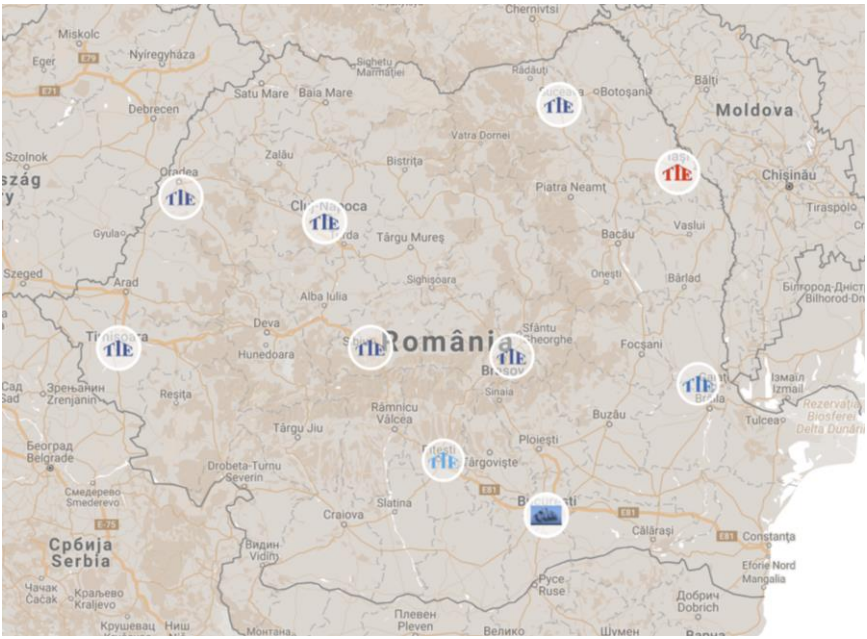
For the excellent condition in running the TIE events, we have to thank the Electronic, Telecommunication and Information Technology faculty board of Gh. Asachi Technical University of Iasi. Without the deeply involvement of the local organizing committee, it could not be possible to benefit the outstanding conditions offered to the TIE participants.

Finally, I have to thank all TIE participants (organizers, students, committees) for their commitments and I wish good luck to this edition and to the next many, many editions.

Bucharest, April 10, 2017

Prof. D.h.c.mult. Paul SVASTA, Ph.D.
TIE Initiator
Head of Center for Technological Electronics and Interconnection Techniques, Faculty of Electronics, Telecommunications and Information Technology, Politehnica University of Bucharest

TIE Past, Present and Future Editions



1992-2002	Politehnica University of Bucharest
2003	Politehnica University of Timişoara
2004	Technical University of Cluj-Napoca
2005	Gh. Asachi Technical University of Iaşi
2006	Politehnica University of Bucharest
2007	Ştefan cel Mare University of Suceava
2008	University of Piteşti
2009	Dunărea de Jos University of Galaţi
2010	Technical University of Cluj-Napoca
2011	Politehnica University of Bucharest
2012	Lucian Blaga University of Sibiu
2013	Transilvania University of Braşov
2014	Politehnica University of Timişoara
2015	University of Oradea
2016	Ştefan cel Mare University of Suceava
2017	**Gh. Asachi Technical University of Iaşi**
2018	University of Piteşti
2019	Dunărea de Jos University of Galaţi

Previous TIE Winners

Year	Name	University
2016	Voina Radu	Technical University of Cluj Napoca
2015	Luchian Teodor	Ştefan cel Mare University of Suceava
2014	Grigoraş Eduard	Ştefan cel Mare University of Suceava
2013	Bostan Adrian	Politehnica University of Bucharest
2012	Aldea Alin	University of Piteşti
2011	Precup Călin	Politehnica University of Timişoara
2010	Dungă Tudor Dan	Politehnica University of Timişoara
2009	Răducanu Bogdan	Politehnica University of Bucharest
2008	Oşan Adrian	Politehnica University of Timişoara
2007	Tamaş Cosmin Andrei	Politehnica University of Bucharest
2006	Moscalu Dragoş	Gh.Asachi Technical University of Iaşi
2005	Andreiciuc Adrian	Politehnica University of Timişoara
2004	Berceanu Cristian	Politehnica University of Timişoara
2003	Munteanu George	Politehnica University of Bucharest
2002	Rangu Marius	Politehnica University of Timişoara
2001	Toma Corneliu	Politehnica University of Bucharest
2000	Vlad Andrei	Politehnica University of Bucharest
1999	Savu Mihai	Politehnica University of Bucharest
1998	Alexandrescu Dan	Politehnica University of Bucharest
1997	Gavrilaş Cristian	Politehnica University of Bucharest
1996	Vintilă Mihai	Politehnica University of Bucharest
1995	Ştefan Marius Sorin	Politehnica University of Bucharest
1994	Bucioc Mihai	Politehnica University of Bucharest
1993	Teodorescu Tudor	Politehnica University of Bucharest
1992	Teodorescu Tudor	Politehnica University of Bucharest

Welcome to TIE 2017

On behalf of local Organizing Committee, it is my very great pleasure to welcome you to the 26-th International Student Professional Contest **Interconnection Techniques in Electronics - TIE 2017**.

The Faculty of Electronics, Telecommunications and Information Technology is the proud co-organizer of this prestigious, global event. In the last 25 years it has been hosted in 10 significant universities from Romania, and this year we are honored to welcome you all again to Iasi, after 12 years, where I am sure you will have a very enjoyable stay, and not only because of the new knowledge which will be shared here.

I think it is very significant that the worlds of both academia and industry are brought together by this contest. I especially appreciate its motto "A WAY to turn your HOBBY into PROFESSION". It emphasizes the interest and the link between the main actors: students, academic staff and not last the representatives of electronics industry.

Due to the important involvement of the industry partners in supporting and promoting this event and the dedication of main organizers, TIE has become a trademark for excellent PCB design skills of future professionals. TIE became a great chance for students to be in touch with realistic industry demands and take a first step towards a fulfilling carrier. I am very glad that this competition will greatly help students in their future professional life. Communication and networking with industry ensures their personal and professional growth.

I would like to thank all those who have invested a great deal of their time in organizing this significant global contest –not an easy task, but a very important one.

Enjoy the TIE 2017 and your stay in Iasi!

Prof. Daniela Tarniceriu, Ph.D.
Dean of The Faculty of Electronics, Telecommunication and Information Technology, "Gheorghe Asachi" Technical University of Iasi

Dear participants and guests,

It is my distinct pleasure to be among the organizers of the 26-th edition of TIE, a contest that developed year by year. The fact that the subjects are prepared by industry experts is a sound and direct message to students to improve their practical training.

The increased number of companies involved and supporting TIE or TIEplus is another reason to encourage participants to be more and more interested in this contest.

I use this opportunity to express my strong belief in the future of this contest and to wish all participant great success.

Welcome to Iasi and to TIE (+)!

Assoc. Prof. Tecla Goraș, Ph. D.
Gheorghe Asachi Technical University of Iasi
Vice-Dean of Faculty of Electronics,
Telecommunications and Information Technology
TIE 2017 Event Chair

What is the true meaning of TIE?

To solve this question for 10 points, one must dig deep in the long history of the competition. Because these three letters, which everyone know stand for „Interconnection Techniques in Electronics", mean in fact so much more.

The **T** can come from several factors, which all have a significant impact on the competition itself: Technology, Technique, Teaching, Training, sTundenTs, Technical Universities and not lastly Together. Because this contest not only pins agains each other the best in PCB design, but it also brings Universities and the Industry together, in harmony, to collaborate, innovate and teach.

The **I** can stand also for Industry, Innovation, Implementation, Interconnection and Initiative, since this contest is filled with all of these, as subjects are developed for real-life applications, by engineers from the industry and are so thought out to be not only challenging but also innovative.

The **E** should mean Electronics, Engineering, Excellence, Expertiese and EPETRUN, all of which are major contributing factors in achieving the statute that this competion enjoys today.

Adding all these together one can see that **TIE** is not only a professional student contest. It is much more than that. It is also a social gathering of industry and academic experts, all coming together with a great goal: that of making electronics engineering enjoyable, fun, competitive and innovative.

Good luck for all TIE 2017 participants!

Cluj-Napoca, the 11 March 2017

Prof. Eng. Dan Pitică, PhD
Technical University of Cluj-Napoca

Message from Ciprian Ionescu

Chair of the IEEE CPMT Hungary-Romania Joint Chapter

This year, the 26th edition of TIE (Interconnection Techniques in Electronics) takes place after 25 years of the first edition initiated at that time in UPB. We still look with nostalgia at the first tasks given to participants in 1992 and we see how much TIE was evolved. I refer here not only to technical resources, at that time we use dot matrix printer and the drawings were attached on transparent drawing paper. In TIE evolution it is to mention here: number of participants, number of Universities, complexity of the work subject, industry participation, international participation, joint workshops and seminars, invited key-note speakers, and so on.

