



**National Research and Development  
Institute  
of Welding and Material Testing  
ISIM Timișoara**

**Institutional Development Plan  
2012-2015**

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## **Introduction:**

Based on the activity analysis made for the last four years an institutional development plan was elaborated. The strategic scientific objectives and directions are established. In order to be able to fulfill these objectives a human resource strategy and a plan for infrastructure development was elaborated. An important factor of institute's development is technology transfer to the industry based on strategic partnership with other institutes and universities. The ISIM development plan starts from a deep analysis of the external and internal medium of the organization followed by establishing clear scientific objectives and directions including performance indicators to be monitored thus leading to a coherent approach for reaching scientific excellence in the research domains envisaged.

### **1. Scientific SWOT analysis**

Before SWOT an evaluation of the external medium (place of the institute in the macro system, the competitors, the external conditions, etc) and an evaluation of the internal medium (organization and personnel, the thematic and the infrastructure) are performed.

#### **1.1 Evaluation of the external medium**

##### ***1.1.1 Place of ISIM in the macro-system***

ISIM is, in Romania, the only R&D institute in the field of welding and material testing, this being a favorable position in the economic and scientific medium. Through the cooperation relations with the industry in the last years, ISIM covers the whole territory of the country, having business partners in all counties. The number of ISIM clients from between 250 and 300.

In the institute two organizations of national and regional importance are located. The Romanian Welding Society (ASR) is the professional organization of welders in Romania and the Association for Multidisciplinary Research in the Western Part of Romania (ACM-V) having members from many all scientific fields working in institutes and universities from Arad, Caras-Severin, Hunedoara and Timis counties. The offer for the industry includes research and development, personnel training, certification and laboratory tests and examinations. Based on a constant preoccupation for development of relations with research entities from abroad, ISIM has excellent relations with institutes and universities from Austria, Germany, Portugal, Italy, UK, Ukraine, Hungary, Serbia, Slovakia, India and Israel. ISIM was and is partner in many European projects.

##### ***1.1.2. Competitors***

The potential competitors of ISIM are, in the field of research and development, other research institutes working in related fields. First of all ICEM in Bucharest have partial activities related with welding but a good experience in material testing. In material testing they have a good infrastructure, high qualified personnel and a long time experience in metallurgy. In the field of rest life evaluation in energetic equipment there are three competitors: TÜV SUD, ICEMENERG and ISPE. With TÜV SUD and ISPE the institute has already signed cooperation protocols to solve together projects in the fields of common interest. The cooperation works well in the benefit of all involved parties. The Romania's adhesion to EU raised the number of competitors, as expected.

A potential competitor in the field of development of specialized NDT equipments is the Institute for Technical Physics in Iasi. ISIM developed a cooperation in the frame of common projects so that the relation are excellent and oriented through cooperation and not competi-

tion. In some universities (Bucharest, Galati, Brasov) exists teaching and research programs in the field of welding. The universities' main research directions are generally oriented to fundamental and experimental research, ISIM uses this research for complementing his projects in a close partnership with the Universities, in the frame of national research projects.

### ***1.1.3. External conditions***

The research activity in Romania is based on a set of laws and regulations who establishes the legal framework for this domain. Unfortunately in the last years this legal framework has changed frequently in respect to financing policy and access rules to financing. In the present legislation a strong access limitation for researchers, especially for the young one, as project coordinators, was introduced which is not so favorable for the institute. The existing national, bilateral and European programs are good opportunities for ISIM for participation in project competitions and were used.

## **1.2 Evaluation of the internal medium**

### ***1.2.1 Organization and personnel***

Because of the personnel reduction in the last years the structure of the personnel is not an ideal one, following a pyramid structure. The lower levels are insufficient occupied. In the sections some young researchers are involved as well doctor students preparing their doctor theses. The higher levels of researcher's activities are held by more aged researchers so that it will be important to analyze the possibility of promoting the existing personnel to CS1 and CS2.

### ***1.2.2. Thematic***

The research projects developed by ISIM are financed by the national research programs and by industrial partners; the interest of industry is especially oriented in direction of development of specialized welding equipments. In the team "Joining technologies and material testing" many research activities asked by industrial partners were made in the field of rest life evaluation of industrial equipments' components and in the field of material's behaviour under heavy loaded conditions.

