



**MINISTRY OF
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EDUCATION**



**NATIONAL INSTITUTE OF RESEARCH
AND DEVELOPMENT IN MECHATRONICS AND
MEASUREMENT TECHNIQUE**

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RESULTS OF RESEARCH • DEVELOPMENT • INNOVATION IN INCDMTM BUCHAREST

2013

VOL. XIX

To the attention of the:
• *Quality Manager*
• *Marketing Manager*
• *Technological
Transfer and
Innovation Manager*

Elaborated by INCDMTM – Bucharest, by:

- Strategy, Development, Marketing and Technological Transfer Division – CSDMTT;
- Relay Centre of Technological Transfer and Consultancy – CRTTC;
- Inter-Regional Centre of Innovation and Technology Transfer Chisinau –Iasi –Bucharest – CIITT;
- Industry Links Office – OLI;
- Evaluation and Training Centre for Mechatronics – CEF „MECATRON”;
- Business and Innovation School – SAI „MINATECH”;
- Bucharest - Ilfov Regional Mechatronics Cluster – ”MECHATREC”;
- Competitiveness Strategic Pole in Mechatronics, Integronics and Adaptronics "INDMECATRON".

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Edited with the support of Ministry of National Education

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INSTITUTE OVERVIEW

► The National Institute of Research and Development in Mechatronics and Measurement Technique – INCDMTM Bucharest has as main objectives:

- basic research
- industrial research
- technological development
- elaboration of development strategies for national and European Precision Mechanics Integrronics, Adaptronics, and Mechatronics industry;

► INCDMTM identifies with the following strengths:

- intelligent measurement technique, active, automatic and computerized control;
- equipments and integronic, adaptronic, mechatronic devices for multi-parameter integrated control;
- non-electric physical quantities control (pressure, temperature, mass, strength, time);
- innovative technologies;
- tribotechnology of cutting and micro-nano-cutting processes;
- intelligent mechatronic, integronic and adaptronic biomedical equipment;
- robotic, microrobotic and nanorobotic systems;
- methodologies, standards, testing and certification;
- links with industry;
- technology transfer;
- development and sustainability strategies;

► *INCDMTM participates in National and European RESEARCH-DEVELOPMENT-INNOVATION programs.*

The National Institute for Research & Development in Mechatronics and Measurement Technique (INCDMTM), is a quasi - governmental organization, established by the national law for promoting R&D activities. We, at INCDMTM, are mainly responsible with fundamental and industrial researches, technological developments, technical and economic regulations, with national or limited applicability, all these regarding the field of precision mechanics and MECHATRONICS, INTEGRONICS AND INTEGRONICS. INCDMTM takes part in working out national strategies for development, giving priority to achieving the scientifically and technological objectives included in National Programs.

► INCDMTM activities, according to NACE: 2571; 2573; 2652; 2813; 2824; 6201; 6311; 6312; 6399; 7021; 7112; 7120; 7211; 7320; 7410; 7490; 8230; 8299; 8541; 8559; 8560; 7811; 5812; 5814; 5819; 5829; 7219; 2651; 2660; 2670; 3250; 3320 include:

- ↳ basic research and development;
- ↳ applied research activities;



GENERAL MANAGER
Gh. Ion GHEORGHE
Univ. Professor PhD Eng.
Eurlng

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- ↪ information technology;
- ↪ manufacturing activities to support specific R&D;
- ↪ studies, strategies and analyses;
- ↪ technological transfer, results capitalization and managerial consulting;
- ↪ general and special training seminars;
- ↪ publishing specialized publications and ordering information;
- ↪ activities in tertiary education;
- ↪ joining activities;
- ↪ activities abroad;
- ↪ activities additional to R&D work;

► **Sub-fields covered:**

- ↪ intelligent measurement technique;
- ↪ systems for measuring non-electrical dimensions and specific technologies for precision mechanics, mechatronics, integronics and adaptronics;
- ↪ MEMS and NEMS;
- ↪ instruments for laboratories and research, special biomedical and environment equipment;
- ↪ quality engineering, assurance and certifying;
- ↪ strategy development, marketing and technological transfer.

► **Our main achievements grouped according the aforementioned activity sub-fields:**

- ***Methods, technologies, measuring and control instruments for assessing quality characteristics through different proceedings, according to measuring techniques:***
 - a) **dimensional control integrated with manufacturing process - in process control, automated and numerical control for:**
 - automotive industry;
 - bearings industry;
 - injection pumps industry;
 - b) **out of process dimensional control for:**
 - FMCG industries;
 - motors industry;
 - c) **control technologies and measuring equipment using laser interferometers, inductive and photoelectric sensors and transducers;**
 - d) **MECHATRONIC, INTEGRONIC AND ADAPTRONIC equipment and installations for multidimensional control, using a high degree of automation and numerical data processing;**
- ***Concepts and methods for improving competitiveness, reliability and capability in industrial processes; new materials, along with appropriate technologies for using them in mechatronics, integronics and adaptronics:***
 - a) **control of non-electrical sizes - pressure, temperature, mass, force, time;**
 - b) **technologies, carbide tools, diamond tools, posts for tools;**
 - c) **equipment for specific testing and investigation methods and procedures;**
 - d) **adapting and applying new technologies and micro-nano-technologies for rationalization and optimization in industrial processes, for cutting costs and consumption, and raising productivity;**
 - e) **building and developing seismic stations;**

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- f) surveillance active/passive mechatronic, integronic and adaptronic systems for normal wear and catastrophic tools;
- g) tribotechnological characterization of cutting and micro-cutting processes (grinding, turning, super-equalling) with tools with the active part made up of hard materials
- **Methods, procedures and instruments for evaluation of trends, prognoses and strategies for the industry of precision mechanics, mechatronics, integronics and adaptronics:**
 - a) strategies for restructuring and development the precision mechanics, integronic, adaptronic, and mechatronic industry;
 - b) strategies for approaching and integrating the precision mechanics, integronic, adaptronic, and mechatronic industry to EU market.
- **Technological transfer, result capitalization and consulting, offered to manufacturing companies and consumers in the industry:**
 - a) control technology for gears parameters;
 - b) control technology for the main parts of the motors with internal combustion;
 - c) manufacturing technologies for blanks from sintered metal carbides and diamonds;
 - d) equipment for gears profile and lead.

► **Other data:**

- Year of establishing: 1971
- Number of employees: 168 (18 PhD Engs, 5 PhD students)
- Collaborators: - over 40 R&D Romanian institutions operating in different fields of knowledge and industry; polytechnic and specialized universities in Brasov, Cluj, Bucuresti, Timisoara, etc.
- Endowment: suitable to accomplished activities
- INCDMTM is registered in the Registry of Commerce
- ✓ Member of:
 - Romanian Chamber of Commerce and Industry, Bucharest
 - General Engineers' Association in Romania
 - Romanian Society of Mechatronics
 - Association of the Romanian Patronage in Precision Mechanics, Optics and Mechatronics Industry
 - Professional Association of Precision Mechanics and Optics from Romania
- ✓ Tutelary Forum:
 - Ministry of Economy, Commerce and Business Environment;
 - Ministry of Education, Research and Innovation;
 - National Authority for Scientific Research
- **In 2013, INCDMTM has been the subject of an international evaluation process (between September 12-13), and received the highest rank A+.**

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CODIFICATION OF PRODUCTS ACCORDING TO NACE ARRANGEMENT OF ACTIVITIES IN THE NATIONAL ECONOMY

- ✓ **Metallic construction and metal products industry:** **NACE 257**
- ✓ **Cutting tools and products:** **NACE 2571**
- ✓ **Hand Tools:** **NACE 2573**
- ✓ **Machinery and medical instruments, precision, optical and watch making:** **NACE 265;266;266;
267;325;3320**
- ✓ **Machinery and medical instruments:** **NACE 2660; 3250**
- ✓ **Machinery and tools of measurement, verification and control:** **NACE 2651**
- ✓ **Measurement, regulating and controlling equipments:** **NACE 8320**
- ✓ **Optical and photographic devices:** **NACE 2670**
- ✓ **Clocks and clock mechanisms industry:** **NACE 2652**



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THE DIVISION OF RESEARCH AND DEVELOPMENT FOR INTELLIGENT MEASURING MECHATRONICS

offers

**Professional solutions and services
of excellence**

The INCDMTM proposal – through the DIVISION OF RESEARCH AND DEVELOPMENT FOR INTELLIGENT MEASURING MECHATRONICS -comprises a wide palette of computer-aided intelligent complex measuring and integrated control equipments.

The DIVISION OF RESEARCH AND DEVELOPMENT FOR INTELLIGENT MEASURING MECHATRONICS, oriented on producing and developing mechatronic measuring means and techniques is prepared to help clients efficiently with the view to obtaining a quality production and to transform production in a intelligent production processes.

The DIVISION OF RESEARCH AND DEVELOPMENT FOR INTELLIGENT MEASURING MECHATRONICS also offers service; this facility includes:

- Putting into operation;
- Training;
- Warranty;
- Service;
- Maintenance and product remedy contracts.



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NACE 265;267;332;

- ✓ **Intelligent Measuring, Testing and Control
Devices and Tools;** ◀ **NACE 2651** ▶
- ✓ **Mechatronic, Integronic and Adaptronic
Measuring, Arrangement and Control
Devices for industrial processes;** ◀ **NACE 3320** ▶
- ✓ **Optical and Photographical Devices;** ◀ **NACE 2670** ▶
- ✓ **Watches and timing mechanisms** ◀ **NACE 2652** ▶



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COMPLEX CONTROL FOR BORES ON GEAR CASING JH3

PRODUCT OVERVIEW

The devices are made from electronic and pneumatic gauges for verifying the bores on Gear Casing JH3.



Pictures from the production line

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TECHNICAL FEATURES

- Electrical supply: 220 V ac /50 Hz;
- Pressure supply: 5 bar;
- Measuring time: maximum 10 sec. per every hole of the part;
- Display resolution: 0,001 mm;
- Electronic gauge with inductive transducers: for 9 diameters;
- Pneumatic gauge: for 6 diameters;
- Pneumatic-electronic transducers: TPE99/1;
- Filter regulator: FESTO
- Industrial processor : CMZ 200 ETAMIC Station;
- Mechanical device-Station's interface: SATELIT ETAMIC;
- Operating system: Windows2000;
- Measuring software: INCDMTM Bucharest;

APPLICABILITY: Pneumatic and electronic measurements for bore's diameters of the gear casing JH3.

TECHNOLOGY TRANSFER: JH3 Gear Casing production line

BENEFICIARY: S.C. Automobile Dacia Group Renault S.A. Mioveni, Argeş, Romania.

FURTHER INFORMATION: Mihai Hacman : laborator_tm1@yahoo.com

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ASSEMBLY FOR CRANKSHAFT CONTROL H4x OP.200-210



PRODUCT OVERVIEW

The devices are made for verifying the dimensions and specified criterions for the piece Crankshaft H4x series, by the beneficiary's demands:

- pressing diameter for pinion gear;
- tapering;
- centered/aligning diameter for flywheel;
- plate diameter;
- position to the bearing no.2 (flywheel) to flywheel front;

TECHNICAL FEATURES

- Electrical supply (for CMZ200 ETAMIC): 220 V ac /50 Hz;
- Pressure supply: 5 bar;
- Measuring time: maximum 10 sec. per every piece;
- Display resolution: 0,001 mm;
- Measurement elements with inductive transducers: pneumatically actuated;
- Industrial processor : CMZ 200 ETAMIC Station;
- Mechanical device-Station's interface: SATELIT ETAMIC;
- Operating system: Windows2000;
- Measuring software: INCDMTM Bucharest;

APPLICABILITY:

Pneumatic measurement for diameters and specified criterion for the H4x-crankshaft's production line.

TECHNOLOGY TRANSFER

- H4x-crankshaft's production line

BENEFICIARY:

S.C. Automobile Dacia Group Renault S.A. Mioveni, Argeş, Romania.

FURTHER INFORMATION: Mihai Hacman : laborator_tm1@yahoo.com

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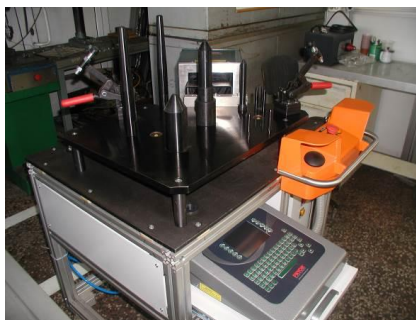
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MECHATRONIC INTELLIGENT EQUIPMENT FOR VERIFYING CROSS-OUT HOLES ON CLUTCH CASING & DIFFERENTIAL GEAR BOX



PRODUCT OVERVIEW

The equipment is designed for verifying the existence of the cross-out holes in the auto-part “Clutch Casing and Differential Gear Box” – H5 TL8, and the scratch-out marking for the burden casting (with three digits).

- The position of the holes : with pins;
- Detection correct position of the holes: with three inductive proximity sensors;
- Marking command: bi-manual;
- Automatic marking good parts: Pryor device (scratch-out);
- Piece clamping: with toggle clamps;
- Automation box: command and signals management; operator protection; proper operation signalization;
- Operating panel: for commands.

TECHNICAL FEATURES

- electrical supply : 230V ; 50Hz ;
- input (without marker) : 500VA
- charging voltage : 24V cc;
- pressure supply : 4 bar ;
- overall size : 800x700x1850 [mm] ;
- engineering shop temperature : 18-38C ;
- relative humidity : 40-70% ;
- engineering shop brightness : 250-260 lux

APPLICABILITY

The equipment verifies the existence of the cross-out holes in the engine part “Clutch Casing & Differential Gear Box” type H5 TL8.

TECHNOLOGY TRANSFER

The product is put into service in the production line “Clutch Casing & Differential Gear Box” type H5 TL8.

BENEFICIARY

S.C. Automobile DACIA Groupe Renault S.A

FURTHER INFORMATION: Mihai Hacman: laborator_tm1@yahoo.com

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MECHATRONIC INTELLIGENT UNIT FOR TIGHTNESS CHECKING AIR INTAKE / LIQUID GAS (GPL) DISTRIBUTOR-ENGINE K7M828



PRODUCT OVERVIEW

The unit is manual and is designed for verifying the tightness of the air intake / GPL distributor for engine K7M828.