Who thinks that could be done more from what originates as a student contest? Well, it was s possible through what the organizers called TIEplus. The, what is now become, TIE "classic", has been oriented to PCB layout design, starting from schematic, and has as final result a physical, geometrical representation of the interconnection structure, that offers the pre-requisites that a real circuit could work. The parasitic elements of the structures are here left outside. TIEplus tackles the very complex domain of high speed design, signal integrity and power integrity. Due to complexity of the problem, the contest work is done in a different way, mainly home work and also Ph.D. students or young post-docs are accepted as participants. TIEplus is a result of collaboration between industry and academic environment. Industrial partners of TIE found in TIEplus a way to promote among Engineering Community the skills they felt necessary for a very good PCB designer.

The present message to this TIE Edition gives me the opportunity to re-affirm the engagement and support of IEEE, a leading Professional Organization in the field of Electrical Engineering. The topics of TIE, and now TIEplus, are in the field of electronic packaging and the IEEE CPMT Society, in particular through the HU-RO Joint Chapter has strongly supported the TIE contest. The TIE event complies with the Core Value of IEEE that is "Growth and Nurturing: encouraging education as a fundamental activity of engineers, scientists, and technologists at all levels and at all times; ensuring a pipeline of students to preserve the profession." In recent IEEE Region 8 Meeting, in Budapest, TIE was emphasized as a unique event in this field and area, being every year a major chapter event.

Finally, on behalf of the Chapter that I represent, I hope that this year 26th Edition in Iaşi will continue the TIE story and will be a real success.

Prof. Ciprian Ionescu, Ph.D.
Bucharest, April 2017

TIE – the Contest of the Future Electronic Engineers

In 1990, Professor Paul Svasta from "Politehnica" University of Bucharest started to promote the idea of the need for closer cooperation between the Romanian electronic industry and the universities as a fundamental contribution to the development of the former. At that time, such cooperation seemed utopian, as the electronic industry or what had been left of it, was almost extinct and the graduates in electronics were searching jobs elsewhere. 25 years later, the professor's ideas are taking shape: there is a Romanian electronic industry in full expansion, small but vibrant, and the schools of electronics are not able to prepare enough graduates, while various business enterprises organize apprentice schools and support the activity of the vocational schools.

One of the most interesting aspects of the cooperation between the electronic industry and the universities is the TIE contest, organized beginning with 1991 by Professor Paul Svasta and his disciples from the School of Electronics, Telecommunications and Information Technology at "Politehnica" University of Bucharest and CETTI. Today the contest is organized every year by another school of electronics across the Universities of Romania. The contestants, over 50, are selected after local contests, and the questions are formulated by a mixed board of experts from both, industry and universities. The event also includes Romanian, UE and US product presentations, workshops on packaging, circuit design, and other topics such as relationship development between industrial entities and educational bodies. It is a far cry from the beginning!

Before the year 2000, with the electronic industry almost extinct, the contest had a clear didactic focus, but had the merit of involving one by one the other schools of electronics in the country: Timişoara, Cluj, Iaşi, Piteşti; the others followed soon.

After the year 2000, the electronic industry became better represented each year, due to the establishment of more industrial enterprises and after 2010 due to increase of the industrial design and development centers,. The electronic engineers' exodus ended, as the competition between the industrial enterprises that needed well-prepared graduates sharpened. The mere participation in the final stage of the TIE contest was an advantage already, while winning a prize was a great step ahead to be recruited by the electronic industry.

To conclude, TIE is a real success, assured by hard work and close cooperation between the schools of electronics and the industrial sector.

Iaşi, April, 10, 2017

Prof. Vlad Cehan, Ph.D.
Technical University "Gheorghe Asachi" Iaşi

After the Silver Edition…, open horizon for the Gold one!

Dear students,
Dear professors,
Dear experts from industry,
Dear invited guests,

As I wrote last year, before the "Silver" edition, being the initiator of the TIE Contest next to my boss, Prof. Svasta, I had the opportunity to organize/participate/feel/touch all the previous **25 EDITIONS… A GREAT LIFE EXPERIENCE!**

As supposed, the 25th edition (the Suceava one) was excellently organized by my colleague, Prof. Eugen Coca, and his co-worker, Ass. Prof. Adrian Petrariu, two specialists in electronics and in CAE-CAD-CAM for the electronics industry, who did their best to offer us the high level environment for the 2016 TIE final.

As a correct negative feedback in electronics (which reduces distortions, noise, and sensitivity to external changes, as well as improves system bandwidth and input/output impedances), the experts from industry are more and more present an the TIE event (a binomial composed of contest and scientific workshop in a very strong relationship, like ionic bonding in chemistry…), offering stability and a solid support for developing all the aspects related to TIE.

As a clear example, the TIE subject of the 2017 edition was totally created by the industrial specialists, without any influence of academia people, a first in the TIE history and a necessary action for enlarging the area of the subject with real, difficult engineering challenges and requirements.

As normally at the end, thank you very much for coming to Iași and for participating to the new TIE era, after the Silver anniversary! Good luck to everybody during TIE 2017!

As conclusion, now, after the Silver Edition, we have open horizon for the Gold one, in 2041! And TIE 2017 is the first step. I am sure that Prof. Tecla Goraș and her team will offer us a memorable event!!! See you in Iași…

Bucharest, 12th of April 2017

Prof. Norocel Codreanu, Ph. D.
Technical manager of the TIE contest

TIE - A Marketing Strategy for Electronics

TIE is no longer a meeting point of strangers. TIE has grown into an "embedded" partnership between steady and involved parties and participants. TIE has tied and continues to tie together members of relevant communities of the electronic society who can make a difference. TIE has surpassed the frame of a simple electronic contest and has started out a solid process of working together between university and industry in the electronic field.

Miele Tehnica is deeply involved into a constant and constructive dialogue with significant representatives of academia from Romania. We initiated the workshop *"Strategic Partnership between University and Electronic Industry".* In the meantime, our project gained the support of political representatives. We made many steps towards each other and our common goal: knowledgeable and skilled young generation of pupils and students, i.e future employees in electronics. In this sense, we created several working groups who have specific tasks into the following directions: adapt curricula at faculty and high school level, create extracurricular electronic activities in schools and high schools, initiate common research projects, and intensify internship, practica and trainee programs of students and teachers in electronic plants as part of a marketing strategy for electronics.

Therefore, we encourage you to be active, come with new ideas, involve professors, teachers, managers and students from the electronic field who can bring about changes in the nowadays faculty structure in order to reach a solid performance of all involved parties. And do not forget: "Success is not an accident. It is hard work, perseverance, learning, studying, sacrifice and most of all, love of what you are doing or learning to do".

Braşov, the 12th of April

Hartmut Hohaus
General Manager
SC Miele Tehnica SRL

Partnership for Education

I am always pleased to be a part of TIE. I see the 26th edition as a sustainable movement in electronics with a growing degree of professionalism, advanced study and a display of skill. Furthermore, I am glad to see TIE from the HR perspective as the elite of young "electronic" generation is coming forward with their ambition, knowledge, research and talent. And last but not least, I am glad to meet our strategic partners and discuss new ideas about the latest developments in our common projects.

TIE has brought us together and has consolidated our partnership into a fruitful dialogue with a clear mission: changing the mentality of how we educate our children, pupils and students into real professionals in electronics. Therefore we started and followed up the already running programs which we think will bring about tangible results in both attracting children towards this niche field and forming them to adapt to their future job requirements as well.

In this context, I would like to thank all those participants in the workshop series "Strategic partnership between academia, industry and political representatives" who took their time and energy to follow the commonly set action plans. We considered a priority first of all to undertake an analysis of the current curricula in the electronic faculties and adapt it in a common approach in relation to ARACIS (The Romanian Agency for Quality Assurance in Higher Education), Ministry of Education and future needs of the industry. Likewise, I salute the creation of the common platform for electronic faculties to share experience and best practice. As for our industry part, we intensified the trainee and internship programs and other forms of research partnership with faculties as well.

I know that significant changes are not obstacle free roads. I know that our day by day duties leave little space for projects with no immediate concrete results. I know we have to remain connected to our projects, to spend time and energy to accomplish our mission. But the future starts today. And we can make it happen the way we imagine it.

Braşov, 12.04.2017

Aurelia Florea
HR Director
Miele Tehnica

The TIEplus Contest 2017, Virtual Prototyping

Modern PCB design involves factors to reduce or limit the influence of electronic noise, inductive coupling, capacitance and resistance change, which may influence the characteristics of the transmitted signal. As such, designers have to deal with impedance matching, minimization of propagation delay effects, reduction of signal attenuation and crosstalk, supply voltage fluctuations and electromagnetic influence.