### ***1.2.3. Infrastructure***

The research infrastructure of ISIM was completed in the last period with new equipments financed partially by the projects and partially by the Ministry of Economy and Trade as support for institutional development. The institute has also a good computer infrastructure based on an intranet.

## **1.3 Scientific SWOT Analysis**

The SWOT analysis involves the evaluation of **Strengths, Weaknesses, Opportunities and Threats**.

The SWOT matrix can be constructed in order to establish the **action plan**. **S-O Strategies** can use the Opportunities to amplify the Strengths, creating new chances. The **S-T Strategies** use the Strengths to overcome the Threats. The **W-O Strategies** uses the opportunities in eliminating the Weaknesses and so eliminating there effect on the institutes activity. Finally the **W-T Strategies** is used for developing strategies which do not allow Weaknesses to become dangerous for the institute.

From the SWOT Matrix the main activities are visible at a glance. Each activity gives solutions for one or two combination of SWOT parameters. The activities are listed below including responsibilities and terms of application.

<p style="text-align: center;"><b>External factors</b></p> <p style="text-align: center;"><b>Internal factors</b></p>	<p><b>Opportunities:</b></p> <ol style="list-style-type: none"> <li>1.Existing non-reimbursable financing sources at national and international level</li> <li>2.Companies are interested in the ISIM research services offer</li> <li>3. Relatively stable legislation of research</li> <li>4. Possibilities for development of the scientific staff through mobility programs in institutes abroad</li> <li>5. EU regulations in favor of environment protection</li> </ol>	<p><b>Threats:</b></p> <ol style="list-style-type: none"> <li>1.Low interest for innovation in the Romanian companies</li> <li>2.Access on the Romanian market of competitors from abroad working in the same field of activity as ISIM</li> <li>3.Migration of competent human resources</li> </ol>
<p><b>Strengths:</b></p> <ol style="list-style-type: none"> <li>1.High competence in specific research areas</li> <li>2 Highly qualified and experienced technical personnel</li> <li>3. Possibility to approach different scientific fields facilitate by the last generation infrastructure</li> <li>4.Solid partnerships with research institute from Romania and abroad</li> <li>5.Experience in participation in national and European research programs</li> <li>6. Certified acc. to ISO 9001 quality management system including R&amp;D</li> </ol>	<p><b>S-O Strategies</b></p> <ol style="list-style-type: none"> <li>a)Preparation of project proposals for national and European programs in the field of welding, material testing and related topics</li> <li>b) Including the institute in European Technology Platforms</li> <li>c) Cooperation partnership with interested EU or non -EU companies.</li> <li>d)Use in common the ISIM infrastructure with similar national and EU institutes</li> <li>e) Development in eco-friendly welding and thermal spraying technologies</li> </ol>	<p><b>S-T Strategies</b></p> <ol style="list-style-type: none"> <li>a)Promoting projects with innovation potential for SMEs</li> <li>b) Research offer to companies by means of on-site visits</li> <li>c)Call centre for SMEs in the field of welding and material testing technologies</li> <li>d) Partnership in research with institutes form abroad and Romania in order to solve the problems of companies</li> <li>e) Stimulating the interest in the use of eco-friendly welding technologies as a basis of a new economical approach, through conferences, workshops and on-site visits.</li> </ol>
<p><b>Weaknesses:</b></p> <ol style="list-style-type: none"> <li>1) Non existing strategy for promoting and valorisation of research results</li> <li>2) Inefficient stimulation mechanism of young researchers</li> <li>3) Limited international cooperation</li> </ol>	<p><b>W-O Strategies</b></p> <ol style="list-style-type: none"> <li>a) Development of a promotion and valorisation strategy of research results</li> <li>b) Development of a stimulation mechanism for young researchers</li> <li>b)Involving young researcher with doctoral and post-doc studies in the research projects of ISIM</li> <li>b)Stimulation of publication of project results in journal having high impact factor</li> <li>c)Stimulation of writing patents proposals based on research results</li> <li>d)Increasing the mobility of researchers abroad in order to get more know-how</li> </ol>	<p><b>W-T Strategies</b></p> <ol style="list-style-type: none"> <li>a)Valorisation of own patents in cooperation with companies (SMEs)</li> <li>b)Stimulation of young specialists from SMEs to work for a period in ISIM (doctoral studies, training in given topics, technical assistance etc)</li> <li>c) Cooperation on the market with competitors for solving problems of industry</li> <li>d) Increase the existing cooperation with other national and/or International R&amp;D institutions, for a higher mobility and the increase in capabilities of solving the problems of industry</li> </ol>

## 2. Strategic scientific objectives and directions

The scientific objectives and directions are practically the outputs of the SWOT analysis. Based on it the main scientific objectives for the next 4 years are:

- O1. Consolidation of the existing scientific know-how and development of new scientific topics
- O2. Increasing the visibility of the research activity results
- O3. Increasing the level of research results' exploitation by technology transfer
- O4. Continuous development of the human resource for research
- O5. Intensify the cooperation with national and international partners.