For tightness the piece are necessary 8 air seals and the base plate.

TECHNICAL FEATURES

- ✦ overall size : 785 x 1000 x 750 [mm];
- ✦ number of tightness surfaces: 18;
- ✦ electric supply: 220V; 50 Hz;
- ✦ pressure supply: min 5 bar;
- ✦ tightness test: ATEQ cell F520;
- ✦ work pressure: 4,5 bar;
- ✦ test pressure: 1 bar;
- ✦ admissible air loss: 15 cm³/min.

APPLICABILITY

The machine verifies manually the tightness of the distributor for air intake / liquid gas for K7M828.

TECHNOLOGY TRANSFER

The product is put into service in the production line for K7M828 engine.

BENEFICIARY: S.C. Automobile DACIA Groupe Renault S.A

FURTHER INFORMATION: Mihai Hacman: laborator_tm1@yahoo.com

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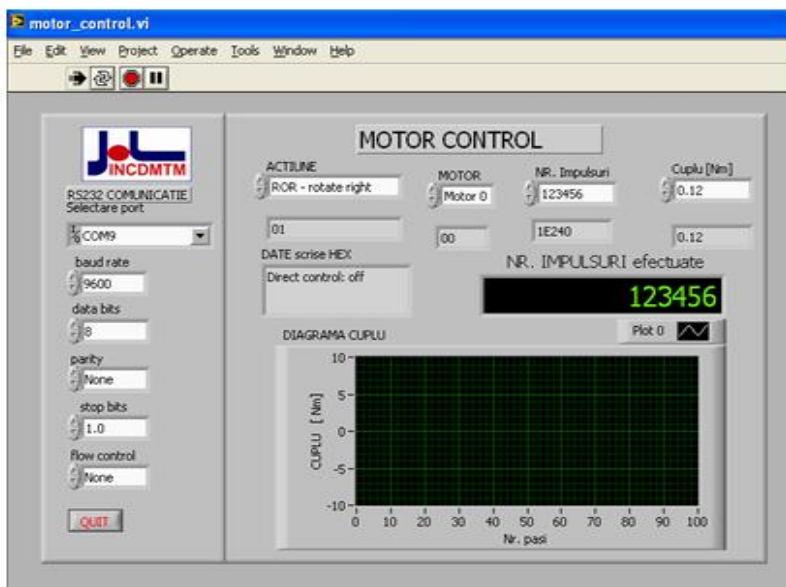
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STEPPER MOTOR MECHATRONIC SYSTEM - GEAR DRIVE



PRODUCT OVERVIEW

The system, based on a modern method which involve the use of specific sensors, specialized software with PC interfaces, mathematical modeling, allowing the optimizing of parameters of mechatronic systems type stepper motor driving - gear transmission and interdependence between them: optimal and critical control frequencies, critical and optimal inertia moments.

The system is made up of 3 individual components :

- 10 stands with gear transmissions from different materials
- Block electronic control stepper motors and pre-ordered number of pulses
- Specialized software interfaces with PC and mathematical model

TECHNICAL FEATURES

For gears :

- Modules used : 0.4; 0.5; 0.6; 0.8; 1.0 mm
- Gear report range : $i = 40 \div 400$
- Materials used : stainless steel for pinions; brass and plastic for gears
- Possibility to obtain different inertia moments and total different total reports for gear transmission

For stepper motor and electronic control unit:

- Positioning precision : $\pm 5\%$ of angular pace

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- Command impulses frequency : variable, to obtain different speeds of the stepper motor shaft
- PC display : frequency and number of impulses

APPLICABILITY

Stepper motor mechatronic systems – gear drive – are used in applications that require precise and controlled movement, due to the following advantages:

- Functioning in closed loop
- Univocity of the conversion of number of command impulses and incremental angular and linear displacement
- Numerical command compatibility
- High positioning precision
- They allow starts, stops, and exchanging of displacement direction without pace loss
- Easy integration in complex systems

Having a high lifecycle, the following applications are used :

- Medical devices
- Devices for recording physical quantities
- Displacements and positioning of optical systems
- 2D and 3D coordination positioning tables
- Devices for orientation and positioning in robotics
- Parts of military driving applications

TECHNOLOGY TRANSFER

Results of research:

- The compendium of parameter optimization of the mechatronic systems with stepper motors - gear transmissions - shall be transferred to specialized businesses
- Papers in specialized journals
- Presentation CD

BENEFICIARY

Dedicated SMEs the presented areas.

FURTHER INFORMATION

INCDMTM can grant technical consultancy and assistance in the realization of products with embedded mechatronic systems with stepper motor – gear drive.

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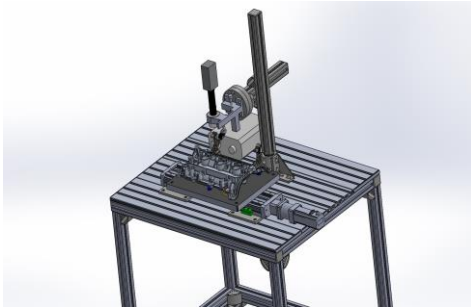


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VISION-BASED MECHATRONIC SYSTEM FOR THE INSPECTION OF THE AUTOMOTIVE PARTS



PRODUCT OVERVIEW

In industrial production systems, vision inspection is increasingly taking the place of quality control using the human eye. The key advantages of image processing are reliability and consistently high inspection speeds, even for complex inspection tasks.

A vision-based mechatronic system can be integrated as top product in the activities of control and inspection of parts, sub-assemblies and products in the final stage of assembly.

The vision-based mechatronic systems has been designed as a modular system intended to assist the human operator in an assembling post on a production line characterized by : parts moving at a high rate, high diversity of parts to be assembled, high similarity between versions of the parts to be assembled, frequent changes of manufacturing series.

Practically, in the same assembling workstation, the human operator has to perform similar operations which involve different subsets for different versions of the manufactured product. Because of high rate and similarity of versions, error probability is very high, the operator may misplace a subset, which may prove inappropriate. Usually, the error is detected much later on the manufacturing line, or even during a later stage, which requires removing the product from the line, disassembling it, recalibrating and adjusting it and so on, with major consequences on manufacturing costs.

TECHNICAL FEATURES

- vision sensor choice: from low-cost smart sensors to high-performance camera
- flexibility - the possibility to choose between 'off the shelf' or 'customised' solutions
- easy integration with other devices through DI/O ports, Ethernet or serial interface - to connect to programmable logic controller (PLC), robot controller
- locating features, presence checking, morphological features
- image enhancing
- ease of use software , friendly interface

APPLICABILITY

The figure illustrates an application for controlling a motor shell on an automotive production line.

A high resolutions video camera is used to verify the morph-dimensional items on a motor shell. In this case, the processing software provides pass or fail verdicts and some dimensional results on the inspected part.

BENEFICIARY : Automotive parts manufacturers, car assemblers, etc.

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VERIFICATION DEVICE FOR FORCE CHECKING ON THE POINT MACHINES ELECTROMECHANISMS WITH DYNAMOMETER BOLT



PRODUCT OVERVIEW

The device is intended to check the forces that arise in the shift way of the point machine, in the articulation point of the handle bar from the kinematic chain of the electro mechanism.

The device can check:

- Force required for actuating the switch in both directions;
- Maximum force developed by the electro mechanism switch;
- Calibration forces of the point switch;
- Force trailing the switch

Components: elastic bolt, attachment device, electronic digital comparator and computer (not a part of the device). The transducer used for measurement is an elastic bolt that is inserted into kinematic chain of the point machine instead of the connection pin of the handle bar and electro mechanism, the device is providing the blocking in measurement position; the elastic deformation of elastic bolt is directly proportional with the amount of action force size. Displacement is measured with an electronic digital comparator directly or by foot pedal and directed to a computer equipped with specific data acquisition software.

TECHNICAL FEATURES:

- Maximum force measured 600 daN;
- Maximum overload without irreversible deformation of the bolt dynamometer: 200 daN;
- Operating class: 1, temperature range: -15°- + 40°C;
- Maximum drive frequency: 1 drive / minute;
- Measurement accuracy: $\pm 5\%$.

APPLICABILITY:

The product is intended for force control and force checking at electro mechanisms of the point machines in order to ensure maintenance and safety rail raceway.

TECHNOLOGY TRANSFER : SC. SPIACT SA. Craiova

BENEFICIARY : SC. SPIACT SA. Craiova

FURTHER INFORMATION:

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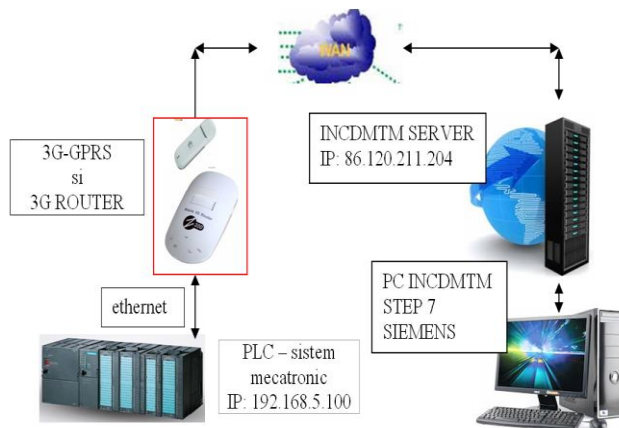
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EQUIPMENT FOR PREDICTIVE TELEMENTENCE AND TELESERVICE BASED SYSTEMS TO CONTROL REMOTE COMPLEX MECHATRONIC SYSTEM CONTRACT NR. 5N / 2009, A.AD. NR. 1/2012; PROGRAM: NUCLEU



PRODUCT OVERVIEW

The Internet provides a low cost way to connect a computer anywhere in the world. Any computer that can connect to a local Internet Service Provider (ISP) can communicate with any other industrial equipment with access to the Internet. With the Internet proliferation, more and more facilities have to remote monitoring and telementence control [2]. This came with the introduction of the networking administration and protocols. The use of these technologies for Predictive Maintenance professionals can be critical to the success of the program at an industrial plant.

To achieve secure connections over the Internet between the user and the machine, INCDMTM has developed a smart Web-based remote access technologies.

APPLICABILITY

Predictive maintenance tends to include direct measurement and interactions of the item. Example, mechatronic system for the measuring of the dimensional parameters while Preventive Maintenance includes the periodical evaluation of the transducers and calibration status. The manufacturing company is telling you that the life span of the transducers is 2 years and calibration procedure must be initiated every 7 days. So just before expiring 3 years you have decided to replace the transducers with a new and scheduled for maintenance every days for calibration [1]. This is called Preventive Maintenance. Business developments also led to the development of the maintenance technique. The beneficiaries organize the maintenance activities are aspects of location of the company, field of activity, characteristics of the means of production, etc. Systemic approach involves considering the following types of maintenance organization, which according to the resources and objectives are designed to ensure optimal availability of technical systems, see the figure 1:

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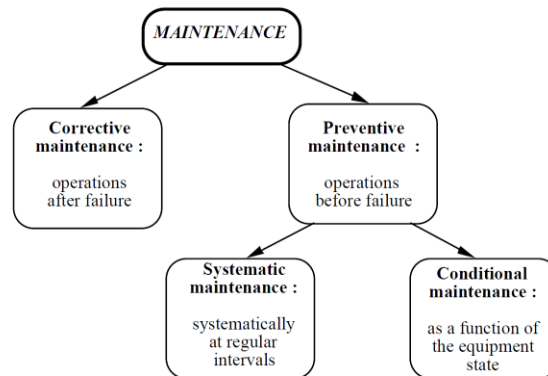


Figure 1- Systemic approach of maintenance [4]

TECHNOLOGY TRANSFER COMPLEX MECHATRONIC SYSTEM FOR MEASURING REVERSE MODULE ON AUTOMOTIVE INDUSTRY

The current project use GPRS technology for communications.

The first advantage of GPRS communication is its price of remote assistance, which is based on the volume of data transmitted. In practice, there are some overhead costs because it is necessary to send “keep alive” data periodically in order to keep the remote monitoring active. The number of keep-alive transmission cycles should be kept small. Accordingly, INCDMTM provides a smart text-messaging for the wake-up mechanism that allows the connection to be closed.

A second advantage is that in some countries GPRS communication networks are much better developed than PSTN networks. With GPRS communication, remote maintenance or “inaccessible” applications is thus more convenient than with landline communication. In addition, the bandwidth of UMTS, HSDPA or HSUPA is comparable to the bandwidth of wired DSL.

Finally, Using two GPRS module and change of web server application with custom INCDMTM monitoring software application guarantees machine builders and system integrators access to remote sites even when the IP addresses are not public or there is a firewall that blocks all incoming communication with SIEMENS PLC [3].

The transfer work refers to the modernization of existing complex measurement systems (see figure 2) in order to add functions and maintenance remote monitoring. Complex measurement system performs dimensional inspection and marking function for one subassembly of an automotive system.

The project proposes to examine existing technologies already implemented in the system and research aimed at identifying progress in the field, internationally and at home, and trends manifested in the design, evaluation and implementation of an annex for monitoring and remote control.

General block diagram of the equipment is shown in the following figure and it shows where the main functional modules and their relationship for a general characterization of how the achievement of key functions is done.