The challenge is not only signal integrity, covered by the TIE contest, finally the market needs a system which meets all criteria of signal integrity, SI, power integrity, PI, and, last but not least, EMI/EMC integrity. The product delivered to market has to be in time, cost-effective, reliable and with minimum of redesign steps. This is only possible using virtual prototyping, the future challenge of TIEplus.

The academia is prepared, the future professionals will be educated for this, and the industry has the background to support this topic. And the software tools able to do this are on the market, the students get familiar with them, and the best of them, with some industry background, can show their professionalism at the TIEplus contest.

The TIEplus vision is now the area of "Virtual Prototyping", to reduce time consuming "Physical Prototyping". This means integrating physical and virtual prototyping, taking into account signal-, power-, and EMI/EMC integration as a whole. This is an important step in the conceptual design stage of the final prototyping stage.

I wish good luck to al participants of this year final TIEplus event!

Bucharest, April, 12th, 2017

Detlef Bonfert, Ph.D.
TIE International Advisory Body

Fraunhofer Research Institution for Microsystems and Solid State Technologies, EMFT
Munich, Germany
detlef.bonfert@emft.fraunhofer.de

Marquardt sustains and appreciates TIE winners

First of all, I would like to thank Prof. Paul Svasta for the commitment and the involvement in organizing and promoting TIE contest and for giving me the opportunity to write my thoughts in TIE 2017 brochure.

My first contact with TIE contest was a few years ago. As I was looking for candidates for our open position in Electronics department, I found out that the most experienced candidates are former or current TIE winners.

Ever since TIE winners became Marquardt employees and their performance made me understand that TIE is not only a contest, it is the way to distinguish the best students in Electronics.

This contest is a launching pad for all students passionate about electronics, but also a milestone for their professional career. It is the link between students and their future workplace.

Marquardt offers many professional opportunities for all those passionate about automotive field. It is the place where students and experienced employees are all together.

We are excited about this partnership and open for future activities.
Congratulations to the organizers for all the effort, initiative and perseverance and good luck to all TIE 2017 participants!

Sibiu, 10.04.2017

Bianca BUTA,
HR Manager, Marquardt Sibiu
jobs@marquardt-ro.com

Perceptions and Impressions about TIE

In many ways, engineering is the practical combination of mathematic and scientific principles in order to improve processes and tackle societal problems. Engineers are thinkers and doers, as they need to be able to think of solutions to problems, but also implement them efficiently. Engineers can be involved in all parts of the creation cycle, from initial research to design, production, testing and maintenance.

But a student that is a contestant at TIE it is giving with **the real grasp of the sector** – he will be able to put all the things he has learned so far on his degree into action, providing him with a real understanding of the industry and what's expected in a professional job. The TIE contest ensure electronics engineering undergraduates get these skills before they enter the workforce – so they're ready from Day One to be key members of engineering product development teams. This involves conceive a range of different ideas, before picking one that addresses the situation and making it a reality.

TIE contest develops annually, mirroring the fact that the Universities and Companies are working together to ensure a better future. European electronics and electrical engineering sector is a large and attractive sales market. For example, in 2016 it had a world market share of 14.6%. Legislation that strives for more fuel or energy efficiency has driven growth for electronics in the automotive, building and lighting sectors. Industrial production turns 'smart' and becomes more automated.

Looking at past year competition, the 25th Anniversary TIE Edition, and remembering with pride that our student won the prize make me impatiently anticipate this year contest. I truly believe, from the beginning of my involvement as student in this contest to present day, that we grew as a family that works to be better. The outcomes of those efforts must be better students, better teachers, and better future employees and employers.

Cluj Napoca, April 04th, 2017

Assoc. prof. Liviu Viman, Ph.D.
Technical University of Cluj-Napoca

TIE Best Practices - For remarkable achievement

TIE contest provides a special opportunity for passionate students to showcase their technical skills and face new challenges in the training period using the latest technologies. During the contest, they could meet some of the best engineers in the printed circuit design field and start new friendships and professional relationships.

To have remarkable achievement in this contest is very important to solve the past edition subjects, to master the selected EDA tool and to have great knowledge regarding printed circuit design and manufacturing.

The subject should be solved by keep in mind the printed circuit design flow:

- Read very carefully the subject and highlight the most important requirements;
- Create the missing schematic components and footprints; assigned the correct package for every component;
- Draw the schematic and import the components to PCB;
- Define the board shape and setup the PCB design rules, layer stackup, grid and units;
- Place and arrange the components;
- Manually route all connections and run a design rule check;
- Add the all mechanical and manufacturing notes;
- Generate the manufacturing files.

TIE is a great chance for student to get in touch with the industry needs and to start their careers in an electronics company.

Cluj-Napoca, 4.10.2017

Radu Voina, Eng. MTS
First place at TIE 2016 Contest
Technical University of Cluj-Napoca

Industrial Advisor Committee Chair Opinion

Any organization that wants to bring added value has to ensure the quality of its own partners and employees. Also, it needs to create a culture to facilitate the self-motivation that brings on the surface all the capabilities one has to offer. The business output will follow as a consequence, not as a main driver.

In this constellation, one must understand where the value adding factors must be placed in the Customer-Engineering-Suppliers relationship. Specific know-how for all interfaces must be build. Therefore a major role of the industry is to feedback both the academic and the state environment. This is futile if the state is not sensitive toward the actual society needs for a healthy and sustainable economic environment that brings long term social benefits. Fortunate, the events surrounding our most important electronics environment in Romania, www.TIE.ro and www.SIITME.ro, bring now together the 4 stakeholders: academia, students, industry and politics, in the "Strategic partnership for education" workshop.

There is room for multiple role-players for Application Developments disciplines (focus TIE) as Integrators, Developers and Testers. But for an efficient RD one must reuse the highly specialized know-how and therefore facilitate timely the build of Specialists (focus TIEplus) and Technology Experts (focus SIITME).

For our future colleagues in the electronics development that have the courage to expose themselves the environments like TIE and TIEplus, I wish them to reach a fulfilling professional life and that "**Your hobby becomes the same as your profession**!"

Cosmin Moisă
Head of Product Development Center
Camera Products Timisoara
and TIE Industrial Advisor Committee Chair

The Legacy

Firstly I would like to thank everyone who directly influenced my decisions, which led me to the point where I am today. If it weren't for some really inspiring people, which I was very fortunate to encounter, I would have probably never had the TIE experience and everything that followed afterwards, professionally speaking.

For me personally, everything TIE related, started in my second year of university when, I was told I would probably have no chance of doing something relevant in this contest, being too young and inexperienced, but after winning the fourth place that year, all my perspectives slowly started to change. So, as cliché as it may sound, this was the most important decision, career wise, I have made in my whole period being a student.

Now, almost 6 years later, I got to the point where I realize how important our work actually is, in guiding this cause through its complicated process of evolution. I really wish that, in the next few years, we could extend this event even more and bring constant complexity and challenge to all the contestants. We have to keep up with all the technological advancements and through this contest, we can slowly introduce everyone interested, to the modern problematic we are encountering every day.

I really believe that TIE has a lot of potential, both as a learning and technological event, therefore we have the possibilities (and moral duty) to share what we, not so long ago, have learned from others. So, in conclusion, we have to continue doing it the analogue way, although we are bound to switch to digitalism :)

Gordan Cristian
TIE Industrial Co-Chair
Hardware Engineer at Autoliv Romania

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TIE 2017 Program

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<tr><td>14:00-16:00</td><td colspan="3">Opening of Onsite Registrations for TIE&TIEplus –
Sala Pasilor Pierduti, TUIASI, Building A</td></tr>
<tr><td>16:00-18:30</td><td rowspan="2">TIEplus preparations
TUIASI P4, Building A</td><td colspan="2">Industry - academia experience exchange -
TUIASI, Building A
Microwave Laboratory / Continental Laboratory visit</td></tr>
<tr><td>18:30-20:00</td><td>TIEplus Technical meeting
Council Room, TUIASI, Building A</td><td>Steering, Industrial and Technical Committees meeting
Room P6, TUIASI Building A</td></tr>
<tr><td>20:00-20:30</td><td rowspan="2">Dinner
Student cafeteria Tudor Vladimirescu</td><td colspan="2">Transport to Water Tower Restaurant</td></tr>
<tr><td>20:00-21:00</td><td colspan="2">Dinner
Water Tower Restaurant</td></tr>
</table>