Objective Number	Strategic objectives	Specific objectives/Performance indicators
O1	Consolidation of the existing scientific know-how and development of new scientific topics	<ul style="list-style-type: none"> <li>-Development of new technologies and specialized equipment in ultrasound welding and processing, including the field of micro joining (nanotechnologies)</li> <li>-Development of environmentally friendly welding and NDT technologies</li> <li>-Further development of applications of friction stir welding (FSW) for industrial partners</li> <li>-Surface engineering to enhance surface characteristics of different materials by laser technology, thermal spraying, and friction stir surface processing (FSSP)</li> <li>-Welding and cutting of new materials like polymers, ceramics, metal matrix composites and shape memory metals</li> <li>-Monitoring of welded structures by complex systems and adequate maintenance procedures</li> <li>-Integration of inspection and welding in the same process (process integrated inspection)</li> </ul>
O2	Increasing the visibility of the research activity results	<ul style="list-style-type: none"> <li>-Development of a coherent promotion strategy for the research results</li> <li>-Publication of at least <b>80 papers (minimum 20 every year)</b> in recognized national and international journals</li> <li>-Participation with at least <b>20 papers/ year</b> at national and international conferences in the field of welding and material testing</li> <li>-Organizing at least <b>3 workshops/year</b> in companies for presentation of research results and discussions about possible cooperation</li> </ul>
O3	Increasing the level of research results' exploitation by technology transfer	<ul style="list-style-type: none"> <li>-generation of at least 5 patent applications/year</li> <li>-including the main research results of the institute in international technology transfer networks</li> <li>-organizing <b>2 thematic workshops/year</b> for patent presentation in order to valorise it in industry</li> <li>-organizing <b>one workshop/year</b> for analyzing the market needs of companies</li> <li>-editing <b>a catalog</b> with the scientific results of the institute updated every year</li> </ul>

		-Elaboration of a <b>feasibility study</b> for a cluster in welding technologies and connected procedures
O4	Continuous development of the human resources for research	-creation of a <b>stimulation mechanism</b> of researchers including salary components, mobility facilities, assuming of responsibilities using the management through objectives -elaboration of a <b>annual training program</b> for the institute's personnel - <b>partnership with universities and institutes</b> for attracting experimented researchers and young people in the R&D activity
O5	Intensify the cooperation with national and international partners	- participation in 2 European Technology Platform Manufacture and EuMat -participation in at least <b>5 international projects</b> (FP7, Leonardo, bilateral, CBC etc.) -A least <b>10 R&amp;D projects/year</b> from private sources (companies, foreign clients etc.) -Preparing minimum <b>2 project proposals</b> for the Structural Funds Program POS-CCE

The strategic objectives incorporate the aspects shown by the SWOT Analysis and the specific objectives indicate the action plan.

<b>Scientific strategic directions</b>	<b>Research themes to be developed</b>	<b>Performance indicators</b>
Development of new technologies and specialized equipment in ultrasound welding and processing, including the field of micro joining (nanotechnologies)	-Specialized US welding equipment for automotive applications  -Micro-welding of electric connectors in electronics	-4 contracts with industrial partners  -10 papers  -1 patent applications  -1 international project
Development of environmentally friendly welding and NDT technologies	-New ultrasound welding technologies for industrial applications	2 research projects  -12 papers  -2 patent applications
Further development of applications of friction stir welding (FSW) for industrial partners	-Application of FSW in automotive industry  -FSW welding of complex industrial components -FSW spot welding of aluminium components	-15 papers  -2 projects  -2 patent applications
Surface engineering to enhance surface characteristics of different materials by laser technology, thermal spraying, and friction stir surface processing	-Thermal spraying of amorphous materials  -Laser beam coating technology	-15 papers  -2 projects