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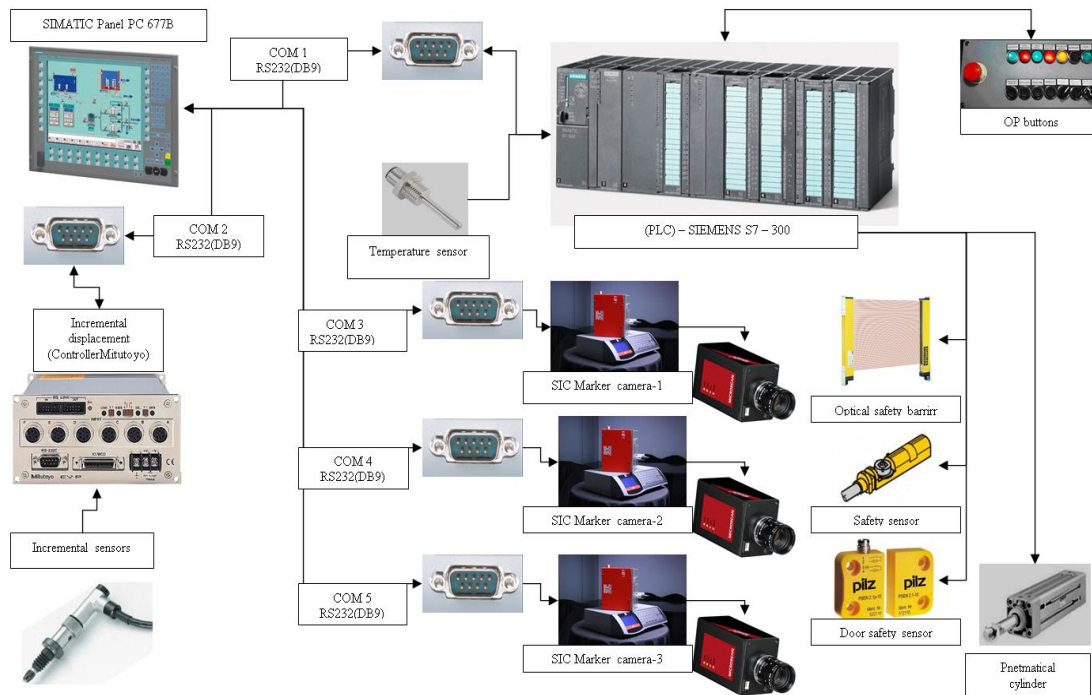


Figure 2 - The bloc diagram of the mechatronic system

Currently the telemaintenance systems are being developed and progressively installed on industrial sites. They are particularly interesting in the fields constituting some risks for the human beings, those fields where human intervention and/or the production stops are very expensive.

Many operational systems are also found in "intelligent" mechatronic systems and in large remote telecontrolling mechatronic systems.

According to the competence and/or to the function of the operator at the production site, he may also have access to certain functions of the telemaintenance computing system, and may collaborate with the expert by telephone and a console (Figure 6.1). This last case is the subject of research. The operator who is on the production site is likely to perform some maintenance actions on the machine following expert instructions. Nevertheless, for certain repairs, the expert will probably need to go to the production site, or to send a specialist. It is obvious that the telemaintenance system is integrated into man-machine system in which the characteristics and the tasks of the telemaintenance expert will have a direct influence on the successfully result of the project concerning the telemaintenance system design. The designer of such telemaintenance systems will need to consider such notions.

BENEFICIARY:RENAULT – DACIA S.A. – Mioveni, jud. Arges, Romania

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INTELLIGENT MECHATRONIC UNIT FOR TIGHTNESS CONTROL OF CARTER CYLINDER ASSEMBLED (SEMELLE) MACHINED TYPE H4Bt49 & H4Bt SULEV



PRODUCT OVERVIEW

The testing unit is a complex, mono-block construction use in checking tightness of the pieces type Carter Cylinder Assembled. All the moving subassemblies are operated by pneumatic cylinders assisted by a lot of proximities sensors. The piece is tightening on all sides, including the tilt one.

The ATEQ-cell is provided with 2 circuits and realizes the measurement cycle after the fixation and tightening the piece.

TECHNICAL FEATURES

- electrical supply: 220 V ac/50 Hz;
- pressure supply: min. 6 bar;
- work pressure: 4,5 bar;
- tightness test pressure: 1 bar;
- admissible air loss:
 - 12 cm³ /min on Low-Pressure circuit;
 - 25 cm³/min on High-Pressure circuit ;
- work time / tour: ~ 83 sec/piece.
- tightness test: ATEQ F570 – 2 circuits cell;
- Automat: Siemens;
- operating panel: OP77;
- operating system: WINCC for OP77;

APPLICABILITY

The unit verifies the tightness of the engine part – “Carter Cylinder Assembled” (machined), designed for H4Bt49° AND h4Bt Sulev types.

TECHNOLOGY TRANSFER

The product is put into service at S.C. Automobile Dacia Groupe Renault S.A. - Pitești

BENEFICIARY : SC Automobile DACIA Group Renault SA Mioveni

FURTHER INFORMATION: Mihai Hacman; e-mail: laborator_tm1@yahoo.com

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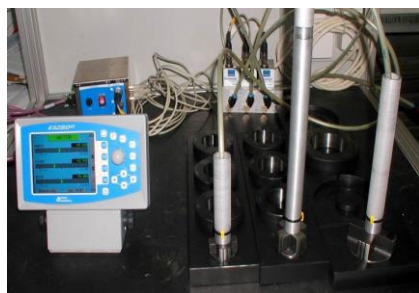
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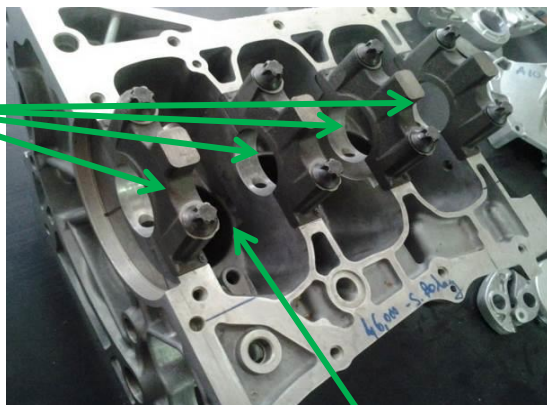
HOLES MEASURING SYSTEM WITH PNEUMATIC GAUGES AND INDUSTRIAL PROCESSOR ESZ800 ETAMIC FOR BLOCK ENGINE



PRODUCT OVERVIEW

The system is made by three pneumatic gauges for measuring three types of diameters from the block engine: bearings crankshaft, rods-crankpins and cylinders. The control is necessary for mating parts.

Diameters:
 $\varnothing 51,943$
(bearings
crankshaft)



Diameters:
 $\varnothing 76,006$
(cylinders)



Diameters:
 $\varnothing 47,619$
(rods /crankpins)

TECHNICAL FEATURES

- Electrical supply: 220 V ac /50 Hz;
- Pressure supply: 5 bar;
- Measuring time: maximum 10 sec. per every hole of the part;
- Display resolution: 0,001 mm;
- Pneumatic-electronic transducers: TPE99/1;
- Filter regulator: FESTO
- Industrial processor : CMZ 800 ETAMIC Station;
- Mechanical device-Station's interface: SATELIT ETAMIC;
- Operating system: WinCC;

APPLICABILITY:

Pneumatic measurements for the control of the assembly "block-engine"- "rods"- "crankshaft".

TECHNOLOGY TRANSFER : Control of the assembly block engine at RTR.

BENEFICIARY: RTR-Renault Technologie Roumanie, Titu, Dambovită, Romania.

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MECHATRONIC INTELLIGENT MACHINE FOR TIGHTNESS CHECKING (under vacuum) GEAR CASING JH3-MACHINED



PRODUCT OVERVIEW

The machine is designed for verifying the tightness of the part: JH3-Gear Casing, under vacuum.

Operation mode:

- The machine has an automatic work cycle;
- The intelligent measuring program is setting for the testing piece;
- The piece is set inside the machine, on the tightening plate;
- On press the START-Button;

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- The piece is fixed on plate with the toggle-clamps;
- The carriage move the piece in the testing position;
- The pressure subassemblies push the piece on the tightening plate;
- The tapered and clamping subassemblies pressurize the bores of the piece;
- The ATEQ-cell introduces air in the obtained cavity of the piece (0,2 bar);
- The machine verifies the air loss (admissible air loss less than 0,15cm³ /s);
- If the piece is good it's automatically marked;
- The machine is protected with immaterial barriers against the intruders over the function, in the work space.

TECHNICAL FEATURES

- electrical supply: 220 V ac/50 Hz;
- pressure supply: 6 bar;
- work pressure: 5 bar;
- tightness test pressure: -0,5 bar;
- admissible air loss: 25 cm³ /min;
- accuracy: $\pm 0,02$ cm³ /s;
- tightness test: ATEQ F510 cell;
- automat: Siemens;
- operating panel: OP77;
- operating system: WINCC for OP77
- work time/tour: ~ 40 sec/piece (time-log conformity)

APPLICABILITY

The machine verifies the tightness of the machined pieces (duralumin) Gear Casing type JH3 using vacuum.

TECHNOLOGY TRANSFER

The product is put into service in the production line for gear casing type JH3.

BENEFICIARY

S.C. Automobile DACIA Groupe Renault S.A

FURTHER INFORMATION:

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CONTROL DEVICES FOR DIMENSIONS AND SPECIFIED CRITERIONS PIECE: FLYWHEEL ASSY-ENG. H4 / H5



PRODUCT OVERVIEW

The devices are made for verifying the dimensions and specified criterions for the FlyWheel Assy-Eng. H4 / H5.

TECHNICAL FEATURES

- specific to each operation and condition checked.

APPLICABILITY: The complex devices measure dimensions and conditions of flywheel type H4/H5.

TECHNOLOGY TRANSFER

The devices are put into services on the production line for FlyWheel Assy_eng. H4/H5.

BENEFICIARY: SC Automobile Dacia SA Mioveni.

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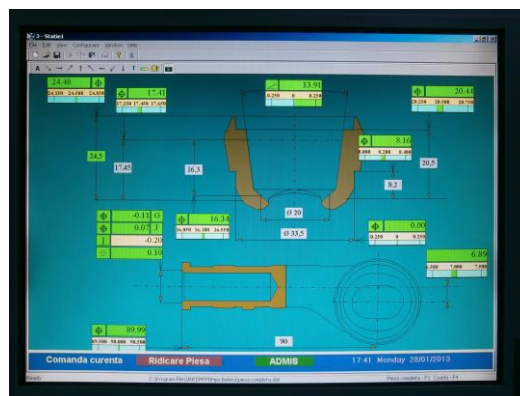
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INTELLIGENT EQUIPMENT FOR MULTIPARAMETRIC MEASUREMENT OF LEFT/RIGHT OUTER BALL JOINT



PRODUCT OVERVIEW

This equipment is designed to accurately dimensional control the left/right outer ball joint. It allows measurement of linear dimensions, angular dimensions, position deviations. The measurements are done with inductive transducers. Data are processed, stored, statistically analyzed and displayed on an industrial computer.

TECHNICAL FEATURES

- Operated mode: manual and automatic.
- Digital display
- Resolution: 0,001 mm
- Flexible construction that allows measurement of both types of outer ball joint (left and right)
- Pneumatic and electric drive
- Judgment criteria: validation/ invalidation part

APPLICABILITY

Automotive industry, for outer ball joint measurement

TECHNOLOGY TRANSFER

The product is put into service on S.C. Componente Auto SA Topoloveni, from 2013.

BENEFICIARY: Automotive industry

FURTHER INFORMATION: Phd. Eng. Aurel ABALARU, e-mail aurel.abalaru@gmail.com

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DEVICE FOR MEASUREMENT THE SYMMETRY OF THE THREADED HOLES RELATED TO THE RIBS OF THE AUTO DRUMS



PRODUCT OVERVIEW

This equipment is designed to accurately measure the symmetry of the threaded holes related to the ribs of the auto drums. The measurement can be done with digital indicator or inductive transducer and Etamic industrial computer.

TECHNICAL FEATURES

- Manual measurement mode
- Digital display
- Resolution: 0,01 mm
- Flexible construction that allows measurement of all types of drums

APPLICABILITY

Automotive industry, for drums measurement

TECHNOLOGY TRANSFER

The product is put into service on S.C. Automobile Dacia Groupe Renault S.A., from 2013.

BENEFICIARY: Automotive industry

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MECHATRONIC EQUIPMENT FOR GEOMETRICAL CONTROL AND MARKING OF BRAKE DRUM

PRODUCT OVERVIEW

The mechatronic equipment consist of a rotary table for part, movable and stable measuring elements, an industrial PC and a customised software and an ink-jet printer. It allows combined internal and external measurements of the brake drums. The following geometrical sizes are measured:

- Out of roundness of braking track in three sections;
- Radial run-out of braking track in three sections;
- Flatness and perpendicularity of the drum rim with the bearing diameter;
- Concentricity of rim diameter with ABS diameter
- Perpendicularity ABS face and concentricity ABS diameter with the bearing diameter;

Customized software provides display and analysis of dynamic measurements and statistical analysis.



TECHNICAL FEATURES

- Measurement accuracy: ± 0.002 mm
- Measuring resolution: 0.001 mm
- Ink-jet marking of good part;
- electrical supply : 230V ; 50Hz ;
- pressure supply : 4-6 bar ;
- engineering shop temperature : 18-38C; relative humidity : 40-70%;
- overall size : 1100x750x185 [mm] ;

APPLICABILITY : Dacia-Renault Group

TECHNOLOGY TRANSFER: The equipment is integrated into drum production line.