Wednesday, April 26 – 2017, first half of day

	"Students" Track	*"Technical & Industrial Committees" Track*	*"Steering Committee" Track*
06:45-07:15	**Breakfast** Student cafeteria Tudor Vladimirescu	**Breakfast at accomodation**	
07:15-07:45	Transport to Bd. Carol I nr.11A, Iaşi		
07:45-13:00	**Registration of the participants** - "Sala Pasilor Pierduti", TUIASI Building A		
08:00-08:05	**Welcome speech** - Aula TUIASI, Building A		
08:05-09:30	**TIEplus 2017 CONTEST - 1st part** Aula TUIASI, Building A		
09:30-09:45	Coffee Break - Sala Pasilor Pierduti, TUIASI Building A		
09:45-11:30	**TIEplus 2017 CONTEST 2nd part** - Aula TUIASI, Building A		**Industries, Academia & State WORKSHOP for: "Strategic partnership for education"** Room P4, Building A
11:30-13:15	TIEplus experience exchange Contest show-room visit	**TIEplus 2017 Technical meeting** Aula TUIASI, Building A	
13:15-13:30	**TIEplus 2017 – AWARDING CEREMONY** Aula TUIASI, Building A		
13:30-14:30	Lunch: Sala Pasilor Pierduti, TUIASI Building A		

Wednesday, April 26 – 2017, second half of day

14:30-16:15	**Technical Workshop -** Aula TUIASI, Building A "TIEplus. The step towards interconnect simulation technology" – Catalin NEGREA, Continental Automotive Romania "Solution for simulation of RF, SI/PI and EMI/EMC application" – Alain MICHEL, ANSYS France "Thermal management aspects in electronic design" – Aurelian BOTAU/Gabriel CIOBANU, Continental Automotive Romania		
16:15-16:30	Coffee Break - Sala Pasilor Pierduti, TUIASI Building A		
16:30-18:30	**Technical Workshop -** Aula TUIASI, Building A "Modeling, design and optimization of electronic package designs" – Danilo Di FEBO, CST AG, Treviglio, Italy "PCB and Stencil Design Correlation dedicated to Pin-in-Paste Technology" – Ioan PLOTOG, UPB-CETTI "Integrated Project for Bachelor Students-a Key Action for Success in Education" - Mihaela PANTAZICĂ, Gaudenţiu VĂRZARU, UPB-CETTI		
18:30-19:30	**TIE Student Technical Session** Aula TUIASI, Building A	**TIE Technical meeting** Room P4, TUIASI, Building A	**Steering committee meeting** Council Room, Building A
19:30-20:30	**Dinner -** Sala Pasilor Pierduti, TUIASI Building A		
20:30-21:00	**TIE Student ECAD preparation** TUIASI Library, Building A	**TIE Technical meeting** Room P4, TUIASI, Building A	**Steering committee meeting** Council Room, Building A

Thursday, April 27 – 2017

	"Students" Track	*"Technical & Industrial Committees" Track*	*"Steering Committee" Track*
06:00-06:45	**Breakfast** Student cafeteria Tudor Vladimirescu		
06:45-07:15	Transport to Bd. Carol I nr.11A, Iași		
07:30-08:00	**TIE 2017 contest preliminary activities** TUIASI Library, Building A		
08:00-12:00	**TIE 2017 CONTEST** TUIASI Library, Building A	**Technical session** Room P8, TUIASI, Building A	**Steering committee contest observation**
12:00-13:00	**Lunch** Sala Pasilor Pierduti, TUIASI Building A		
13:00-18:00	**Assessment of the TIE 2017 projects; litigations** TUIASI Library, Building A		**Steering committee meeting** Council Room, Building A
18:00-19:00	TIE experience exchange Contest show-room visit	**TIE 2017 Result Evaluation** Room P4, TUIASI, Building A	
19:00-20:00	**TIE 2017 - AWARDING CEREMONY** - Aula TUIASI, Building A		
20:00-22:00	**Gala dinner TIE 2017** Sala Pasilor Pierduti, TUIASI Building A		

Friday, April 28 – 2017	
08:00-09:00	**Breakfast**
09:00-09:30	Transport to Bd. Poitiers nr. 6, 700671 Iaşi
09:30-11:30	Industry - academia experience exchange - Bd. Poitiers nr. 6, 700671 Iaşi RD tour @ Continental Automotive Romania
11:30-12:00	Ending session / Final remarks – Meeting Room @ Continental Automotive
	Lunch and Departure

Note: Items in the program marked with **bold** type represent **compulsory activities** for the given track.

Agenda HR Workshop April, 26 - TIE 2017

Room P4, Building A

Technical University Gheorghe Asachi of Iaşi

09:30-09:40 **Welcome**
Daniela TĂRNICERIU, Dean Gh. Asachi Technical University of Iaşi
Paul SVASTA, UPB (ETTI), APTE
Hartmut HOHAUS, General Manager,
Aurelia FLOREA, Human Resources Manager, Miele Tehnica Braşov

09:40-10:00 **Short summary of the working group 'Strategic Partnership for Education' activities**
Aurelia FLOREA, Human Resources Manager, Miele Tehnica Braşov

10:00-11:00 First session: **Academic environment- Industrial environment Relationship**

Session Chair: Aura FLOREA, Miele Tehnica Braşov
Session Co-Chair: Dan PITICĂ, Technical University of Cluj Napoca

10:00-10:20 **Academic environment- Industrial environment, Best Practice**

Cristian NEGRESCU, Dean - Faculty of Electronics, Telecommunications and Information Technology, Politehnica University of Bucharest

10:20-10:30 **Q&A**

10:30-10:50 **Best Practice examples at Transilvania University of Braşov**
Carmen GERIGAN, Dean – Faculty of Electrical Engineering and Computer Science, Transilvania University of Braşov

10:50-11:00 **Q&A**

11:00-13:00 Second Session: **Fitting the educational environment to industry requirements**

Session Chair: Hartmut HOHAUS, General Manager, Miele Tehnica Braşov,
Session Co-Chair: Cristian NEGRESCU, Dean, UPB – ETTI

11:00-11:20 **The educational environment and the vocational electronics education paradigm**
Mihai AGAPE - Orşova Children's Palace Branch, Drobeta Turnu Severin

11:20-11:30 **Q&A**

11:30-11:50 **Virtual Prototyping Topics in the design flow of electronics systems development**
Cătălin NEGREA, Continental Automotive Romania

11:50-12:00 **Q&A**

12:00-13:00 **Electronic educational environment fitting to actual industry requirements.**
Marius BODEA: Deputy, PNL Iaşi
Camelia GAVRILĂ: Deputy PSD
Liviu POP: Secretary of State, Ministry of Education

13:00-13:15 **Summary and future action plan**
Session Chair: Aura FLOREA, Miele Tehnica Braşov
Session Co-Chair: Paul SVASTA, UPB (ETTI), APTE

13:15-13:30 **TIEplus 2017 – Awarding Ceremony – In University Aula**

13:30-14:30 **Lunch break**

Technical Workshop
April 26, 2017

07:45-13:00 ***Registration***

14:30-16:15 ***First Session***
Session chairs:
Prof. Dan PITICĂ, Ph.D., Technical University of Cluj Napoca, Romania
Cosmin MOISĂ, Continental Automotive, Timişoara

14:30-15:00 **TIEplus. The step towards interconnect simulation technology**
Cătălin NEGREA, Ph.D., Continental Automotive Romania

15:00-15:05 **Q&A**

15:05-15:45 **Solution for simulation of RF, SI/PI and EMI/EMC application**
Alain MICHEL, ANSYS

15:45-15:50 **Q&A**

15:50-16:25 **Thermal management aspects in electronic design**
Aurelian BOTĂU/Gabriel CIOBANU, Continental Automotive, Timişoara

16:25-16:30 **Q&A**

16:30-16:45 ***Networking Break***

16:45-18:30 ***Second Session***

Session chairs:
Prof. Norocel CODREANU, Ph.D., Politehnica University of Bucharest
Cristian GORDAN, Autoliv Romania SRL, Electronics Division

16:45-17:25 **Modeling, design and optimization of electronic package designs**

Danilo Di FEBO, CST AG, Munich, Germany

17:25-17:30 **Q&A**

17:30-18:00 **PCB and Stencil Design Correlation dedicated to Pin-in-Paste Technology**

Ioan PLOTOG, UPB-CETTI

18:00-18:05 **Q&A**

18:05-18:25 **Integrated Project for Bachelor Students-a Key Action for Success in Education**

Mihaela PANTAZICĂ**,** Gaudenţiu VĂRZARU, UPB-CETTI

18:25-18:30 **Q&A**

Student Technical Session
Aula TUIASI, Building A

Session Chairs:

Prof. Norocel CODREANU, Ph.D., Politehnica University of Bucharest

Prof. Tecla GORAŞ, Ph.D., Gh. Asachi Technical University of Iaşi

18:30-18:45 Introduction / Technical preparations for the final

18.45-19:25 TIE 2016 subject solution - Voina RADU, TIE 2016 winner

TIE Student ECAD preparation
TUIASI Library, Building A

Session Chairs:

Prof. Norocel CODREANU, Ph.D., Politehnica University of Bucharest

Prof. Tecla GORAŞ, Ph.D., Gh. Asachi Technical University of Iaşi

20:30-21:00 Set-up / checking of contest computers & CAD design tools

TIE 2017

DESIGN OF ELECTRONIC MODULES AND ASSEMBLIES

Student Professional Contest

Awarding Ceremony

April 27, 2017 - Aula TUIASI, Building A

19:00-19:10 ***Opening Ceremony Speech:***
Prof. Daniela Tărniceriu, Ph.D*, Dean of Faculty of Electronics, Telecommunications and Information Technology Gh. Asachi Technical University, Iaşi*

19:10-19:20 ***State of the art TIE 2017***
Prof. Norocel Codreanu, Ph.D., *Politehnica University of Bucharest,*
TIE Technical Committee Chair

19:20-19:30 ***TIE 2017 Awarding***
Prof. Dr.h.c.mult. Paul Svasta, Ph.D., *Politehnica University of Bucharest,*
TIE General Chair
Prof. Dan Pitică, Ph.D., *Technical University of Cluj Napoca,*
TIE General Academic Co-Chair

19:40-19:50 ***PCB Designer Certification recommended by TIE Industrial Committee***
Dipl. Eng. Cosmin Moisă, *Continental Automotive Timişoara,*
TIE General Industrial Co-Chair
Assoc. Prof. Gabriel Chindriş, Ph.D., *Technical University of Cluj Napoca,*
TIE Industrial Advisor Committee, Academic Co-Chair

19:50-20:00 ***Looking Forward TIE 2018***
Prof. Nicu Bizon, Ph.D., *Dean of Faculty of Electronics, Communications and Computers, University of Piteşti,*
TIE 2018 Chair

TIE 2017 Gala Dinner (Sala Paşilor Pierduti, TUIASI Building A)

The importance of virtual prototyping in the design flow of electronic equipment

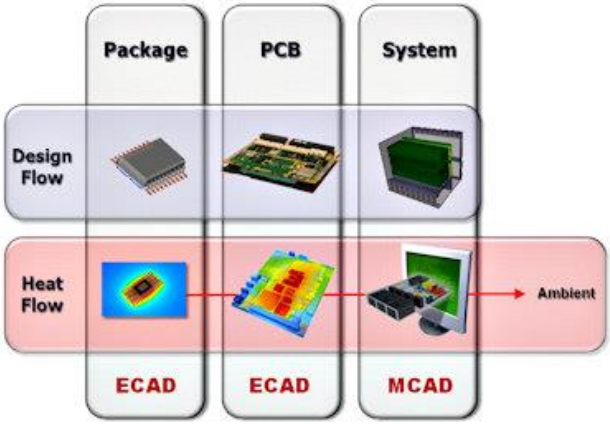
(Problematica prototipului virtual in fluxul de proiectare pentru dezvoltareaa echipamentelor electronice)

Abstract: Virtual prototyping is an essential design technique in the context of today's complexity and reliability requirements of electronic products.

Keyword: virtual prototyping, design flow, simulation, TIEplus

The continuous complexity increase of electronic assemblies correlated with today's time-to-market demands, creates the need of accelerated development cycles that imply the usage of virtual prototyping techniques. In the last decade, the importance of topics like signal integrity, thermal management, and electro-magnetic compatibility in the development of an electronic device, has risen dramatically, creating the need for a concurrent simulation based design flow. This presentation gives an insight on the role, benefits and challenges associated with the use of virtual prototyping techniques within a product development cycle.

During TIE2015 technical workshop a new contest idea was defined



and presented as extension of the traditional TIE, focused on simulation technologies for PCB design. The newly born concept became reality on the 6th of November 2015 as the first edition of TIEplus. TIEplus aims to create a collaborative-competitive environment where the candidates presents their technical solutions for the proposed subject, but also exchange ideas on simulation approaches and get in touch other PCB design professionals.

About the presenter: Catalin Negrea is the initiator and coordinator of a virtual prototyping team in Continental Automotive, Interior Division, focused on the development of high-end design solutions for automotive clusters. In 2013 he was nominated as a company level expert in the field of signal and power integrity.
He obtained a Ph. D. degree from the Politehnica University of Bucharest in 2013, with a thesis focused on multidisciplinary modeling and electro-thermal simulation of active devices. Catalin is the author of 12 scientific papers in the fields of thermal management and signal integrity.

Timisoara, 24.03.2016

Catalin Negrea, Ph.D.
Lead Engineer / Virtual Prototyping
Instrumentation & Driver HMI
Research & Development Electronic Engineering

Continental Automotive Romania
catalin.negrea@continental-corporation.com

TIEplus.
The step towards interconnect simulation technology

Abstract: "TIEplus" represents a new challenge under the TIE brand, focused on supporting simulation technologies for PCB design. The main disciplinary areas of interest are signal and power integrity.

Keyword: TIEplus, electro-magnetic simulation, signal and power integrity

During TIE2015 technical workshop a new contest idea was defined and presented as extension of the traditional TIE, focused on simulation technologies for PCB design. The newly born concept became reality on the 6th of November 2015 as the first edition of TIEplus. The subject required the signal integrity simulation of a multi-board video acquisition system. After a 2 week solving period, the contestants met at the "Stefan cel Mare" University of Suceava and presented their solutions to the technical committee in an open meeting. Each solution was discussed and potential improvements were outlined. Finally, a ranking of the constantans was established.

Fig. 1. TIEplus poster

This year the second edition of TIEplus is hosted at the Technical University "Gheorghe Asachi" of Iasi, with a focus on Power Integrity simulations of memory systems.

TIEplus can be seen as one step further in the direction of promoting high level expertise in the field of electronic packaging. The aims is to create a collaborative-competitive environment where the candidates presents their technical solutions for the proposed subject, but also exchange ideas on simulation approaches and get in touch other PCB design professionals.

This workshop session will cover a brief review of the first two TIEplus events and the next steps in the implementation of future editions. An overview on the contest disciplinary area and design approach will be also presented.

Timisoara, 23.03.2017

Dr. Catalin Negrea
Lead Engineer / Virtual Prototyping
Instrumentation & Driver HMI
Research & Development Electronic Engineering

Continental Automotive Romania
catalin.negrea@continental-corporation.com

ANSYS Solution for simulation of RF, SI/PI and EMI/EMC application

Abstract: In today's world of high performance electronics, the effects of electromagnetic fields on circuits and systems cannot be ignored. In this presentation, I will introduce electromagnetic (EM) simulation and illustrate its use with different example like antenna and PCB. Finally, I will speak about last innovation in EM simulation.

Keyword: Electromagnetic, Signal/Power Integrity, Antenna, EMI

Simulation is critical in design process of high performance electronics systems. Designer have access, all along the design process, to different level of simulation: system, circuit and EM. In the first part of this presentation I will describe the different simulation level, when and how to use it, how to combine them together. I will focus on the different type of EM simulation available within ANSYS solution and their scope.

EM radiated field from PCB

During the second part of this presentation I will use some example to Illustrate EM simulation usage. These examples will include placement of an antenna in a side mirror on a car, extraction of a DDR4 channel from printed circuit board (PCB), prediction of DC power loss and voltage drop from a PCB power delivery network, analysis of Electromagnetic interference (EMI) radiated from high speed PCB and study of Electromagnetic compatibility (EMC) in a car.

Finally, I will give an overview of the last innovation available in ANSYS EM simulation including broadband meshing, 3D components and Layout driven assembly.

About the presenter: Alain received his B.Sc. degree from the Technical institute of Ville D'Avray, France, June 1990, having specialized in electronics option 'microwave technique'.

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Thermal management aspects in electronic design

Abstract: Automotive industry nowadays is one of the key industries of our society. Now this industry is using more electronics devices and modules than ever before. All of these electronics equipments are using a significant amount of power and generating a considerable amount of heat which has to be extracted from the electronic system to achieve optimal functionality and reliability over time. Since miniaturization is also a key factor and the systems are using more and more powerful electronic devices, the thermal management of equipments becomes a serious problem and the thermal design is a must. In this presentation we focus on the need of thermal design for automotive electronics systems and some examples of thermal design implemented at component, PCB and of course at system level.

Keyword: Thermal design, instrument cluster, PCB, components, simulation, liquid cooling.

Automotive electronics systems are using more and more power and are generating a lot of heat which need to be extracted efficiently in order to maintain the functionality and achieve reliability. Systems like instrument clusters and central displays are getting more and more complex, having powerful graphic controllers, DDR memories and power supplies, integrated usually on a single main PCB. All this elements are considerable heat sources if we take a look at their power dissipation in typical application operation.