(FSSP)	gies  -Friction stir surface processing of steel components by aluminium coatings	-2 patents  -2 contracts with industrial partners
Welding and cutting of new materials like polymers, ceramics, metal matrix composites and shape memory metals	-Laser welding of polymer sheets for industrial applications  -Brazing of metal matrix composites	-1 project with industrial partner  -8 papers  -1 patent applications
Monitoring of welded structures by complex systems and adequate maintenance procedures	-risk based inspection monitoring of complex industrial equipment	-4 projects with industrial partners  10 papers
Integration of inspection and welding in the same process (process integrated inspection)	-Welding system with inter-gated control of the process	-2 projects  -5 papers  -1 patent application

### 3. The human resource strategy

#### 3.1. Recruitment policy

In order to ensure the objectives foreseen at the point 3.2 it is necessary to employ young researchers in the next period. It will be also necessary to employ some researchers having already higher qualification because the existing personnel can be promoted only after they fulfill the legal conditions. The number of employed researchers is correlated with the necessities of each domain in the activity of the sections and with the presumable structure and volume of the research contracts in the future.

In the table below a plan for employment is presented:

Qualification required	Field of activity	2012	2013	2014	2015
Engineer in Material science	Methods for analyzing amorphous and other new materials and evaluation criteria	1		1	
Doctor student in mechanical engineering	Ultrasound welding		1		1
Doctor student in mechanical engineering	Surface engineering, thermal spraying	1		1	1
Doctor in weld-	Laser welding,	1	1	1	

ing technologies	Electron Beam welding MAG CMT welding				
Engineer in mechanics and material science	Evaluation of Structures and rest life assessments	1	1		1
Physicist	Thermographic analysis Eddy current examination	1	1		
Engineer in nondestructive testing	UT, VT, PT, RT			1	
Design engineer	Design of metallic structures	1		1	
Higher qualification researcher	Welding technologies, Material testing	1	1	1	1
<b>Total</b>		<b>7</b>	<b>5</b>	<b>6</b>	<b>4</b>

Following this plan it will be possible, first of all, to develop the ground basis of scientific personnel which will allow, in few years, to promote them in higher position. From the existing personnel and from the higher qualified researchers foreseen to be employed, in 2 or 3 years an exam will be organized for the promotion of them in the categories of CS1 and CS2. The **recruitment of the new staff members** will be done by exams organized for every position in accordance with the law's provision. The exams will be announced publically in newspapers and in the institute and the examination will be made by a commission in conformity with the law. The possible candidates will come from universities (people with finalized university studies, master students or doctor students) but also specialist having an industrial practical experience. The higher qualified researchers could be also university professors having interest to spend a part time activity in the institute.

### 3.2. Personnel training

The permanent scientific and professional development of the personnel involved in research will be of major importance in the next period. The very good knowledge of English language is a condition of efficient participation in European or bilateral projects. In 2012 and in 2014 an English language course of higher level will be organized for at least 5 researchers every year, followed by a TOEFL test for the participants. Another field of interest is the training in using computer programs (Microsoft Office programs). Every two years a course will be organized in institute finalized by exams.

In order to stimulate the **career development of young researchers** they will be stimulated to follow doctoral studies in thematic having strong relation with research priorities of the institute. Doing so, they will have the possibility to grow up professionally and to become, in the next years, researchers of higher grads

### 3.3. Mobility

The participation of the institute in European projects will allow developing **the mobility of researchers** to the partners. The objectives of this mobility were be getting new know-how but also working in the laboratory with high quality infrastructure. Last but not least a **secondary effect could be the change of mentality** and learning about how is the work organized,

what are the human relations, how is a successful paper etc. In the projects a mobility component will be every time introduced including not only documentation but also working in laboratory making experiments on equipments which are not available in our institute.

### **3.4. Mechanism for evaluation and stimulation of the personnel**

In the institute an efficient evaluation system is applied. Every year the researchers have to complete a form indicating their research results, papers published, technologies elaborated, technology transfer actions, etc. For each type of activity a score is allocated and a total is calculated. So it is possible to see the progress of each researcher from one year to other. The salary of the researchers is correlated with the total score.

### **3.5. Gender Policy**

Related to the **gender policy** it will be stimulated the employing of women. It is foreseen to employ at least one woman every year in research positions.