BENEFICIARY: Dacia Group Renault

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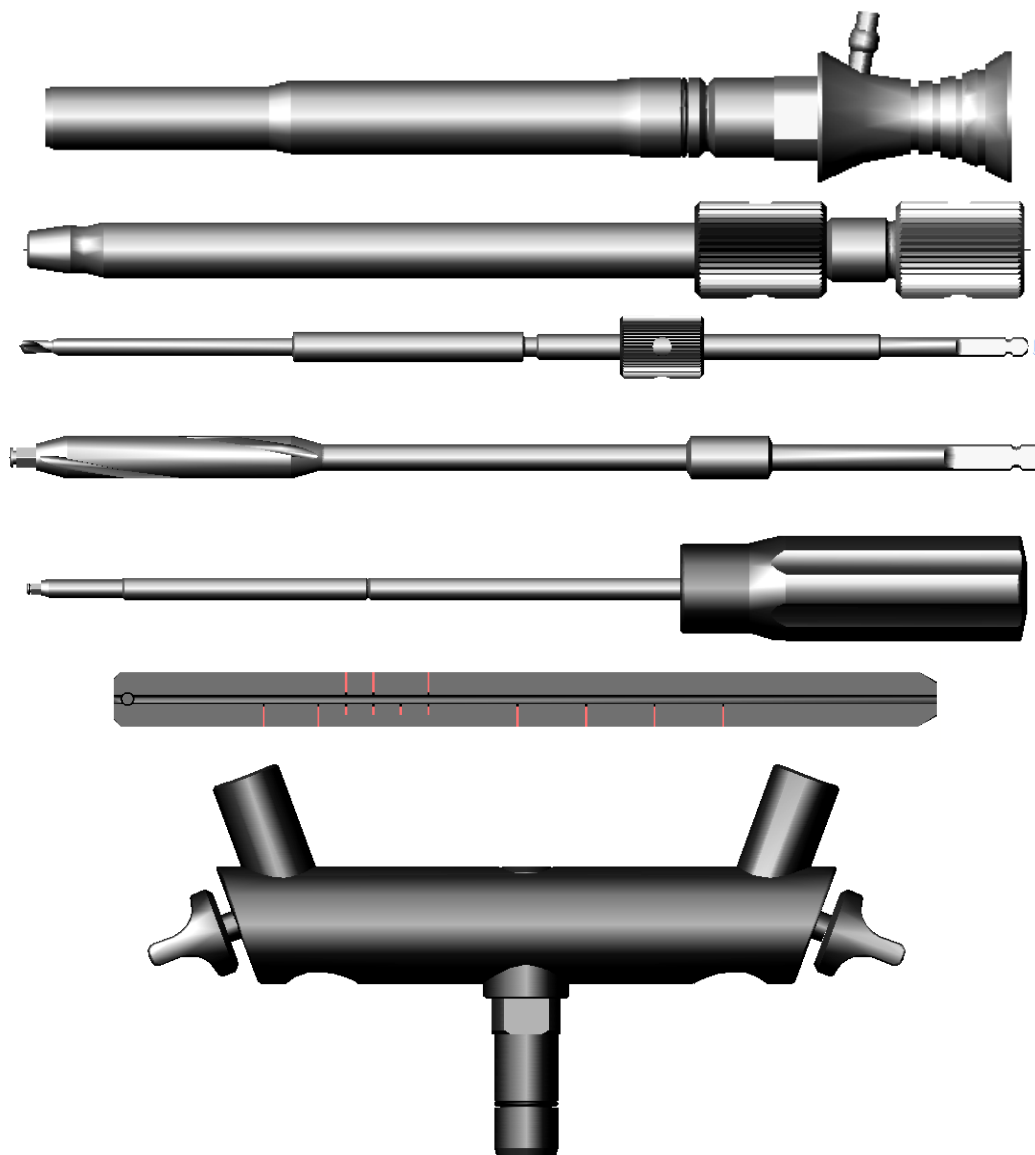
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INNOVATIVE INSTRUMENTS FOR MINIMALLY INVASIVE SURGERY IN FEMUR FRACTURE REDUCTION

This work was supported by a grant of the Romanian National Authority for Scientific Research, CNDI – UEFISCDI, project number „PN-II-IN-CI-2012-1-0347”



PRODUCT OVERVIEW

The proposed instruments help the surgeon to perform the drills, insert the screws and Kirchner guiding wires for bone fragments fixation using implant plates and minimally invasive technique. The toolkit includes: cutting tools (self centering drills, cylindrical drills, taps, cutting

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rods), guiding and alignment tools, measuring tools (rulers, angular measuring device, spacers), fixing tools (wrenches and adapters).

The instruments facilitates fixation of different implants produced by renowned companies so that they correspond to the anatomical landmarks required to obtain proper functionality. The innovative aspect of the project is based on developing of a set of tools to allow one- hand operation and achieve precise position, orientation and fixation of the implant plates, inserting Kirschner wires and realization of incisions, bone drilling and tightening screws. The guiding device can be used in orthopedic surgery, under X-ray visualization, for precise positioning of the trocar and of the drills. The precise positioning is needed to drill the holes in bone for insertion of dedicated cortical screws which will fix the implanted plate in intramedullary canal of the fractured bone.

TECHNICAL FEATURES

The set contain all necessary instruments for positioning and fixing of the plates implant using minimal invasive techniques in femoral fractures.

APPLICABILITY

The instruments are used in clinics for orthopaedy and traumatology.

TECHNOLOGY TRANSFER

The technical documentation is transferred to a small manufacturing unit SC CARMESIN SA which will manufacture and commercialize the products.

The product will contribute to improve the performances of medical act and to develop and improve quality of life. Making these devices increases quality of health care, reduces patient risks of diseases and may increase total turnover of the producer.

BENEFICIARY

- SC CARMESIN SA;
- Is intended for endowing the orthopedic clinics and emergency hospitals.

FURTHER INFORMATION

PhD.eng. Stanca COMSA e-mail: stanca_comsa@yahoo.com



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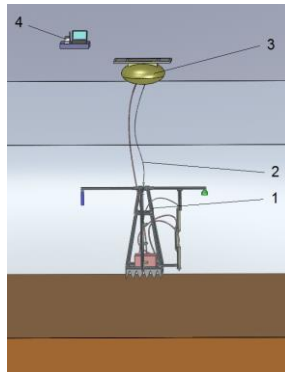
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ULTRASONIC MEASURING SYSTEM FOR DEPOSITION OF SEDIMENTS IN RESERVOIRS - SEDCONTROL

PRODUCT OVERVIEW



SEDCONTROL system



Floating module

The silting process affects the useful volume of the reservoirs, with important economic implications. The bathymetric maps of dam lakes are drawn measuring the water depth in x-y coordinates and show the dynamics of the silting process if they are updated periodically, but the accuracy of these determinations is related to the precision of the x-y coordinates. For a more accurate assessment of the deposition process, the SEDCONTROL system takes measurements in fixed points. It contains sensors of distance, turbidity, pressure, temperature and optional an array of ultrasonic sensors to detect the presence or absence of sediment. Also, it can be used as a mobile system.

TECHNICAL FEATURES

SYSTEM:

- Operating depth: 30 m
- Wireless range: 1 km

TURBIDITY SENSOR:

- Sediment range: Sensitive to grain sizes of less than 1 μm ;
- Frequencies: Up to 4 frequencies, from 500 kHz to 5 MHz
- Power requirement: 8 V to 24 V dc. Typically 1 W when logging, and with standby of typically 1 mW when not logging.

ULTRASONIC SENSOR:

- Resonant Frequency: 200kHz $\pm$ 10kHz
- Beam width: 9.5° $\pm$ 1°, Conical
- Depth range: 0.5-400m frequency dependant
- Resolution: 1cm

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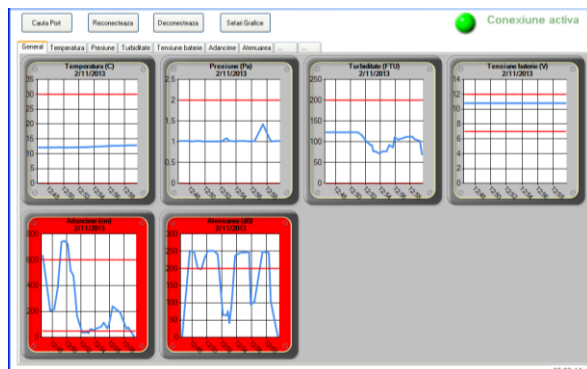
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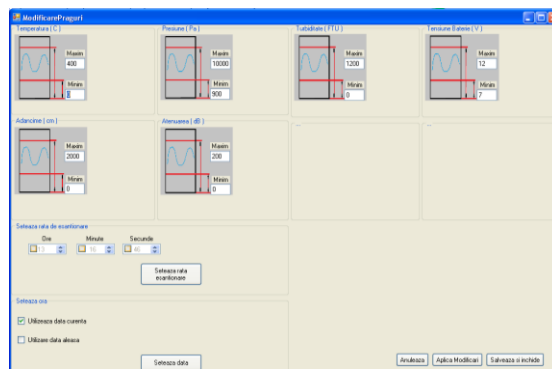
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SOFTWARE:



Graphs of the measured parameters



Setting the date, sampling rate, alarm thresholds

APPLICABILITY

The dynamics of the silting process presents interest to those who exploit reservoirs, which have the following functions: power generation, flood control, water supply, discharge regulations, level regulations, fishing, navigation and recreation.

SEDCONTROL system has the following advantages:

- allows for direct measurements in a fixed measurement position;
- allows for real time information on changes in sediment layer;
- allows to perform transversal profiles for lakes or rivers.

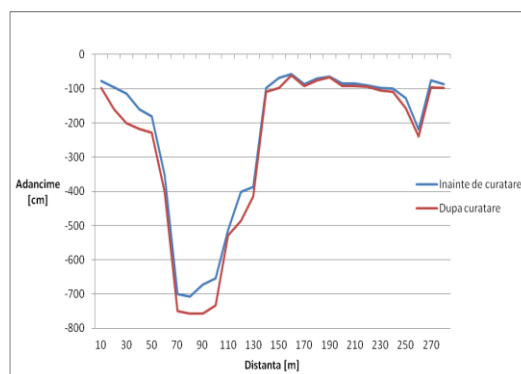
TECHNOLOGY TRANSFER

The acquired Know-how-ul will be transferred to production and manufacture units, possible to SMEs with profile of precision mechanics and mechatronics.

BENEFICIARY: Water management entities.



Used as mobile system



Bottom profiles

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Alexandru Moldovanu, e-mail: smoldovanu@gmail.com

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**DIVISION OF RESEARCH
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The DIVISION OF RESEARCH AND DEVELOPMENT FOR MECHATRONIC MICRO AND NANOTECHNOLOGIES offers professional solutions and services:

- ✓ **Researches in the field of processes specific to chipping** (dynamics, kinematics, tribology):
 - Special chipping tools and high productivity tools;
 - Tools with the active part made up of tough materials (CMS, cermets, ceramic);
 - Tools with the active part made up of extra-tough materials (NCB diamond, diamond poly-crystals):
- ✓ **Mechatronics** technologies;
- ✓ Design and execution for:
 - Special chipping tools and high productivity tools;
 - Tools and subassemblies of tools;
 - Tools and subassemblies of tools and tool support assemblies for the extractive industry and the wood industry, the industry of civil engineering;
- ✓ Tool support assemblies and dedicated accessories for motor vehicles – theme tools;
- ✓ Matrices;
- ✓ Complex laboratory devices;
- ✓ Dedicated theme installations and tools used in precision mechanics and mechatronics;
- ✓ Special micro technologies and nanotechnologies.



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NACE 267

NACE 289

NACE 711

- | | |
|---|-------------------------|
| ✓ Subassemblies for laser devices | ◀NACE 267▶
NACE 2670 |
| ✓ Special machines and equipments | ◀NACE 289▶
NACE 2899 |
| ✓ Industrial robots | |
| ✓ | ◀NACE 711▶
NACE 7111 |
| ✓ Technical engineering and consultancy | |
| ✓ Technical testing and analysis | NACE 7120 |



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EQUIPMENT

PRODUCT OVERVIEW

CERTIM is a high end, state of the art equipped research center of The National Institute of Research and Development in Mechatronics and Measurement Technique. CERTIM will provide INCDMTM's personell the ability to perform high precision measurements in a controlled environment inside a ISO 7 certified clean room with metrological certified high end equipment.

TECHNICAL FEATURES

The main technical features of the CERTIM center is the capability of measuring up to 0.1 nm. Also using 3D scanners, printers and reverse engineering software we can build functional models of existing objects.

APPLICABILITY

CERTIM's capabilities will be applied in calibrating technological and nanotechnological processes and providing services for business

TECHNOLOGY TRANSFER

Development of CERTIM – The Research Center for Measurement Technique

BENEFICIARY

The National Institute of Research and Development in Mechatronics and Measurement Technique – INCDMTM

EQUIPMENT

PRODUCT OVERVIEW

Within the SuNs project The National Institute for Research and Development in Mechatronics and Measurement Technique will develop a laser based telemetry system.

TECHNICAL FEATURES

The telemetry system will allow satellites to maintain a certain formation by determining the relative distance between each satellite and if the distance is not right the telemetry system will comand taking proper action to correct the flight path.

APPLICABILITY

Applicable in outer space satellite formation flying.

TECHNOLOGY TRANSFER: ESA – European Space Agency

BENEFICIARY: ROSA - Romanian Space Agency

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- ✓ **Software products realization;** ◀NACE 5829▶
- ✓ **Informatic data processing;**

- ✓ **Database; Databank services;** ◀NACE 6311▶

- ✓ **Research and development in engineering sciences;** ◀NACE 7219▶

- ✓ **Market research;** ◀NACE 7320▶
- ✓ **Strategic and operational marketing;**

- ✓ **Consultancy in management and in business;** ◀NACE 7022▶
- ✓ **Technological Transfer;**

- ✓ **Direct marketing and Advertising;** ◀NACE 7021 ▶

- ✓ **Editing activities;** ◀NACE 5811; 5812; 5814;5819▶



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- **CAPITALIZATION**
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in

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offers

for TECHNOLOGICAL TRANSFER

the following researches in domain:

1. Researches regarding **development strategy of domain and production** for precision mechanics and mechatronics, integronics and adaptronics, and Romanian industry impact in EU.
 2. **Marketing researches regarding promotion of products and services** I.C.C.N Chisinau and INCDMTM Bucharest on the markets from Romania, Moldavia Republic and other countries in precision mechanics, integronics and adaptronics and mechatronics domains.
 3. Researches for **restructuring strategy substantiation in precision mechanics industry, integronics, adaptronics and mechatronics domain**.
 4. Researches regarding the **impact of integration in European Union** of precision mechanics, integronics, adaptronics and mechatronics industry.
 5. Researches regarding **international collaboration possibilities** in investments domain for privates and state economical agents specialized in precision mechanics, integronics, adaptronics and mechatronics manufacturing in Romania, in order to align qualitatively and competitive to the same European industry.
 6. Researches regarding the **tendency of European community industry** to develop Romanian markets on medium and long time in precision mechanics, integronics, adaptronics and mechatronics domain.
 7. Researches regarding **connection and integration of databases** in national and European information network.
 8. Researches regarding **developing of strategic marketing and modern management activities** to evaluate and innovate the European tendencies in precision mechanics (measurement technique and quality engineering, instrumentation engineering), integronics, adaptronics and mechatronics industrial domain.
 9. Researches regarding growth and organization of infrastructure entities type „relay centre for transfer and consultancy”, „interregional centre for innovation and transfer”, etc
- For transfer is provided **technical assistance and consultancy** by Strategy, Development, Marketing, Capitalization and Transfer Division based on CONTRACT.