Having in consideration that the automotive operating temperature range is -40 to 90 deg C we can see that the worst case regarding the thermal aspect is the ambient temperature close or equal to the upper limit of this interval. In these conditions the electronics can reach critical temperatures due to self heating and without a proper thermal design reliability or even functional issues can appear.

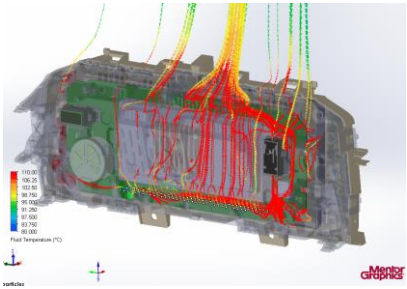

Fig. 1. Air streams temperature

This thermal design is analyzed using thermal simulation based on finite element. Usually several thermal simulation loops for design optimization are performed before building and testing a prototype. In this presentation we will talk about the thermal design concept, heat transfer methods, major heat sources on automotive PCBs and we will give some examples of thermal design from the simulations results.

Iasi, 26 April 2017

About the 1st presenter: Aurelian Botău, thermal simulation responsible at Interior Instrumentation and Diver – Human Machine Interface, Continental Automotive Timisoara. He is specialized in the numerical FEM simulation field and Thermal design.

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About the 2nd presenter: Gabriel Ciobanu, thermal simulation responsible at Chassis and Safety – Vehicle Dynamics, Continental Automotive Iasi. He is specialized in thermal simulation of PCBs, systems and liquid cooled electronics.

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Modeling, design and optimization of electronic package designs

Abstract: Several years ago, the package-level interconnect was viewed as only a space transformer that bridged the gap between the fine silicon die features and the coarse features of the motherboard environment. This is no longer the case. In today's challenging microprocessor environment, a robust electrical design for the package-level interconnect can enable superior system performance while a poor design can limit system performance. The selection of best form factor must balance cost, performance and reliability at the same time.

Keyword: PCB, SI, PI, EMC, EMI

The form factor ranges from two-lead packages with simple structure to multi-layer, high lead-count structures, stacked chips and package-on package (PoP) formats. Also, the performance and I/O count have drastically increased while the size of the components and products have decreased. Higher package integration, more functionality in smaller space and higher density and interconnectivity are nowadays the key aspect to be achieved for a successful package design. In this presentation an accurate analysis of complex electronic package signal and power integrity requires striking a balance between accuracy, to capture the necessary physics, and simplification, to reduce simulation time and compute requirements to manageable levels.

A typical electrical design workflow was considered. Specifications, netlist and schematic is the starting point, for pre-layout with EM simulation and test routing/post layout, EM/circuit simulation and comparison to specs. The EM simulation is present twice (pre-layout and post-layout) and it is the most important aspect of the flow since it allows to reduce the overall time to market. If the comparison to the specifications is positive, the final stage of design approval and production is achieved. If not, more EM/circuit simulations have to be performed. It is therefore very important to meet the specifications at the first cycle of the simulations and also to fill in this step in shortest possible time.

One popular strategy to reduce the time simulation and the complexity of the model when using 3D EM solver is to truncate the model leaving only a few important features surrounding the nets of interest. Also, for power delivery network extraction only PWR/GND nets are typically included. This presentation explores strengths and weakness of these methods and demonstrates the significant impact that simplifications can have on results. Modeling guidelines are developed and applied to several types of high-speed package designs. Simulated results are correlated with measurements and/or by comparing multiple solver technologies.
Design criteria such as BGA signal-to-GND ratio, impact of degassing holes and optimization of the position and the number of GND vias in proximity of critical nets are analyzed.
The presentation also studies the benefits (if any) of on-package decaps and it demonstrates how a pre-layout analysis is more useful for the purpose.

About the presenter: Danilo Di Febo was born in Atri (TE), Italy, in 1980.He received the Laurea degree in electronic engineering in 2009 and the Ph.D. degree in electrical and information engineering in 2013, both from the University of L'Aquila, L'Aquila, Italy.
The main focus of his activities was modeling and analysis of complex system, signal and power integrity on PCB, signal and power integrity on complex system that involve board placed in the final position, cables and all the connections, EMC analysis of integrated system.
In the past he worked on IBIS files, improving their function and correct all the errors generated by IBIS rules checker, using a standalone tolls developed in Java., on EMC on satellite modules and avionic equipment's, and on FSV feature selective validation, a tool that implement an IEEE strategy to compare data using an engineering approach.
Actually he is working as application engineer at CST.

Treviglio (BG), Italy, 28.03.2017

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PCB and Stencil Design Correlation Dedicated to Pin-in-Paste Technology

Abstract: The actual trend to miniaturization and low power on electronic industry is to be reduced the number Through-Hole Devices (THD) maximizing Surface Mount Devices (SMD) with consequence of Surface Mount Technology (SMT) extension. The THD request wave or selective soldering processes in the frame of Through Hole Technology (THT). In some cases of existing Mixed Technology (MT), Surface-Mount/Through-Hole, the Pin-in-Paste (PIP), also named the Intrusive Soldering Process (ISP), is cost reduction solution by removing THT. The PIP is a process where SMD and THD are both provided with printed solder paste, placed on or in the Printed Circuit Board (PCB) and reflowed together in the same SMT soldering process. The objective of stencil printing of solder paste for the intrusive soldering process is to provide enough solder volume after reflow to fill the hole and create acceptable solder fillets around the pins. The stencil design constrains are imposed by PCB thickness, components placement, holes diameters compare to dimensions and forms of components leads. The optimum condition is correlation of PCB and Stencil design.

Keyword: Intrusive Soldering Process, Pin in Paste, Stencil design.

In electronic industry at global level, on competitive market of electronic manufacturing services (EMS), the assembling facilities offers at high quality, short time and especially low cost are the key of success. The EMS companies have to resolve two major objectives to assure that, zero defects on assembling lines and costs reduction, both in close connection. The best solution is to reduce the number of technological processes used on assembling lines.

The Pin-in-Paste (PIP) assembling technology also named Intrusive Soldering Process (ISP), Reflow Soldering of Through-Hole components (ROT) or Alternative Assembly and Reflow Technology (AART), consist in printing paste on through-hole pads, planting THD into the paste deposit and allows for the simultaneous reflow of

odd-forms and THD as well as SMD (Fig. 1). PIP is cost reduction solution by removing THT and hand soldering.

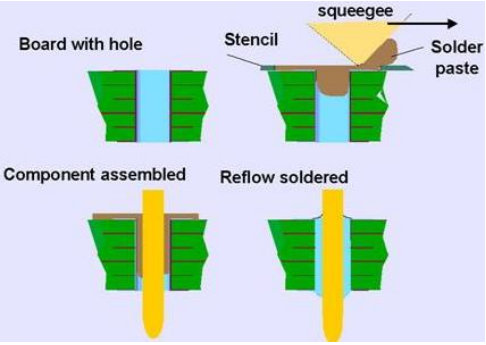

Fig. 1. Pin-In-Paste process sequence

The stencils dedicated to PIP design method presented, offer solutions paste deposit volume calculation relating to holes diameters compare to dimensions and forms of components leads, PCB thickness and components placement. Considering the constrains generated by components placements and their technological restrictions relating to the soldering processes on one side and by the condition to assure the printed paste volumes on other, the method requests, for an optimum solution, to consider a feedback between Stencil and PCB design stage.

Practical results are present, optical and X-Ray analyzed.

In cases of feedback between Stencil and PCB design absence, remains constrain of peak soldering process temperature that in convection could overpass 260^0C. A solution is offer by Vapour Phase Soldering (VPS) technology that maintain the temperature at the boiling point.

In order to minimizing manufacturing cost, Pin-In-Paste offers solutions for complete assembling of high complexity PCB using only one reflow process avoiding overheating of the assemblies relatively to infrared reflow oven.

Iasi, Romania, 26.04.2017

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Integrated Project for Bachelor Students - a Key Action for Success in Education

Abstract: Today's students are living in a world centred on the use of electronic devices such as smartphones, smart TVs, tablets and ultrabooks. They don't get the chance to put in practice the theory they learn. It has been observed that students lack practical skills in the field of electronic product manufacturing.

Keywords: integrated project, hands-on, Design for Manufacturing

Help Wanted, Skills Lacking…..

The electronics specialist's profile seen by companies in the electronics industry is different depending on the size of the company and on their main activities. While big, multinational companies are looking for high-qualified human resources with one area of expertise, small and medium companies, which must adapt rapidly to the market's needs, are looking for an electronics specialist who is flexible, with a broad general knowledge, ready to switch from one type of activity to another anytime.