## **4. Mechanisms for stimulating the appearance of new research directions**

The stimulation of appearance of new research directions will be of great importance in the next years. The mechanisms **for stimulating the appearance of new research directions are:**

### **4.1. Exploratory workshops**

Organizations of workshops at the industrial partners for identify their needs. It is foreseen to organize every year one exploratory workshop at companies working in the field of welding metallic structures. To these workshops interested companies, working in similar field (e.g. automotive, naval, energy, petro chemistry etc.) were invited to discuss about their problems and perspectives.

The American Welding Society, in conjunction with the Department of Energy of USA, has recently published a **Vision for Welding Industry** that will carry the **welding industry through 2020**. This document is of great importance in establishing priorities and new research directions in our institute, too. Some of the main ideas in this vision are already included in the objectives listed at the point 2.1 like e.g. integration of inspection and welding, process monitoring, joining of advanced materials, micro-joining etc.

Starting from that vision and from the experience of ISIM in specific research areas the offer of the institute in the frame of these workshops will be concentrated on FSW with application in automotive and naval field, thermal spaying of metallic and ceramic materials petrochemical plants, micro welding with ultrasound, monitoring of welding processes, etc.

### **4.2. The role of European projects, participation in Research Networks, participation in European Technological Platforms**

The **participation in European projects** in the field of welding and material testing will be a major objective of the next period because being involved in the last research topics in Europe it will be necessary to follow-up the trends in research. The opportunities offered by the European Programs for **mobility of researchers** like Marie Curie, will be used intensively for **specializing at least 2 young researchers / year in European institutes and universities** in topics of interest for our institute. The experience and infrastructure of the institute will be

used for offering young doctor students the possibility to work in the laboratories together with researchers if **the thematic of their work is oriented to new research directions**.

For the next period the participation in two European Technological Platforms Manunet and EuMat is foreseen. The participation in these big European Networks will be of major importance in the future. For 2012 **ISIM has two MANUNET projects** in progress being involved in the scientific tasks in his field of activity.

ISIM is member of the International Institute of Welding and so will participate every year with scientific contributions in the scientific commissions of IIW. The IIW organizes every year the Annual Assembly, every time in another town around the world. ISIM will participate actively to this event of global importance with the best papers in the field of welding and material testing.

### 4.3. Scientific Advisory Board

The activity of the Scientific Council of ISIM will include every year **an analysis about new research directions** possible to be supported in the institute. In this analysis's **the participation of recognized specialists** in the field of welding and material testing from Romania and from abroad will be promoted in order to get the best information and ideas for new projects and new research directions. In the institute there **is a tradition to organize the so called "ISIM Scientific Colloquia"** (Colocviile Stiintifice ISIM) dedicated to interesting topics in the field of activity of the institute. The invitation of specialists from outside the institute will bring new ideas and information in discussion.

### 4.4. Cooperation with universities

The **cooperation with universities** will be of extremely important because we need their experience especially in argumentation of the new welding and testing procedures, in mathematical modelling of the phenomena, in FEA, in laboratory experiments etc. The already traditional cooperation with Politehnica University of Timisoara, Dunarea de Jos University Galati, Politehnica University Brasov, University of Craiova will be developed in future.

## 5. Financial SWOT analysis

Strengths:	Weaknesses
<p>Currently in a balanced financial position, covered until the end of the year (accounts receivable smaller than accounts payable)            During consecutives financial years there were no long – term debts (longer than one year)            The institute disposes of a good portfolio of contracts and orders that generally is revealed in net profit at the end of the year            Taxes and contributions paid on time to the state budget, as required by law            Favorable credit line (working credit in RON)            Own premises (no additional costs for renting)</p>	<p>The accounts receivable and payable are subject to an ongoing activity            A part of the cash flow is still ensured through a credit line (with a downward trend form year to year)</p>

<p>The institute's patrimony includes specialized equipments with performance indicators Higher revenues than expenses in this financial year ensures a normal ongoing activity</p>	
<p><b>Opportunities:</b></p>	<p><b>Threats:</b></p>
<p>Favorable lending conditions considering loyalty, contract terms rigorously respected and so on The possibility of obtaining EU – financed projects and not only. There is a great emphasis regarding research and development at this moment, this being one of the five goals adopted by Europe 2020 Strategy (Research and Innovation). Therefore, a lot of R&amp;D programmes will be accessible along cross-border, operational POSDRU, FP7 and so on.</p>	<p>Fluctuant local and global economy and financial markets Reduced governmental finance for research Orders at a low level/number from free market beneficiaries, whose activity is constrained by the current economic status Bankruptcy and payment defaults among the beneficiaries.</p>