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KTFORCE – KNOWLEDGE TRANSFER JOINT FORCES FOR EFFICIENT INNOVATION POLICIES (Program INTERREG IVC)



PRODUCT OVERVIEW

KTForce is a project supported by INTERREG IV C, an inter-regional cooperation programme co-financed by the European Regional Development Fund (ERDF), which main objective is to improve the development of regional policies in the knowledge transfer and innovation area between universities and the industry, through the exchange of best practices between different European organizations.

Knowledge Transfer joint forces for efficient innovation policies – KTForce is an INTERREG IV C regional initiative project, that will run from 01.01.2012 to 30.06.2014 and has a budget of 1,428,222.73 €.

KTForce interregional project focuses on the exchange of experiences between 11 partners from 6 European regions, some from “Moderate and Modest innovator” countries and others from “Innovation follower and leader” countries, according to the 2010 Innovation Union Scoreboard.

KTForce aims to improve innovation policies in the partner regions by sharing the experience of the Knowledge Transfer offices. The focus of the project lies on triple helix based stakeholder involvement.

The KTForce partnership was created by getting involved 2 types of partners from each region: an operational partner, namely Knowledge Transfer offices, and a local or regional authority, responsible for the definition and implementation of potential policies resulting from the project.

KTForce Project involves 11 partners from six European regions:

- Partner 1 – University of Porto (PT)
- Partner 2 – Innovation Agency (PT)
- Partner 3 – Waterford Institute of Technology (IE)
- Partner 4 – South-East Regional Authority (IE)
- Partner 5 – National Institute of Research and Development for Mechatronics and Measurement Technique (RO)



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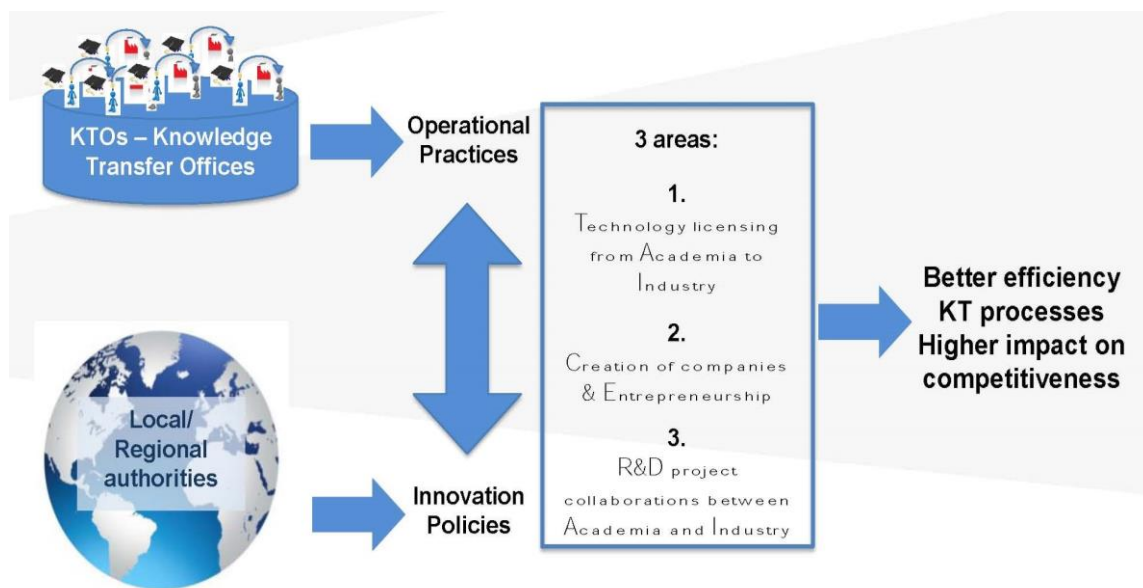
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- Partner 6 – Executive Agency for Higher Education, Research, Development and Innovation Funding (RO)
- Partner 7 – University Joseph Fourier Grenoble 1 (FR)
- Partner 8 – City of Grenoble (FR)
- Partner 10 – Aufbauwerk Region Leipzig GmbH (DE)
- Partner 11 – Sunrise Valley (L)
- Partner 12 – Technical University of Dresden – CIMTT (DE)

TECHNICAL FEATURES:

The objective of the KTFORCE project is to identify, analyze and select KT practices and innovation policies, namely on its 3 key areas: Technology Licensing, Spin-off creation & Entrepreneurship, and University-Industry relations, that already showed effective results in some regions and on which KT should rely across Europe (fig. 1). It goes further the simple identification of practices and policies since it develops an assessment method that enables to measure the impact policies have on practices and vice-versa, so that the best innovation policies and measures can be selected by regions and recommendations for further implementation can be advanced.



APPLICABILITY

KTFORCE will contribute to the potential successful transfer of the KT practices identified within each partner countries, as well as the improvement of innovation policies at national, regional and local levels. This will be enabled through a series of activities:

1) Exchange of experience at interregional level: the partners will gather regularly in each different country to share the experiences on KT practices and innovation policies via:

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- the organization of study visits, thematic seminars and workshops, gathering members of the Focus and Task Force Groups, ii) the organization of public conferences to increase the degree of interregional cooperation and awareness regarding the measures taken at political level.

2) Identification and analysis of the best KT practices and innovation policies and the efficiency relations between each other through the definition of metrics and the categorization of the variables from the policies in order to select which ones impact in KT.

3) Development of an interactive database webtool available via the KT Platform to gather the best practices and innovation policies of each region, and the implementation plans of some selected innovation policies in the partner regions;

4) Dissemination of the good practices and policies identified through the definition of an effective communication strategy plan in order to reach the main European stakeholders on Innovation and KT.

The main expected result is the improvement of local and regional innovation policies focusing KT, as well as the transfer of best practices, both at operational and political levels. Completed by the development of an implementation plan of selected policies in each partner region and presented via an interactive database webtool, the results planned by KTFORCE will have a strong impact on the definition of innovation policies focusing KT in Europe.

TECHNOLOGY TRANSFER

KTFORCE will contribute to the potential successful transfer of the KT practices identified within each partner countries, as well as the improvement of innovation policies at national, regional and local levels. Identified good practices and policies would be selected and translated into partner languages, to be used in order to improve the activity of technology transfer and regional development.

BENEFICIARY

At the partnership level, by involving actors at both operational and political levels, the identification of best practices (methodologies, procedures) on KT and the way they are linked with the identified innovation policies at political level will be of great benefit for both types of entities. Policy makers and deciders, through their involvement in the project, will strongly understand the importance of an intense collaboration with the operational actors to implement efficient policies in the Knowledge Transfer area and how this might contribute to increase the regional economy and competitiveness.

This awareness raising will increase national/regional and local authorities outside the consortium to take advantage of these results to implement some identified innovation policies in their own region. In addition to that, the quality and importance of the results to be reached by the project is so high that it will be easy to spread it among the partners' networks contacts, via the KT platform advertising and the distribution of edited booklets. In addition to the partners'

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involvement in the project and their commitment to use the project's results and to disseminate them among their contacts, KTFORCE will give an important value to the dissemination activities during and after the end of the project, by establishing a project's communication plan.

Public authorities in the field (national, regional and local actors) will receive the relevant information (booklets of implementation plans of each region, available both in English and partner country language) produced within the project and will be encouraged to analyse and implement any relevant policies.

Finally, the involvement of the partners in various European and international networks on Innovation and Knowledge Transfer will enable to spread the results of the project to a wider audience via the use of the various networks' platforms and the participation in meetings and events regularly organized for the members.

FURTHER INFORMATION

By promoting the exchange of good practices on the KT area for improving innovation policies between 6 different EU regions, the KTFORCE fits perfectly the INTERREG IVC Capitalisation Programme. Finally, considering the role of KT as a booster for an innovative, competitive and dynamic Europe, it is clear that KT acts directly on the field of Innovation, Research and Technology development, which justifies the selection of sub-theme 1. Furthermore, sub-theme 2 "Entrepreneurship and SMEs" is partially addressed by the project, since Knowledge Transfer area also clearly focus on spin-off creation and entrepreneurship.

With a focus on interregional cooperation, the project aims to build a strong and wide network that answer regions' needs at the level of KT, through the identification, collection, analysis and exchange of experience and good practices, at both operational level (mostly in 3 KT areas: Technology Licensing, Spin-off Creation & Entrepreneurship, and University-Industry relations) and political level (innovation policies).

This will enable to identify a set of relation factors between innovation policies and KT practices, identifying both impediments and success elements towards successful KT processes between the stakeholders.

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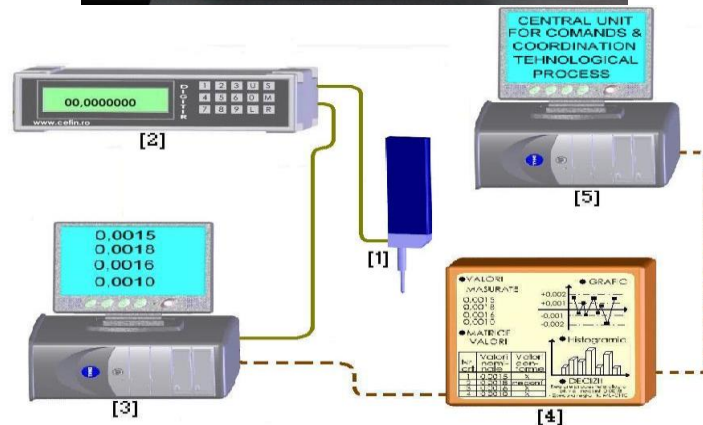
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INTELLIGENT MECHATRONIC SYSTEM FOR HIGH PRECISION MEASUREMENT OF LINEAR MICRO-MOUVEMENTS IN INDUSTRIAL AND LABORATORY ENVIRONMENTS - DIGITIL

•Technology transfer•



PRODUCT OVERVIEW:

The intelligent micro-system – DIGITIL includes the following innovative components / modulus:

- Incremental photoelectric transducer (1) for measurement of micro-displacements -and incremental divider scale with detail of original incremental network ;
- Electronic subsystem digital unit for measurement and display (2) ;
- Informatics unit PC (3) – and the functional block diagram;
- LCD monitor (4);
- Central informatics unit PC (3);

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DIGITIL has an original configuration of intelligent mechatronic micro-system for measurement in continue flux (Original solution for the construction of the intelligent transducer; Original solution for the linear incremental photoelectrical network divisor kind / vernier kind and the incremental network of zero; Original solution for the construction of the electronic unit for measurement, display and transfer; Original software for the process of measurement, comparison, representation and transfer; Original system for the electronic pitch of impulses; Lower energetic consumption for the entire micro – system; Lower ambience noise, network noise and other electromagnetic noises; Compensation of the amplifiers offset), quick measurement in real time, micron precision of measurement per measurement interval, Efficient control of data measured (that are acquisitioned and storage).

The intelligent system – DIGITIL includes the following innovative components / module:

- [1] Photoelectric incremental transducer for measurement of linear micro-movements
- [2] Electronic unit for digital measurement/display
- [3] Informatic unit PC
- [4] Electronic unit for registration and representation
- [5] Central unit for commands and coordination

TECHNICAL FEATURES

Dimensions (L x l x h – in mm): 600 x 550 x 880.

- **Measurement interval:** 10mm; (and 30; 50; 80;100mm for product development);
- **Resolution (R) :** 0,001mm ;(and 0,0001mm; 0,00001mm for product development)
- **Accuracy :** $\pm 0,001$ mm $\pm 0,0001$ mm for product development);
- **Display capacity:** 8 decade +1 decade for sign;
- **Supply IRED:** $+(5 \pm 0,25)V$;
- **Supply for electronic unit:** 220V; 50 Hz $\pm 2\%$;
- **Electronic sub-partitions:** logical(2,4,6) and analogical(5,10,20);
- **Counting error:** $\pm$ bit; **Accuracy error:** max. $\pm R/8$;
- **Electrical impulses frequency:** 0÷100 Hz;
- **Impulses filling factor:** $a/p = 0,5 \pm 0,1$;
- **Shift of impulses:** A and B : $b/p = 0,25 \div 0,05$;
- **Signals output:** TTL and with free collector.

APPLICABILITY

The product is used in very accurate linear measurements in static and dynamic, very precise linear positioning in static and dynamic, equipped as CN and CNC system on machine tools and other equipment; equipped as CN and CNC system on industrial and control robots / micro robots; equipped as intelligent mechatronic systems for measurement and control, or complex instruments / devices and equipments for control and measuring in 1D, 2D and 3D.

TECHNOLOGY TRANSFER: This technology / product were transferred to S.C. QUATRO PRODCOM S.R.L.

BENEFICIARY: S.C. QUATRO PRODCOM S.R.L., Dr. Eng. Ghiorghe Stoica

FURTHER INFORMATION: Professor PhD.EurEng Gh. Ion GHEORGHE / Tel. 021.252.30.68/69, Fax. 021.252.34.37, e-mail: geo@cefin.ro ; geocefin@yahoo.com

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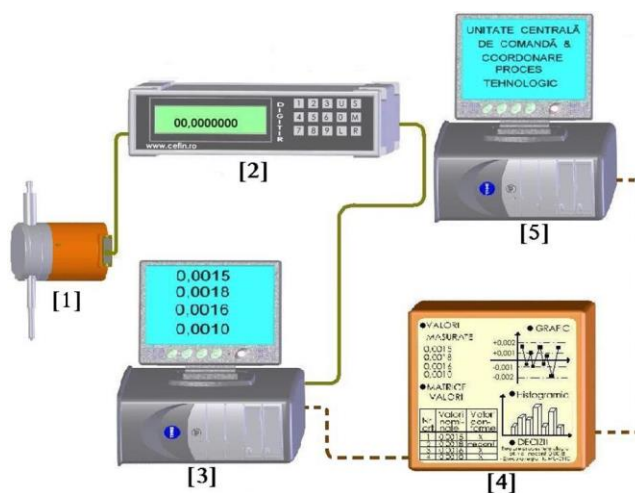


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INTELLIGENT MECATRONIC MICRO-SYSTEM FOR DIMENSIONAL MEASUREMENT FOR HIGH PRECISION MEANT TO DEVELOPMENT OF INSTRUMENTATION ENGINEERING IN INDUSTRIAL AND LABORATORY ENVIRONMENTS - DIGITRIL

•Technology transfer•



PRODUCT OVERVIEW:

The intelligent micro-system – DIGITRIL includes the following innovative components / modulus:

- [1] Photoelectric incremental transducer for measurement of linear micro-movements
- [2] Electronic unit for digital measurement/display
- [3] Informatic unit PC

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[4] Electronic unit for registration and representation

[5] Central unit for commands and coordination

DIGITRIL is designed for positioning / micro positioning and, equipment of technical and technological installation MECHATRONICS equipment as a - CN and / or CNC system mechatronic.