Building the Workforce of Tomorrow: A Shared Responsibility

For all these reasons, at the beginning of the 2013-2014 academic year, the Faculty of Electronics, Telecommunications and Information Technology from "Politehnica" University of Bucharest accepted the challenge of an integrated hands-on project named "Project 1 - Electronic circuits and devices" with third year Bachelor students. Today, the P1 project gives meaning to knowledge assimilated by students in their first two years by integrating it into a harmonious whole. Also, the students are encouraged to respect industry standards, deadlines and deliverables. This is our way of bringing the students' education closer to the industry requirements.

Design for Manufacturing

Some basic PCB design guidelines set out best practice to reduce the cost of the boards and to minimize the risk of errors arising during manufacture:

- Respect the rules especially in terms of spacing, traces size and power isolation. Manufacturers have different requirements; make sure you read their own guidelines before sending your design. Naming and file formats also vary depending on the manufacturers.
- Take into consideration the Surface Mount Technology only.
- Usually the board frame is rectangular. For specific reasons, you could also do other types of shapes such as polygons.
- Make the lower left corner start at (0,0).
- Keep a board edge clearance of at least 100mil for components.
- Keep a board edge clearance of at least 50mil for the interconnection structure.
- Don't forget to define and export the Solder Paste layer.
- Export the board outline in a separate file.
- Place the multilayer ceramic capacitors parallel to the board edge.
- Use the same units and number format to export Gerber files and Excellon file.

Bucharest, April 7, 2017

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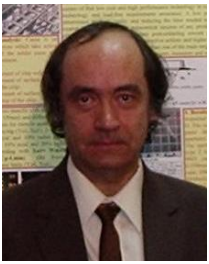

Recognition by the industry of student competences in PCB design


Association for Promoting Electronics Technology

APTE

Serial: AT no: ____/20__
Edition: XXVI

Certificate of Competence
in PCB design
awarded to

_____

is certified in PCB Design as recognition of her/his high level of advanced knowledge and design skills in the field of CAD for development of electronic modules and assemblies

The International Student Contest "Interconnection Techniques in Electronics, TIE 2017", 26th edition - Iași, România

APTE President, Prof. Dr.H.C mult. Paul Svasta, Ph.D

General Industrial Co-Chair, Cosmin Moisa, Continental Automotive România

TIE Technical Program Committee Chair, Prof. Norocel Codreanu, Ph.D., Politehnica University of Bucharest

TIE 2017 Certificate of Competence

The „PCB Designer" certificate is awarded, after evaluation, by the TIE IC (Industrial Committee) to selected participants as recognition of the high level of knowledge in the field of CAD for development of electronic modules and assemblies. The certificate is offered under the "umbrella" of the Association for Promoting Electronics Technology, APTE.

TIE Industrial Committee
Recommended PCB designers from 2010-2016

Participant Name	University	Year
Dungă Tudor Dan	Politehnica University of Timişoara	2010
Pică Zamfir	Technical University of Cluj-Napoca	2010
Gross Péter	BME Budapest	2010
Antonovici Dorin	Ştefan cel Mare University of Suceava	2010
Condrea Daniel	Ştefan cel Mare University of Suceava	2010
Lupuţ Cătălin	Politehnica University of Timişoara	2010
Banciu Alexandru	Politehnica University of Bucharest	2010
Fülöp Krisztián	BME Budapest	2010
Tudose Mihai Liviu	Politehnica University of Bucharest	2010
Burgheaua Mihai	Ştefan cel Mare University of Suceava	2010
Knizel Alexandru	Politehnica University of Timişoara	2010
Pandelică Ovidiu	University of Piteşti	2010
Caracaţeanu Cătălin	Dunărea de Jos University of Galaţi	2010
Ţibuleac Cătălin	Politehnica University of Bucharest	2010
Blănaru Andrei	Transilvania University of Braşov	2010
Malinetescu Adrian	North University of Baia Mare	2010
Ungureanu Vlad	Transilvania University of Braşov	2010
Precup Călin	Politehnica University of Timişoara	2011
Antonovici Dorin	Ştefan cel Mare University of Suceava	2011
Mareş Mihai	University of Piteşti	2011
Gordan Cristian	Politehnica University of Timişoara	2011
Burghea Mihai	Ştefan cel Mare University of Suceava	2011
Crăciun Gabriel	Politehnica University of Timişoara	2011
Ţibuleac Cătălin	Politehnica University of Bucharest	2011
Bostan Adrian	Politehnica University of Bucharest	2011
Fiastru Bogdan	Technical University of Cluj-Napoca	2011
Aldea Alin	University of Piteşti	2011
Andrieş Lucian	Ştefan cel Mare University of Suceava	2011

Caracaţeanu Cătălin	Dunărea de Jos University of Galaţi	2011
Aldea Alin	University of Piteşti	2012
Turdean Mihai	Technical University of Cluj-Napoca	2012
Andrieş Lucian	Ştefan cel Mare University of Suceava	2012
Avădanii Alexandru	Politehnica University of Bucharest	2012
Mares Mihai	University of Piteşti	2012
Marin Marian Valentin	University of Piteşti	2012
Burgheaua Mihai	Ştefan cel Mare University of Suceava	2012
Tănase Mihai	Politehnica University of Bucharest	2012
Boţilă Alexandru	Politehnica University of Timişoara	2012
Ţibuleac Cătălin	Politehnica University of Bucharest	2012
Gordan Cristian	Politehnica University of Timişoara	2012
Antonovici Dorin	Ştefan cel Mare University of Suceava	2012
Ardelean Mihaela	Politehnica University of Timişoara	2012
Ştefan Andrei	Politehnica University of Bucharest	2012
Bostan Adrian	Politehnica University of Bucharest	2013
Bota Claudiu	Politehnica University of Timişoara	2013
Ilie Mihai	Technical University of Cluj-Napoca	2013
Timoficiuc Ovidiu	Ştefan cel Mare University of Suceava	2013
Olenici Alexandru	Technical University of Cluj-Napoca	2013
Sofîlca Ionuţ-Bogdan	1 Decembrie 1918 University of Alba Iulia	2013
Grigoraş Eduard	Ştefan cel Mare University of Suceava	2013
Chitic Mihail	Transilvania University of Braşov	2013
Petric Cristian	Politehnica University of Timişoara	2013
Cervis Alexandru	Maritime University of Constanţa	2013
Moise Mădălin-Vasile	University of Piteşti	2013
Lăcătuş Daniel	Politehnica University of Bucharest	2013
Eduard Grigoraş	Ştefan cel Mare University of Suceava	2014
Alexandru Mihai Ilie	Technical University of Cluj-Napoca	2014
Ovidiu Timoficiuc	Ştefan cel Mare University of Suceava	2014
Mădălin Moise	University of Piteşti	2014
Teodor Luchian	Ştefan cel Mare University of Suceava	2014
Robert Dobre	Politehnica University of Bucharest	2014
Radu Ciocovanu	Gh. Asachi Technical University of Iaşi	2014

Daniel Gheorghe	Politehnica University of Timişoara	2014
Traian Butaru	Politehnica University of Bucharest	2014
Teodor Luchian	Ştefan cel Mare University of Suceava	2015
Maranciuc Florin Bogdan	Ştefan cel Mare University of Suceava	2015
Moise Mădălin Vasile	University of Piteşti	2015
Paranici Andras	University Of Oradea	2015
Cojocariu Gheorghe	Ştefan cel Mare University of Suceava	2015
Butaru Traian	Politehnica University of Bucharest	2015
Marin Ionuț - Alexandru	University of Piteşti	2015
Cocan Nicolae	Lucian Blaga University of Sibiu	2015
Burta Andrei	Politehnica University of Timişoara	2015
Dumitrache Florin	Transilvania University of Braşov	2015
Iliescu Mihai	Politehnica University of Bucharest	2015
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Cocan Nicolae	Lucian Blaga University of Sibiu	2016
Gîbu Marius Andrei	Politehnica University of Bucharest	2016
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Anechitei-Diacu Gavril-Cristian	Ştefan cel Mare University of Suceava	2016
Racheru Alexandru	Politehnica University of Timişoara	2016
Cocan Alexandru Ionuț	Lucian Blaga University of Sibiu	2016
Goglea Alexandru Nicolae	University of Piteşti	2016
Onofrei Șerban	Gh. Asachi Technical University of Iaşi	2016
Serghie Andrei	Ştefan cel Mare University of Suceava	2016
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Autoliv Romania the automotive safety systems manufacturer, the local subsidiary of the Swedish company Autoliv, is the second largest automotive safety supplier in Romania. Almost 11.000 romanians work in Autoliv's factories from Brașov, Sf. Gheorghe, Lugoj, Reșița and Onești. To these are added the engineering and development centres from Brașov and Timișoara, a European IT centre and a lot of support services for Autoliv's subsidiaries from Romania and Europe, plus a future centre of R&D in Iași.