**Proposed measures:**

**Considering the institute's weaknesses the following measures will be taken:**

- Advance will be requested at contracts and orders signing.
- On time payment for each phase/stage will be introduced in the contractual terms; when a payment for the finalized phase/stage is missed, the next phase/stage won't start until the debt is cleared.
- Bad debtors will be avoided when signing a contract or starting a collaboration.
- The annual narrowing policy for the working loan/credit will continue.
- Client fidelization by respecting contract terms
- Customers spectrum can be broaden with the recommendations of satisfied beneficiaries and good marketing referring to the base activity
- The interest and the fees and also credits will be reduced if the financial and banking market will allow it
- If the research's finance from the state budget through national R&D programs will be stopped, the institute will have to turn to alternative funding sources, some of which are currently used:
  - Accessing R&D programs with European funding. For this kind of programs, in order to support the co-financing rate at a maximum level, it will be seeked a bank loan.
  - Bank working credit will be reevaluated by increasing its general value
  - Increasing the volume of contracts and collaborations with partners from industry and from the free market: expanding the range of offered services, offering and benefiting from loyalty collaborations and so on
  - Accessing cross-border R&D programs: IPA etc
  - Accessing operational POSDRU R&D programs.

## 6. Infrastructure: investment plan and strategy

The investment plan is correlated with the scientific objectives for the next 4 years.  
The following equipments are necessary in the next period

No.	Scientific directions	Equipment/Instrument	Estimated value (EURO)	Acquisition term
1	Development of technologies and specialized equipment in ultrasound welding and processing, including the field of micro joining (nano technologies)	-new programmable US welding equipment	10.000	2 <sup>nd</sup> Year
		-spectrum analyzer for piezoceramic convertors	8.000	First year
		-mechanical testing machine for micro joining	45.000	2 <sup>nd</sup> Year
		-micro hardness testing instrument	20.000	3 <sup>rd</sup> Year
2	Development of environmentally friendly welding technologies	-photovoltaic cells	50.000	3 <sup>rd</sup> Year
		-industrial DC/AC converter	15.000	3 <sup>rd</sup> Year
3	Further development of applications of friction stir welding (FSW) for industrial partners	-professional FSW welding machine	150.000	2 <sup>nd</sup> Year
4	Surface engineering to enhance surface characteristics of different materials by laser technology, thermal spraying, and friction stir surface processing (FSSP)	-high power laser (2000W)	250.000	3 <sup>rd</sup> Year
5	Welding and cutting of new materials like polymers, ceramics, metal matrix composites and shape memory metals	-instrumented mechanical testing machine	250.000	2 <sup>nd</sup> Year
		-instrumented Charpy testing machine	100.000	4 <sup>th</sup> Year
6	Monitoring of welded structures by complex systems and adequate maintenance procedures	-portable hardness testing instrument	30.000	First year 2 <sup>nd</sup> Year
		-portable optical microscope	20.000	First year and 4 <sup>th</sup> Year
		-updates of the existing expert systems		
7	Integration of inspection and welding in the same process (process integrated inspection)	-computer controlled design system	40.000	4 <sup>th</sup> Year

The financing of the investment plan will be sustained by the research projects and from the budgetary allocations of the Ministry of Economy, Trade and Business Medium. These equipments are necessary to replace older important equipments and for creating the conditions for the new projects to be solved. In case the acquisition will not be possible in some equipment it will be necessary to find cooperation in universities and institutes in Romania or abroad.

## 7. Technology transfer and the attraction of non-public funds

In ISIM exists a technology transfer centre named CENTA. In the future the centre will be reorganized in order to ensure a better connection with the industrial environment. In the frame of the centre a person with industrial experience will be involved having tasks in marketing. The main target of the marketing activity will be the industry, SMEs and big companies too. The first step will be the elaboration of **market evaluation** for different industrial sectors (automotive, aeronautic, naval, railway, nuclear etc.). Every year 60 companies were include in this market evaluation. Starting from this analysis new specific offers were be elaborated. These offers will start from a very good knowledge of the real needs of those sectors, avoiding non targeted general offers. The second step is **to visit 30 companies** and asses their needs correlated to the ISIM offer. In order to raise the visibility of the institute in industry we **will organize seminars and workshops** in different regions (Iasi, Cluj-Napoca, Bucharest, Constanta, Brasov etc. one in each region) on the thematic of interest for the region, inviting companies from that region to participate.