The claimed novelties are: original solution for the construction of the intelligent transducer; original solution for the linear incremental photoelectrical network divisor kind / vernier kind and the incremental network of zero, original solution for the construction of the electronic unit for measurement, display and transfer; original software for the process of measurement, comparison, representation and transfer; original system for the electronic pitch of impulses; lower energetic consumption for the entire micro system; lower ambience noise, network noise and other electromagnetic noises; compensation of the amplifiers offset; quick measurement, in real time; micron precision of measurement per measurement interval; efficient control of data measured (that are acquisitioned and storage); original dedicated software which signalize promptly with audio and video messages(included a hold on of the measurement process) when a measured product is no conform (it is not in the tolerated field established at the start of the process).

TECHNICAL FEATURES

Dimensions (L x l x h – in mm): 600 x 550 x 880.

- **Measurement interval:** 10mm; (and 30; 50; 80;100mm for product development);
- **Resolution (R) :** 0,001mm ;(and 0,0001mm; 0,00001mm for product development)
- **Accuracy :** $\pm 0,001$ mm $\pm 0,0001$ mm for product development);
- **Display capacity:** 8 decade +1 decade for sign;
- **Supply IRED:** $+(5 \pm 0,25)V$;
- **Supply for electronic unit:** 220V; 50 Hz $\pm 2\%$;
- **Electronic sub-partitions:** logical(2,4,6) and analogical(5,10,20);
- **Counting error:** $\pm$ bit; **Accuracy error:** max. $\pm R/8$;
- **Electrical impulses frequency:** 0÷100 Hz;
- **Impulses filling factor:** $a/p = 0,5 \pm 0,1$;
- **Shift of impulses:** A and B : $b/p = 0,25 \div 0,05$;
- **Signals output:** TTL and with free collector.

APPLICABILITY

The product is used in very accurate linear measurements in static and dynamic, very precise linear positioning in static and dynamic, equipped as CN and CNC system on machine tools and other equipment; equipped as CN and CNC system on industrial and control robots / micro robots; equipped as intelligent mechatronic systems for measurement and control, or complex instruments / devices and equipments for control and measuring in 1D, 2D and 3D.

TECHNOLOGY TRANSFER: This technology / product were transferred to S.C. QUATRO PRODCOM S.R.L.

BENEFICIARY: S.C. QUATRO PRODCOM S.R.L., Dr. Eng. Ghiorghe Stoica

FURTHER INFORMATION: Professor PhD.EurEng Gh. Ion GHEORGHE / Tel. 021.252.30.68/69, Fax. 021.252.34.37, e-mail: geo@cefin.ro ; geocefin@yahoo.com

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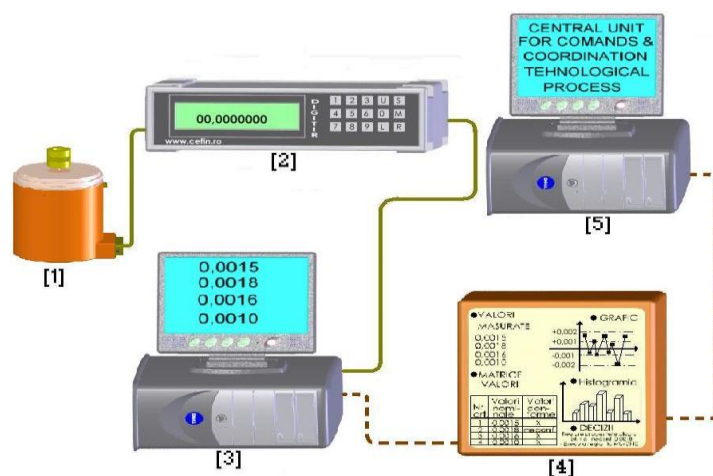
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INTELLIGENT SYSTEM WITH PHOTOELECTRIC TRANSDUCER WITH INCREMENTAL DISCS FOR MEASUREMENT OF ANGULAR MOTIONS - DIGITIR

•Technology transfer•



PRODUCT OVERVIEW

The intelligent system with incremental disks photoelectric transducer for dimensional and angular displacements measurement in industrial environment is intended for positioning / micro-positioning, direct measurements, angular displacements / micro-displacements and equipping as NC and/or CNC system, technical and technological installations and equipments.

The intelligent system, converts an analogical quantity (angular displacement) in a digital quantity (number of impulses).

The intelligent system, by photoelectric transducer subsystem supplies at exit four rectangular signals in quadrature and zero signals.

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An adequate processing of those signals in electronic subsystem for measurement and digital display, allows electronic sub-partitions with 2, 4, 8 (in case of analogical exits can be made sub-partitions with 2, 4, 5, 10, 20) and detection of angular displacement orientation.

The intelligent system – DIGITIR includes the following innovative components / modulus:

- [1] Photoelectric incremental transducer for rotation
- [2] Electronic unit for digital measurement / display
- [3] Informatic unit PC
- [4] Electronic unit for registration and representation
- [5] Central unit for commands and coordination

Based on binding heights, the beneficiary can built different assembling systems of photoelectric transducer subsystem, adequate to various applications, with condition of respecting subsystem characteristics. Axis of rotation is made of non-corrosive steel hardened / tempering. Mechanical coupling is made through precision elastic systems.

TECHNICAL FEATURES: Dimensions (L x l x h – in mm): 600 x 550 x 880.

- **Measurement domain:** infinite; **rotation angle** is ∞ ; **measurement interval** $0^\circ \div n \cdot 360^\circ$;
- **Resolution** : $R = \frac{360^\circ}{N}$, [°, ' , "] ; where :N = number of impulses / rotation;
- **Accuracy** (correctness error): max. $\pm R/4$;
- **Hysteresis value:** max. $\pm R/7$;
- **Accuracy error:** max. $\pm R/8$;
- **Null impulse width:** max. R;
- **Electrical impulses frequency:** $0 \div 100$ Hz;
- **Null impulse** (reference): one at 360° ;
- **Impulses filling factor:** $a/p = 0,5 \pm 0,1$;
- **Shift of impulses:** A and B : $b/p = 0,25 \div 0,05$;
- **Signals output** : TTL and with free collector
- **Photoelectric transducer subsystem weight:** max. 0,5 kg
- **Overall size** (photoelectric transducer subsystem: max. $\varnothing 58 \times 95$ mm;
- **MTBF** : 1500 hours;
- **R (550 h):** 0,9 ;
- **R (950 h):** 0,76 ;
- **Z (550 h):** $2,8 \cdot 10^4 \text{ h}^{-1}$;
- **Z (950 h):** $4,4 \cdot 10^4 \text{ h}^{-1}$;

APPLICABILITY: The product is used in very accurate linear measurements in static and dynamic, very precise linear positioning in static and dynamic, equipped as CN and CNC system on machine tools and other equipment; equipped as CN and CNC system on industrial and control robots / micro robots;

TECHNOLOGY TRANSFER: S.C. QUATRO PRODCOM S.R.L.

BENEFICIARY: S.C. QUATRO PRODCOM S.R.L., Dr. Eng. Gheorghe Stoica

FURTHER INFORMATION: Professor PhD.EurEng Gh. Ion GHEORGHE / Tel. 021.252.30.68/69, Fax. 021.252.34.37, e-mail: geo@cefin.ro ; geocefin@yahoo.com

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INTEGRATED MANAGEMENT DIVISION



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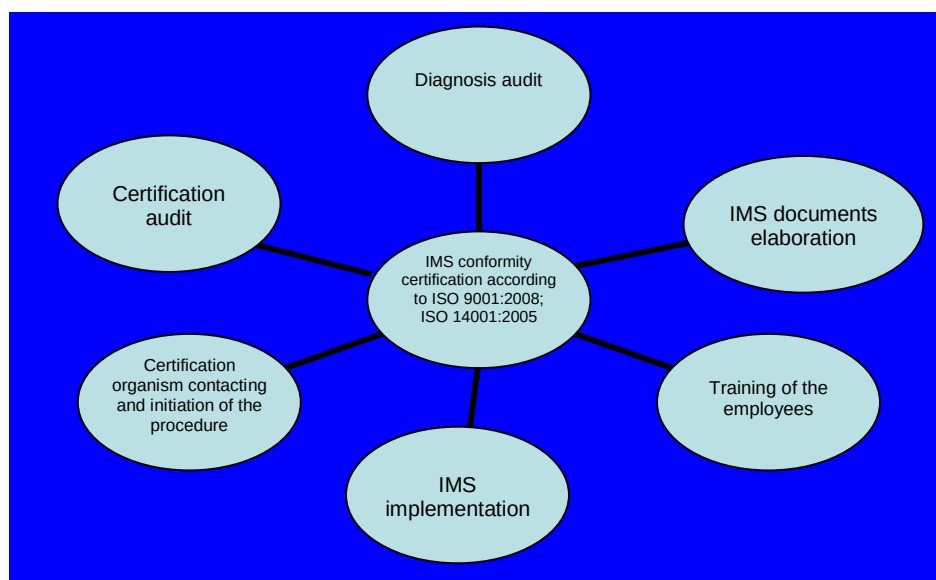


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INTEGRATED MANAGEMENT SYSTEM (IMS) CERTIFICATION IN FIVE STEPS



TECHNICAL AND FUNCTIONAL FEATURES:

- ◇ Duration until obtaining the certification – 5 months
- ◇ Assistance during the certification audit
- ◇ Internal audit services and assistance during availability of the certificates
- ◇ National and international recognition of certificates

APPLICABILITY:

- ◇ **Competitive advantage:** certified firms confirm the development of new businesses.
- ◇ **Increase in the demand by clients:** certified firms report an increase in the demand from clients, and, automatically an increase in business.
- ◇ **Business protection:** firms that are not certified have declared that they have lost clients who have preferred certified organizations. They have found out when losing contracts is already too late.
- ◇ **Cost reduction:** through efficiency, continuous improvement, loss diminishing, key control of processes.
- ◇ **The competition is certifying:** in many fields, concurrent are certified or are being certified. The more you wait before doing it, the bigger will the competition advantage be.
- ◇ **New prospects:** certified firms want to have certified business partners.
- ◇ **You will be qualified for the participation in public acquisitions.**
- ◇ **Increase in credibility:** Your businesses can increase dramatically, taking into account that many firms only work with certified firms.

CAPITALIZATION AND TECHNOLOGY TRANSFER:

Eng. Carmen Finat; carmen.finat@cefin.ro

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THE RESEARCH IN INTEGRATED MANAGEMENT DEPARTMENT HAS AS PRIMARY FIELDS OF EXPERTISE:

-  **Execution of research – development projects focused on quality management and environment issues;**
-  **Methodological coordination of the certified laboratories of INCDMTM;**
-  **Development and implementing of quality management or integrated systems for:** organizations, trial labs, management systems certifying entities, product certifying entities, inspection entities;
-  **Internal and external audits of the quality management system;**
- Standardization, standard development, attending in Technical Standardization Committees;**



Research objectives of the CCMI personnel:

- attending participation in competitions through project C – D proposals;
- execution of C – D projects
- elaboration and editing of technical and scientific materials designed for presentation and informing purposes.
- Participation in development of scientific standards for the departments tied of expertise.

The CCMI personnel abilities for:

-  The completion of all activities assigned to CCMI, with the regard for the specific conditions and terms subsequent from the procedure which documents the quality manage system;
-  Identifying and registering any and all problems concerning processes, products and for the integrated quality management system;
-  Annual management analysis;
-  Initialization and conduction on Internal Audit Programs;
-  Identifying of professional training needs inside the CCMI ;
-  Follow up of the training activities and training evaluation participation in INCDMTM;
-  Participation in the analysis of bids, orders and contracts;
-  Involvement in the assessment and selection activity of subcontractors;
-  Timely elaboration at a scientific level of all the works assigned to CCMI;
-  Projects elaboration concerning the main activity field of CCMI and the department's personnel.

The concerning domains of CCMI are part of the interest domain set of INCDMTM and are based on the following fundamental management principles:

-  Clients explicit and implicit needs satisfaction;
-  Quality level assessment opposed to the degree of correspondence with the client's needs;

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- ☞ Prevention, as an economic solution for the improvement of the integrated quality management system;
- ☞ Planning of the activities / processes of INCDMTM;
- ☞ Perfecting internal communication in INCDMTM;
- ☞ Promoting a quality based value system.

The main objectives of CCMI are:

- ☞ **Continuous improvement of the integrated quality management system implemented in INCDMTM and keeping conformity with the referred standard SR EN ISO 9001: 2008 and SR EN ISO 14001: 2005 ;**
- ☞ **Project proposals participation** at the National and International Research – Development Innovation Programs;
- ☞ **Maintaining the certifications of the laboratories placed under the legal authority oh INCDMTM according to the conditions of the referral SR EN ISO / CEI 17025**

CCMI is enabled and competent to deal with the development of the following third party works:

Ensuring a high level of competitiveness for the organizations / trial labs by giving assistance with the integrated quality management system for:

- technical and administrative assessment, identification of processes / sub processes of the organization, development of the establishment based on the processes existing in the lab / organization, by taking into consideration of all the conditions and norms concerning quality and quality management;
- ensuring the good functioning of the organization's processes according to the requested standard conditions of document elaboration;
- ensuring the success of developing integrated quality management system through an appropriate documentation of the processes from the organizations/labs, through the development of quality management system / integrated management system;
- development of an adequate management system documentation of the processes / sub processes and activities that take place in the organization, in accordance with the organizational culture, with its objectives the services / products it provides, with the referral standards and / or other legal / normative requirements.
- ensuring the success of quality management system, implementation, maintenance and continuous, improvement inside organizations / trial labs by providing consulting and / or technical assistance.