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Autoliv

Continental develops intelligent technologies for transporting people and their goods. As a reliable partner, the international automotive supplier, tire manufacturer, and industrial partner provides sustainable, safe, comfortable, individual, and affordable solutions.

Continental Automotive in Romania

In Continental Automotive Romania, over 8000 people work in the R&D centers in Timisoara, Sibiu, Iasi and Brasov and in the production plants in Timisoara, Sibiu and Brasov. Our engineers develop software solutions, hardware and mechanical designs for body, safety, engine and transmission applications as well as navigation systems and instrument clusters for future cars and trucks.

University collaboration

Research contracts	Summer practice
Teaching Program	Diploma Projects
Conti InfoCenter	Private scholarship
ContiLab	Master Program
Sponsorship	PhD Projects
Recruiting fairs	Company visits, workshops, competitions

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Societatea **COMTEST** oferă sisteme şi servicii de înaltă calitate din aria telecomunicaţiilor pe măsura nevoilor şi asteptărilor clienţilor săi.

COMTEST activează in prezent ca unic distribuitor pentru Romania al companiei **Keysight Technologies**, divizia de echipamente de măsurări electronice şi de comunicaţii provenită din HP

Keysight Technologies este prima companie mondială de echipamente de măsurare şi lider în tehnologiile electronice şi de comunicaţii care oferă soluţii inovative de test şi măsurare pentru a permite clienţilor şi partenerilor săi, lideri în domeniul lor de activitate, să ofere produsele şi serviciile care să facă diferenţa în viaţa oamenilor de pretutindeni.

COMTEST reprezinta in Romania compania **Amplifier Research**, lider mondial în echipamente EMC şi amplificatoare de putere acoperind orice gama de frecvenţă pâna la 45 GHz. Soluţiile complete, gata de pus în funcţiune, amplificatoare, antene, cuploare, generatoare de semnal, contoler de sistem, receptoare şi multe altele integrate printr-o aplicatie soft într-un sistem curinzător.

COMTEST promovează in Romania produsele Comtest Engineering Holland – lider in fabricarea de camere anecoice şi integrarea de laboratoare EMC. Cel mai performant laborator EMC din Romania, acreditat in totalitate conform standardelor CISPR si ISO17025 a fost implementat de către Comtest Engineering Holland în colaborare cu echipa COMTEST.

Schwarzbeck Mess Elektronik produce o gamă completă de antene şi echipamente pentru laboratoarele EMC în gama de frecvenţe pană la 40 GHz. Produsele sunt în acord cu ultimele prevederi ale standardelor EMC şi Automotive, sunt fiabile şi cu performanţe stabile. Le puteti gasi in toate laboratoarele de profil.

ELECTRO OPTIC COMPONENTS is specialized in the development and manufacture of optoelectronic systems for various applications. Some of the company achievements are:

- warning systems against laser and radar illumination;
- optoelectronic sensors and interfaces for their integration into complex systems;
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- laser rangefinders subassemblies for integration in other optical systems (binoculars, optical aiming devices);
- aiming pointers and intelligent pointers, equipped with laser diodes in the visible and infrared spectrum;
- ruggedized PC computers with framegrabbers for image processing of different video sources such as CCD and night vision cameras, which can be integrated in complex surveillance systems;
- DC/DC and AC/DC convertors;
- various types of microcontroller boards for automation;
- PC and microcontroller software development.

ELECTRO OPTIC COMPONENTS is ISO 9001:2008 certified and has the technical ability to develop complex electronic and optoelectronic systems for different applications.

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MARQUARDT SCHALTSYSTEME ROMANIA

↗ With over 9300 employees in 18 locations, the Marquardt Group is a global leader in electro-mechanical and electronic systems for automotive, electric power tools and home appliance industries.

↗ Since 2006, Marquardt Sibiu sustains the business with 5 production areas - Electronics, Plastic Molding, Assembly, Painting & Laser, Microswitches, a R&D Center, and the efforts and talents of over 2,800 employees.

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Corporate Fact Sheet

Overview

Microchip Technology Inc. is a leading provider of microcontroller, mixed-signal, analog and
Flash-IP solutions, providing low-risk product development, lower total system cost and faster time to market for thousands of diverse customer applications worldwide. Headquartered in Chandler, Arizona, Microchip offers outstanding technical support along with dependable delivery and quality. For more information, visit the Microchip website at http://www.microchip.com.

- Founded in 1989
- Publicly held (NASDAQ: MCHP) and listed on the Standard & Poor's 500 financial index
- $2.161 billion in net sales for fiscal year 2015 (ending March 31, 2015)
- More than 9,400 employees worldwide
- 50 sales offices worldwide
- Manufacturing facilities: Tempe, AZ; Gresham, OR; Bangkok, Thailand
- Development centers: Bangalore, India; Lausanne, Switzerland; Santa Clara & Los Angeles, CA; Chandler, AZ; Bucharest, Romania; Manila, Philippines; Budapest, Hungary; Brisbane, Australia; Milwaukee, WI; Norristown, PA; Shanghai, China; Hsinchu, Taiwan; Austin, TX; Karlsruhe, Germany; Gothenburg, Sweden; Hauppauge, NY; Chennai, India; Irvine, CA; Hong Kong, China; Vietnam
- The Company's quality systems are ISO/TS-16949:2009 certified
- 98 consecutive quarters and 24 consecutive years of profitability, as of March 2015
- Has shipped more than 15 billion PIC® microcontrollers
- #1 in worldwide 8-bit microcontroller revenue
- Corporate headquarters: 2355 W. Chandler Blvd., Chandler, AZ 85224, United States

Applications

Microchip serves over 90,000 customers in more than 65 countries who are designing highvolume embedded control applications in the consumer, automotive, office-automation, communications and industrial-control markets worldwide.

Miele Tehnica Brașov is a subsidiary of Miele & Cie. KG, Germany. It was established in 2009 as a second electronics factory in the group, after the plant in Gütersloh.

The Miele plant in Braşov currently has 300 employees and produces electronic components for a wide range of Miele appliances, such as washing machines, tumble dryers, vacuum cleaners, ovens and others. The products Miele offers to its customers set the standards for durability, performance, ease of use, energy efficiency, design and service products.

In august 2015, in Brașov, a software development division was created. Within this new division the software for a wide variety of Miele appliances is developed.

The facility in Brașov is equipped with state-of-the-art technology and all quality requirements are respected according to the Miele Group's standards. This fact is acknowledged by all the certifications currently in place: ISO 9001, ISO 14001, ISO 50001, OHSAS 18001 and SA 8000.

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TENSOR is a private company, founded in 1996, authorized Channel Partner in Romania for ANSYS software (CFD, FEA, and ANSOFT). We are actively involved in engineering modeling and simulation (our strength being Computational Fluid Dynamics), both in academic medium and on commercial side.

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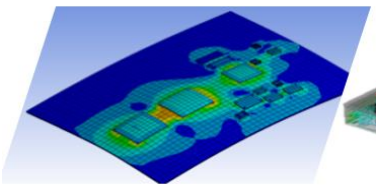

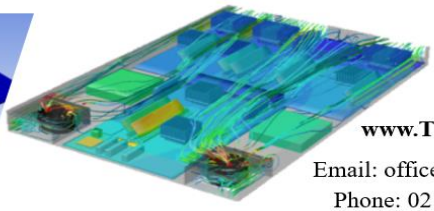

www.TENSOR.ro
Email: office@tensor.ro
Phone: 021.444.23.78

An invitation to TIE 2018

It is my privilege to invite you and then will be a real honor to welcome you to the TIE 2018, the 27th edition of the Professional Student Contest on Interconnection Techniques in Electronics (TIE), on behalf of the University of Pitesti.

This contest is supported by universities and companies, being hosted in 2008 by University of Pitesti and now, after 10 years, this contest comes back here.

The buildings of the University of Pitesti will host all contest activities, and attendees will be able to tour and experience the university's state-of-the-art facilities. New facilities in labs and all classrooms were the latest in educational technology, and this is the standard for all buildings in the new campus, too.

The contest aims to serve as an international forum for effective exchange of practical knowledge and experience among students because is designed to raise the interest of a wide range of students by sharing the newest innovative solutions in various fields of Interconnection Techniques in Electronics. The TIE contest is already a success, attracting a large number of students, which reflects the high interest for the exciting fields of TIE contest. The TIE contest also means a great opportunity for the international engineering community to share their cutting-edge research solutions and promote the engineering advancements to academia.

Finally, I would like to thank all volunteers for their valuable efforts in organizing this important professional contest in Romania, and wish all the attendees an enjoyable program during TIE 2017.

I am looking forward to welcome you at TIE in April 18-21, 2018, and hope that you will enjoy the stay in Pitesti during TIE 2018 as well.

Prof. Nicu BIZON
Dean of Faculty of Electronics, Communications and Computers,
University of Pitesti

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