Applying the scientific know-how of the institute in the frame of **direct contracts with companies** the technology transfer will take place by implementation of welding and testing technologies, welding and testing equipments, personnel training, certification of welders and NDT operators and certification of companies in accordance with the European standards and directories. This is a strong support for the companies in **raising their competitiveness in the international market competition**. The technology transfer activities in the next years **will be oriented at least for** welding technologies for special materials where the companies has no experience, inspection equipment for monitoring welding processes, ultrasound welding equipment and technologies, rest life evaluation of power plants and chemical plants, risk based inspection in the same field, implementation of the friction stir welding technology in automotive, anti corrosion surface protection by thermal spraying etc. Another way is to develop the **personnel training of specialists** in industry be transferring them the theoretical and practical experience of ISIM researchers. At least 400 specialists from industry were included in different training programs of ISIM.

In order to **attract non-public funds** the relation with industry will be intensified by marketing activities. To avoid the competition with other institutes and services companies it will be renewed the cooperation agreements in order to make in common different activities like non-destructive testing, metallographic replica examinations, rest life evaluation using the expert systems existing in ISIM, etc. Such kinds of co-operations were with ISCIR, TUV SUD, CNCIR, LUDAN, ISPE etc. The training activities are another source of non-public funds because the companies are interested to have qualified personnel in accordance with the European norms and Regulations to be able to make export in EU countries. The same think is valid for the certification of personnel, procedures and companies. ISIM will use his special position on the Romanian market for attract non-public funds through this type of activities.

## 8. Strategic partnership and visibility: events, communications, collaboration

- ISIM will organize every year **two traditional international conferences**, one in June and the second one in November.

The first ne **“Innovative Technologies for Joining Advanced Materials”** will invite authors from Germany, Romania, Serbia, Hungry, Spain and other countries. The participants will be from research institutes, universities and companies.

The second **conference “Structural Integrity of Welded Structures”** will be dedicated to material testing. We expect participants from Romania, Serbia, Hungry and Germany.

Participants were from institutes, universities and industry. Both conferences will include papers of interest for industry

The traditional conferences will be organized every year in order to ensure the dissemination of the own research results and to be informed about the last research activities in other institutes and universities. Every occasion will be used to invite known specialists from abroad to participate with papers at these scientific events.

- The institute will publish the **scientific journal BID-ISIM Welding & Material Testing** with 4 numbers/year in 150 copies; the journal is coded as B+ in the CNCSIS evaluation. **We will continue to publish** that journal involving the scientist from the editorial board **to make the peer review of all papers** send by the authors.
- In order to be visible the institute has an **internet page** [www.isim.ro](http://www.isim.ro) is and will be constantly updated. The internet page gives information about the research and development activity, project in progress of the institute, but also about personnel training activities, certification of persons and companies, material testing laboratory facilities and news from the institute. **The internet site of ISIM** will be reorganized in order to allow a better access to information about the research results and the actions in benefit of companies. The information will be better structured, long texts were eliminated and short and essential news introduced. For detailed information, if somebody needs it, links were made the connections. The reorganization of the internet site shell allow searching machines like Google to find easier the information about ISIM's competences and offers.
- In the next 4 years **we will support the publication** of the research results in ISI journals and the participation in international conferences of the ISIM researchers. As it foreseen in the scientific specific objectives a number of at least 80 papers will be published in important journals abroad and the participation at international conferences will be also intensified.
- The participation at international exhibitions and fairs will be supported so that the most important research results will be present making ISIM more visible on international level. Special attention will be **for patent exhibitions** like that organized every year in Geneva and at the Innovation Exhibition at TIB in Bucharest. This could be a good occasion the try to valorize the research results in form of patents.
- Cooperation with universities: A strong cooperation in research is foreseen with universities and other institutes. **The traditional cooperation partners in projects** (University Politehnica Timisoara, University Politehnica Bucharest, University of Craiova, University Dunarea de Jos Galati, University of Brasov, ICPE-CA Bucharest, IFT Iasi, ICMET Craiova, ICTCM Bucharest etc.) will be kept by preparing in common project application in national and international competition. **The participation in European FP7 Program** will be supported in cooperation with our partners from abroad: SLV Munich, IZFP Saarbrücken, Université de Bourgogne, Bay-Logi Miskolc, Institute Gosa Beograd, Institute of Material Testing in Beograd, Italian Welding Institute in Genoa, Institute of Welding in Wien, etc.