Main areas of interest of the CCMI in the standardization domain

In full accordance with the national policy of standardization, CCMI participates at the assimilation of European standard process by assigning a representative of CCMI in the Technical Standardization Committee.

Also from the standardization point of view, CCMI has responsibilities in ensuring a human interface with the consequent department of ASRO and in maintaining a standardization data base in INCDMTM.



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INDUSTRY LINKS OFFICE

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ACTIVITY CONTROL IN INDUSTRY LINKS OFFICE

- ↪ **constituting a database with potential internal and external product/ technology/ service purveyors – OFFER and with participants at technological transfer – DEMAND from precision mechanics, mechatronics and connected domains;**
- ↪ **facilitation of information transfer to the partners;**
- ↪ **participation at negotiation of technology transfer;**
- ↪ **promotion, by various ways, of current and perspective necessities of economical agents;**
- ↪ **rational maintenance with some other technological transfer centers from different domains;**
- ↪ **consultancy and assistance regarding the participation in RD projects launched by the European Union.**



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**THE RELAY CENTRE FOR
TECHNOLOGY TRANSFER
AND CONSULTANCY
• CRTC – INCDMTM •**



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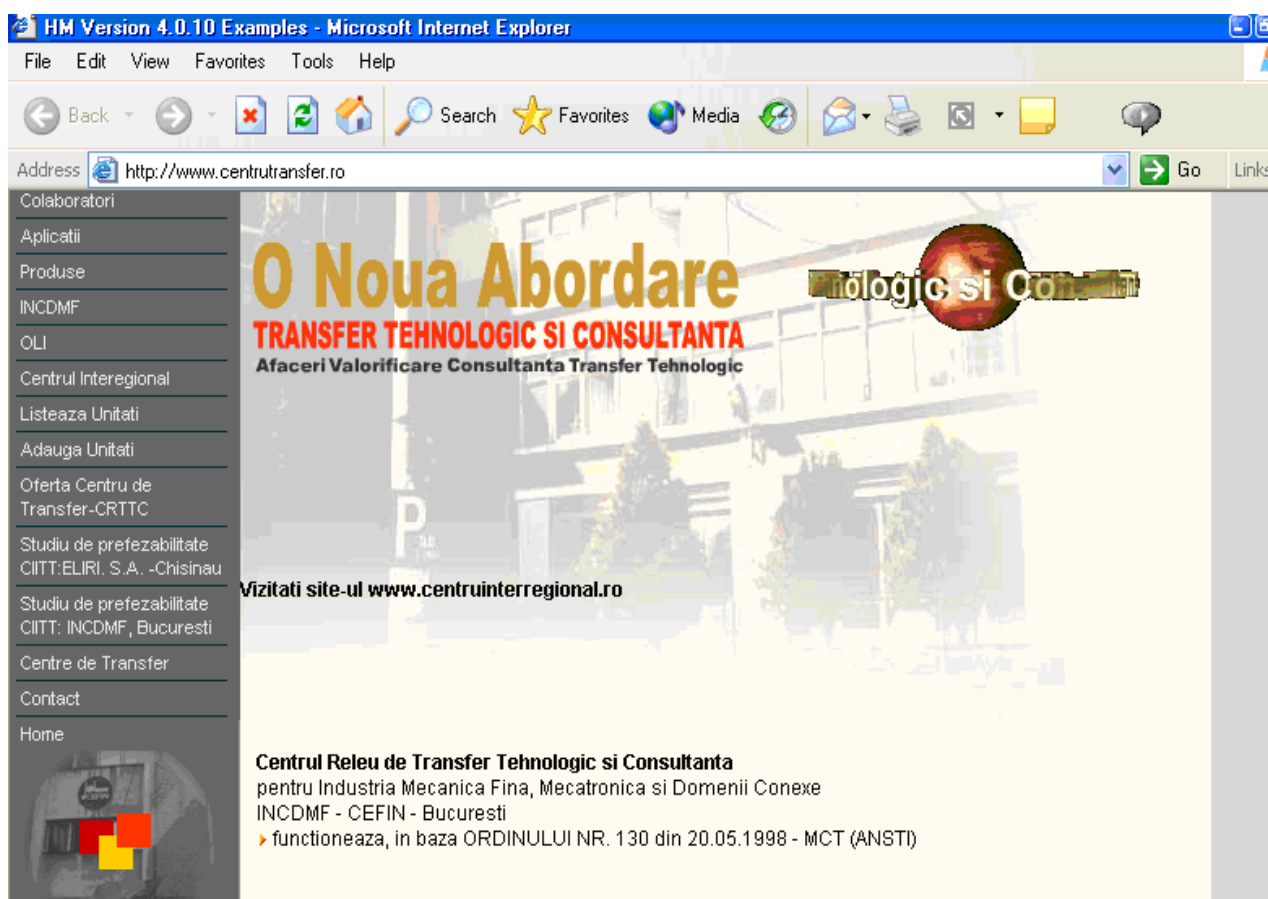
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www.centrutransfer.ro

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- Accredited ISO 9001/ 2001



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**INMA-CERTSC
ORGANISM DE CERTIFICARE
A SISTEMELOR DE MANAGEMENT AL CALITĂȚII**



CERTIFICARE



**SR EN 45012:2000
CERTIFICAT DE ACREDITARE
Nr.040-C/ 15.03.2004**

CERTIFICAT

NR. 5 - SMC / 15.04.2004

INMA-CERTSC certifică conformitatea
sistemului de management al calității organizației:

**CENTRUL RELEU
DE TRANSFER TEHNOLOGIC SI CONSULTANȚĂ
CRTTC – INCDMF**

București, sector 2, șoseaua Pantelimon nr.6-8

cu cerințele din documentul de referință:

SR EN ISO 9001 :2001

pentru următoarele activități:

- | | |
|---|-------------------|
| • Cercetare-dezvoltare în științe fizice și naturale (științe tehnice) | clasa 7310 |
| • Activități de studiere a pieței și de sondaj | clasa 7413 |
| • Activități de consultanță pentru afaceri și management (transfer tehnologic în domeniul mecanică fină, optică, mecatronică și alte domenii conexe și interdisciplinare) | clasa 7414 |
| • Alte activități de servicii prestate în special Întreprinderilor (activități ale organizatorilor de târguri, expoziții și congrese) | clasa 7487 |

Data certificării:

24.12.2003

Data reînnoirii certificării:

-

Prezentul certificat este valabil până la:

24.12.2006

**PREȘEDINTE INMA-CERTSC,
Ing. Miu Cosmina**



**DIRECTOR GENERAL INMA,
Ing. Gângu Vergil**

Menținerea certificării se realizează în condițiile respectării Contractului de Certificare



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ROMÂNIA

MINISTERUL EDUCAȚIEI ȘI CERCETĂRII
AUTORITATEA NAȚIONALĂ PENTRU CERCETARE ȘTIINȚIFICĂ

CERTIFICAT

În conformitate cu Decizia Președintelui Nr. 9056 din 24.02.2006, se acordă titlul de „CENTRU DE TRANSFER TEHNOLOGIC”, entității Centrul Releu de Transfer Tehnologic și Consultanță - CRTTC constituită fără personalitate juridică în cadrul Institutului Național de Cercetare – Dezvoltare pentru Mecanică Fină – CEFIN, cu sediul în municipiul București, Șos. Pantelimon nr.6-8, sector 2, Cod Unic de Înregistrare 930 din data de 30.11.2002.

Titlul de entitate a infrastructurii de inovare și transfer tehnologic se acordă pentru o perioadă de 5 ani, începând cu data de 01.03.2006.



Nr. 14
BUCUREȘTI, 01.03.2006



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- **CERTIFICATE OF AUTHORIZATION – MECI, NR. 14/2004**
- **CERTIFICATE OF ACCREDITATION ISO 9001/2001, NO. 5-3 MC/2004**

RELAY CENTER OF TECHNOLOGICAL TRANSFER AND CONSULTANCY

•CRTTC•

THE FUNDAMENTAL OBJECTIVE AND THE OPTIONS OF STRATEGY

RELEVANT THROUGH Relay Center of Technological Transfer and Consultancy – CRTTC –

[A] The fundamental objective in the medium term:

- (1)** creation by TECHNOLOGICAL TRANSFER of some sub-sectors of fine mechanics, optics and mechatronics for a functioning market, compatible with the EU principles, rules, mechanisms, institutions and policies;
- (2)** shaping the convergence of technological transfer activities, based both on evaluation of resources and opportunities, and on national and international context;
- (3)** support the imperative to conclude the transition of TECHNOLOGICAL TRANSFER to market economy in the field of industrial fine mechanics, optics and mechatronics as well as preparation of the accession of industries Fine mechanics, optics and mechatronics in industrial fields related EU;

[B] Options of the corresponding strategy of basic objective options aim to create conditions for:

- (1)** providing specific industry sectors increased proportion of fine mechanics, optics and mechatronics based on technology transfer and increase investment rate, both through a significant participation of national capital and by attracting external resources;
- (2)** further measures to stabilize the specific sub-industry of fine mechanics, optics and mechatronics through support for technology transfer for the domain and policies to ensure the budget deficits incurred and the dynamic quasi-fiscal deficit reduction in the specific industry;
- (3)** the promotion and integration of technology transfer and coherent policies are compatible with EU mechanisms, aimed at "adjusting" fine structural mechanic, optics and mechatronics, development and modernization of specific sub-area, revitalization and upgrading of sub-sectors and that some businesses related sub, supporting implementation of information technology in the automation industry and specifically by his computerization of other industrial sectors of developing the national strategy;
- (4)** providing an optimal environment TRANSFER OF TECHNOLOGY AND BUSINESS, specific market area based on the development of market competition, by reducing costs and easing the tax burden and promoting specific measures to stimulate small and medium enterprises;
- (5)** modernization and development of technology transfer and industrial services and other specific fields to best meet the needs and requirements of the internal market

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**NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT
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- (and external), and approaching the standards the EU countries;
- (6) increasing technology transfer and the remodelling of the structure of industrial production capacity and the related field of fine mechanics, optics and mechatronics, including the development and fostering cooperation with EU partners, including entities related to technology transfer infrastructure, amid consolidation operation market economy, it real infrastructure of a competitive environment and the renewal of SMEs with potential competitiveness;
 - (7) sequence selection process for resizing and operators in the field of fine mechanics, optics and mechatronics, engaged in restructuring and economic recovery by absorption of the most effective technology transfer of R & D results;
 - (8) developing the technology transfer consultancy and training, entrepreneurial training and business in centre field-specific relay transfer of fine mechanics, optics and mechatronics, which facilitates the provision of useful services for SMEs;
 - (9) improving project management research and development-innovation and technology transfer and capacity development to generate scientific and technological knowledge in the field of fine mechanics, optics and mechatronics, in order to reduce disparities in technology, information infrastructure development, application of standard procedures for assessing of operations and personnel, developing the capacity to disseminate scientific knowledge and technology infrastructure transfer extension and marketing services, industry liaison offices, business centres and centres of excellence;
 - (10) developing capacity of the innovation in the economic environment, by developing the field of fine mechanics, optics and mechatronics, and that the technological transfer of results in this priority area.
- **MISSION:**
 - 1. **Awareness of companies in the industry, the necessity and importance of technology transfer;**
 - 2. **Constant involvement Relay Technology Transfer Center and Consultants share the results of RDI technology transfer.**

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**INTER-REGIONAL CENTER
OF INNOVATION AND
TECHNOLOGY TRANSFER
CHISINAU –IASI –
BUCHAREST**



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INTER-REGIONAL CENTER OF INNOVATION AND TECHNOLOGY TRANSFER CHISINAU –IASI –BUCHAREST

WHO ARE WE?

- ✓ **CIITT** is “an inter-regional centre of innovation and technology transfer” associated with applied research institutions, universities and academic environment in Moldova and Romania;
- ✓ **CIITT** is an official collaborator of the Ministry of Education, Research, Education and Youth and the Ministry of Economy, Commerce and Business Environment, for disseminating information and promoting technology transfer and research results;
- ✓ **CIITT** is a partner in economic institutions and units from different industries in Romania and Moldova, for support and the process of technology transfer and consultancy;

FIELDS OF COMPETENCE:

- Information sharing
- **Consulting**
- Industrial Services, Commercial
- Technology Transfer for Products / Technologies / Services
- **Management and marketing**
- **Database**
- Information Products

MANAGEMENT & MARKETING:

- Human Resource Management
- Project Management
- Management of SME
- Information Management
- Management of Research
- Industrial Marketing
- Market research (product / technology / services)

STRATEGY & DEVELOPMENT:

Development strategy for the following industries:

- Precision Mechanics & Mechatronics & Integronics and Adaptronics;
- Electronics and Electrical engineering;
- Construction machinery
- Strategy & Development of SMEs in industrial and economic environments mentioned;
- Medium and long term strategy of the areas mentioned in light of EU accession.

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**THE NATIONAL SCIENTIFIC
CLUSTER
«MICRONANOMECASTRONICA»**



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NATIONAL SCIENTIFIC CLUSTER “MICRO-NANO-MECHATRONICA”

OVERVIEW:

Beginning with the INITIATION PROTOCOL/1058 & 167/30.08.2007 for NATIONAL SCIENTIFIC CLUSTER MICRO-/NANO TECHNOLOGIES for MECHATRONICS, SENSORS AND ROBOTS performed between INCDMTM-Bucharest and the UNIVERSITY “POLITEHNICA” - RESEARCH AND DEVELOPMENT CENTER FOR MECHATRONICS, that put the basis of excellence scientific researches in the HIGH-TECH field of micro-nano-technologies for mechatronics, sensors and robots for an advanced and sustainable consideration of this domain for reaching EU levels of performances and compatibility - European area of research and also regarding The LISBON strategy.