## GLOSSARY

AROTT	Romanian Association for Technology Transfer
ACM-V	Association for Multidisciplinary Research in the Western Part of Romania
ASRO	Standardization Association in Romania
CALIST	Funding programme of National Plan for Research, Development and Innovation - National Programme of Quality and Standards
CAPACITIES	Funding programme of National Plan for Research, Development and Innovation that relates to developing research capacity, by RDI system by opening the international scientific environment and connection to the national socio-economic
CEEX	Research Excellence Program
CENTA	Technology Transfer Centre of ISIM
CIP programmes	Competitiveness and Innovation Framework Programme
CNCSIS	National Council of Scientific Research in Higher Education
CNFPA	National Council for Adult Vocational Training
CNMP	National Centre for Programme Management
CORINT	Funding programme of National Plan for Research, Development and Innovation that relates to international cooperation and partnership
COST	Intergovernmental framework for European Cooperation in Science and Technology, allowing the coordination of nationally-funded research on a European level
CS	Scientific researcher
CSI	Scientific researcher with first degree
CSII	Scientific researcher with second degree
CSIII	Scientific researcher with third degree
EC	European Commission
EN	European <a href="#">standard</a>
EPO	European Patent Office
ERANET	European funding scheme created to step up the cooperation and coordination of research activities carried out at national or regional level in the Member States and Associated States
ETUF-TCL	European Trade Union Federation of Textiles, Clothing and Leather
EU	European Union
EU HORIZON 2020	Horizon 2020 is the financial instrument implementing the <a href="#">Innovation Union</a> , a <a href="#">Europe 2020</a>
EUREKA	European funding programme that supports the competitiveness of European companies through international collaboration and in creating links and networks for innovation
EUROSTARS	European Joint Programme dedicated to the R&D performing SMEs
FEDR	European Fund for Regional Development
FP7	Seventh Framework Programme
GDP	Gross domestic product
HG	Government decision
IDEAS	Funding programme of National Plan for Research, Development and Innovation that relates to obtaining scientific and technological results, consistent with those of Europe reflected by increasing visibility and international recognition of Romanian research
IIW	International Institute of Welding
IDT	Technological Development Engineer
INFRAS	Funding programme of National Plan for Research, Development and

INNOVATION	Innovation that relates to the consolidation of standardisation and quality infrastructures Funding programme of National Plan for Research, Development and Innovation that relates to increased capacity for innovation, technology development and uptake of research results into production, to improve the competitiveness of national economy and quality of life
ISO	International Organization for Standardization
INSME	International Network for Small and Medium Sized Entreprises
INTERREG IVC	European funding programme that supports Innovation & Environment Regions of Europe Sharing Solutions
ISPIM	International Society for Professional Innovation Management
IT	<a href="#">Information technology</a>
IZFP Saarbrücken	Fraunhofer Institute of Non-destructive Procedures Saarbrücken
MATNANTECH	Funding programme of National Plan for Research, Development and Innovation that relates to New Materials, Micro and Nanotechnologies
MECMA	Ministry of Economy, Trade and Business Environment
NUCLEU Programme	National Authority for Scientific Research programme
OHSAS	Occupational Health and Safety Advisory Standards
OSIM	State Office for Inventions and Trademarks
PARTNERSHIP	Funding programme of National Plan for Research, Development and Innovation that aims to create conditions for better cooperation between different entities of RDI, business and / or government units to address the problems identified
PhD	Doctor of science
PN	National plan
PNCDI	National Plan for Research, Development and Innovation
POSCCE	Sectoral Operational Programme Increase of Economic Competitiveness
POSDRU	Human Resources Development Operational Programme
R&D	Research and Development
RELANSIN	Funding programme of National Plan for Research, Development and Innovation that relates to Economic Recovery through Research and Innovation
RENAR	Accreditation Association Romania - National Accreditation Body
RO	Romania
SEE	South East Europe Transnational Cooperation Programme
SLV Munich	Welding and Training Institute Munich
SME	Small and medium-sized enterprises
SR	Romanian standard
T I	Technician first level
T II	Technician second level
TS	Technician
TT	Technological transfer
U	
UEFISCDI	Executive Unit for Financing Higher Education, Research, Development and Innovation