THE NATIONAL SCIENTIFIC CLUSTER “MICRO-NANO-MECHATRONICA”

- is responsible and coordinates at national level, advanced scientific researches for micro-nano-technologies for mechatronics, sensors and robots:
- development of new products micro-/nano-/mechatronics: micro-/nano-/sensors, micro-/nano-/actuators, mini-/micro-/nano-/robots;
- development of new micro-/nano-/intelligent systems: for new HIGH-TECH domains of microelectronics and electrotechnics, aerospace, micro-/nano-/mechatronics, for new domains MID-HIGH-TECH and LOW-HIGH-TECH;
- development of new advanced systems for integrated manufacturing processes:
 - (a) off-process: ultra-precise systems for integrated control and monitoring for different industrial environments;
 - (b) on-process: high accurate intelligent systems for interface control and quality evaluation for industrial issues;
- development of new principles, methods and high performances techniques: optical-electronic, laser, ultrasonic, piezoelectric etc.;
- development of micro-/nano-/technologies:
 - (a) litho-photography;
 - (b) chemical corrosion;
 - (c) micro lasers;
 - (d) thin layers;
 - (e) LIGA;
 - (f) physical/ chemical;
 - (g) micro-machinery;
- development of frictional technological system researches:
 - (a) frictional systems specific to cuttings and micro-cuttings;
 - (b) frictional systems specific to friction torques;
 - (c) characterization of micro-/nano-/ covering structures;
 - (d) dynamic testing with or without lubrication;

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- development of new intelligent materials:
 - (a) hard and extra-tough materials;
 - (b) composite materials;
 - (c) ceramics materials;
 - (d) direction properties materials;
 - (e) processing and characterization materials;
- development of equipments and techniques for analysis and environmental control;
- development of intelligent medical techniques:
 - (a) virtual with guiding through neuro-images for microsurgery and neurosurgery;
 - (b) therapy with implant-prosthesis for controlled bone regeneration;
 - (c) connections for securing techniques of data given by clinical and laboratories devices;
 - (d) new joint generating techniques;
- is responsible and coordinates at national level of research-development infrastructure achievement using WHITE-CHAMBERS for micro-/nanotechnologies for mechatronics, sensors and robots;
- is responsible and coordinates of research-development infrastructure achievement i.e. "Pole of excellence for Mechatronics" within the project belonging to – IMPACT-STRUCTURAL FUNDS:
 - (a) building-located nearby Mechatronic and Precision Mechanics Department in Polytechnic University Bucharest;
 - (b) technical and technological environment specific to WHITE CHAMBERS;
- participates and elaboration Inventing Developing Research projects within National and European Programs, at their open competitions, as a coordinator and/or partner;
- participates and initializing and organizing National Technology Platforms on certain domains, similar to European ones, developing research activities, projects elaboration, information disseminating, marketing, training etc.;
- is responsible for the elaboration and application of developing strategy in the adequate domains;
- participate at dissemination and capitalization by technological transfer of the Inventing Developing Research of industry, economy and society;
- participate at the organizing of technical-scientific events and manifestations, elaborates scientific works for symposium, conferences/ scientific national and international congress;
- develops contact/contracts with institutions/ associations for research similar in EU.;
- it could be extended by attracting other research institutions, universities etc.;
- it functions based on its own Regulations, commonly established with CLUSTER entities.

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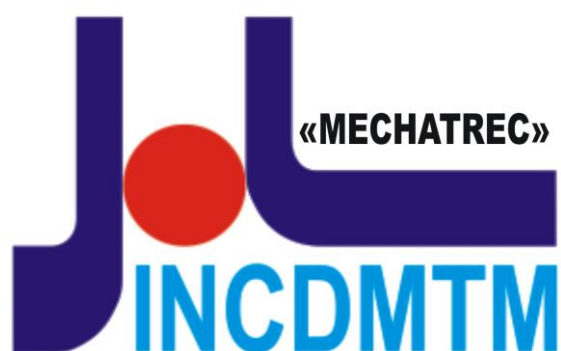


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**THE REGIONAL CLUSTER BUCHAREST-
ILFOV IN THE FIELD OF
MECHATRONICS,
INTEGRONICS & ADAPTRONICS
«MECHATREC»**



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MECHATREC REGIONAL CLUSTER

• Purpose of MECHATREC Regional Cluster

Regional Cluster MECHATREC goal is the implementation and development, during preliminary time of its own strategy, by:

- Presenting, promoting, supporting and defending the economic, technical, scientific, social and legal aspects of cluster members;
- Increasing economic competitiveness domestically and internationally through:
 - Supporting a policy of cooperation within the cluster and with other external organizations;
 - Promoting and supporting innovation in structural entities;
 - Developing a common framework for the transfer, valorisation and implementation of advanced know-how;
 - Cooperation between cluster members in research, product development and new technologies;
- Coordination in defining common strategic objectives: the design and implementation of measures and actions needed to achieve them;
- Participation in various forms of association and cooperation with other national and international organizations aiming at establishing projects of common interest;
- Development of activities covered by the nomenclature.

Activities in the European Community (NACE) implemented internally in the National Classification of Economic Activities (NACE - Rev.2):

a) Implementing activities for the following divisions / groups:

..25/255, 256, 257;

..26/262, 265, 266, 267;

..28/281, 284, 289;

..32/325;

..33/331, 332.

b) Research - development: NACE division 72/group 721;

c) Technical testing and analysis activities: NACE division 71/group 712;

d) Other professional, scientific and technical activities: NACE division 74/groups: 741, 749;

e) Activities advertising and market research activities: NACE division 73;

f) Membership organization activities: NACE division 94/group 941;

g) Publishing activities: NACE Division 58;

h) Extraterritorial organizations and bodies activities: NACE division 99;

i) Commerce activities: NACE division 46/groups: 461, 464, 465, 466 and division 47/groups: 471, 474, 477.

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The goal of establishing the Regional Cluster MECHATREC is to develop the following strategic technical and technological directions:

- the field of intelligent advanced mechatronic, integronic and adaptronic equipments, multi-structural, technological, and informational features for decision-making, measurement, control, integrative adaptive control;
- the field of high-tech mechatronic systems for industrial and commercial applications;
- the field of intelligent special medical and biomedical devices;
- the field of intelligent and hyper-intelligent mechatronic integronic adaptronic micro-nano-technologies;
- the field of intelligent new materials with micro-nanometric structures and special features new processing technologies and usage;
- the field of innovative and customized modular systems in industry and economy;
- the field of advanced electromechanical mechatronic micro-nano-systems and systems;
- the field of intelligent micro-robotics and nano-robotics;
- the field of intelligent measurement technique, calibration, testing, calibration and functional tests and measurements;
- the field of micro-nano techniques and micro-nano-tribology;
- the field of logistics and support services;
- the field of human resource development and specialization in the field;
- The Regional MECHATREC Cluster structure is based upon economic units and sub-units required to achieve the set objectives and purpose, including:
 - economic production, trade and services – type SME, with or without RDI activities;
 - businesses having as main activity object – Research, Development and Innovation: national institutes, specialized institutes and centres;
 - secondary schools and universities;
 - testing laboratories and specialized testing laboratories;
 - chambers of commerce and industry, operating at central / regional / local level;
 - scientific organizations and professional associations and employers;
 - federations and confederations;
 - regional development agencies;
 - and so on.

In brief, the cluster structure is:

- 33 SMEs;
- 8 research institutes (INCD, IC);
- 3 universities;
- 3 administrative bodies;

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- 2 chambers of commerce and industry;
- 3 centres of training, assessment and valuation;
- 3 experts.

• The need for forming MECHATREC Cluster is based upon national and European programming documents:

National Reform Plan - Business Environment and Industrial Policy Chapter;

- Mechatronics - Integronics - Adaptronics Development Strategy, as mix integrative scientific field with economically proven potential, but poorly supported at regional level;
- cluster development program coordinated by MECMA - Romania;
- Europe 2020 and 2030 Strategies;
- Document Cluster Association in Romania, CLUSTERO;
- Documents of the European Cluster Alliance;

• Examples of good practices and successful actions of MECHATREC Cluster:

- Partnerships with other clusters and competitiveness poles (eg EL - including INDAGRO, ALL ELECTRIC, etc.).
- Collaboration between structural entities (eg INCDMTM - UPB - CCDM - HESPER - CCIB, UMF - Orthopaedics Clinic - Floreasca Emergency Hospital - INCDMTM, INFOSIT - INCDMTM - High School of Mechatronics, etc.)
- Collaboration with personalities from the field (lectures in the field, supported by: prof. Stiharu Ion, Ph D - Concordia University, Montreal - Canada, Professor. Alexandru Ivan - University Besancon - France Prof Rajshree Mootanah, PhD - University of Oxford England, etc.).
- Cluster development database (members, designs, manufacturing, etc.).
- Developing business opportunities between cluster members and joint projects;
- Amplification and intensification of cooperation between and inter-clusters in high-tech strategic areas;
- Achievements of mechatronic, integronic and high-tech adaptronic products:

• **Cluster development perspective**

The MECHATREC cluster development perspective includes the following:

- ✓ Attracting new members;
- ✓ Membership in the CLUSTERO National Association and the International Alliance of European clusters;
- ✓ Enhancing partnerships, collaborations and relationships to optimize value chains, products and intelligent manufacturing.

FURTHER INFORMATION:

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**THE STRATEGIC COMPETITIVENESS
POLE IN THE FIELD OF
MECHATRONICS, INTEGRONICS &
ADAPTRONICS «INDMECATRON»**



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INDMECATRON COMPETITIVENESS POLE

Scope of the INDMECATRON Pole

The scope of the INDMECATRON Pole is to value, develop and implement its own strategies, according to time schedules designed and monitored to achieve the overall and specific objectives, such as:

- Representing, supporting and harmonizing the interests of all economic entities in its own structure;
- Objective and joint activities projecting, in strategic development areas, developed on the basis of their market research, marketing, valuation, feasibility, technology transfer, and so on,
- Creation, development and commercialization of innovative and intelligent mechatronic and adaptronic products, technologies and services;
- Working on a partnership between the states and the pole and its external entities to promote national and international research - development - innovation projects in common fields based on reciprocity, especially project management and formation of consortia for project development in the value chain matrix of high-tech intelligent mechatronic products;
- Working to address funding for European projects and international tenders and proposals promoting projects of common interest by promoting mutual international consortia formation, able to achieve mutual proposed projects and ensuring their management and coordination;
- Intelligent economical competitiveness through tangible and intangible investments financed from its own resources of national, community, international funds raised, etc.

The Pole specific objectives are listed, as follows:

- Economic competitiveness and national and international visibility techniques and tools:
 - Policies supporting collaboration within the Pole and other entities outside it;
 - Promoting and supporting innovation in all entities in the pole structure;
 - Development of a common framework for the transfer, capitalisation and implementation of advanced know-how;
 - Cooperation among members, research - development - innovation of products, technologies and services for participation in joint projects at national and international R & D programmes;
 - Coordination in defining common strategic objectives: the design and implementation of measures and actions needed to achieve them;
 - Development of new facilities and infrastructure in the new entity or entities within the innovative Pole;
 - International communication networking with other European or international competitiveness poles;
 - Development with public authorities at local, regional, national, and international level, aimed at achieving sustainable development.

The structure of the INDMECATRON Competitiveness Pole consists of economic entities with legal personality, Romanian and / or foreign individuals, as founding members and associate (recruited) members, as follows:

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- Productive economic agents, trade and service agents type SME and large enterprises with or without research - development – innovation focus.
- Economic entities, whose principal activity is Research - Development - Innovation:
 - National research and development institutes (INCD);
 - Research institutes - (ICD);
 - Research-development centres (CCD);
 - And others.
- Tertiary and secondary technical education;
- Testing laboratories and specialized testing and nationally accredited laboratories;
- Chambers of commerce and industry, operating at central / regional / local level;
- Scientific organizations and professional associations and employers;
- Central / regional / local entities;
- Employers' associations / federations and confederations;
- Individuals / experts.

In brief, INDMECATRON pole structure comprises:

- 54 SMEs;
- 7 Economic Development Agency;
- 11 National Institutes of RDI;
- 9 institutes of RDI;
- 7 chambers of commerce and industry;
- 11 central government / regional / local units;
- 9 universities;
- 7 federations / confederations;
- 7 specialized high schools;
- 6 research centres;
- 5 centres for training / evaluation / transfer;
- 9 testing accredited and specialized testing laboratories;
- 5 organizations and professional associations and employers associations;
- 9 individuals / experts.

Examples of good practices and successful practices of INDMECHATRON Pole of Competitiveness

➤ **Good practices:**

- Forming partnerships based on mutual interest and specialized subfields;
- Collaboration with other poles of competitiveness, according to the direct / related activities in their fields;
- Generation of product / technology and / or high-tech services, developing innovative SMEs in different regions and geographies.

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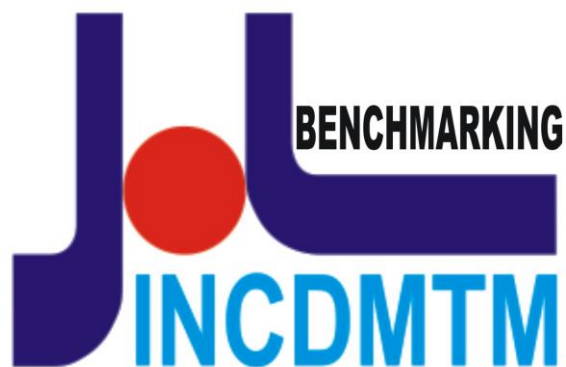


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BENCHMARKING NETWORK



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BENCHMARKING NETWORK FOR USING PERFORMANT, ON LINE, STRATEGIC BENCHMARKING FOR SUPPORTING ECONOMICAL REFORMATION AND TRADE for SMALL and AVERAGE COMPANIES

OVERVIEW:

Benchmarking is a continues and systematic measuring and comparing process of the activity of certain organization to one of the leaders, no matter in which place of the world, in order to obtain information to be used in improving performances.

GENERAL OBJECTIVES:

- The increase of the Romanian RDI system capacity of gathering knowledge and first rank results and experience in top scientific and technological domains, and transferring them towards social and economical internal environments for increasing their competitiveness.
- Supporting the creation, development, integration and consolidation in specific domains of certain research networks which activity reaches the level of excellence, recognized by international regulations;
- Acceleration of the lining up and technological integration process of the economic agents according to requirements and regulations of European Union;
- Integration and consolidation of research and development agents in the specific domains, and also lining up to Module 1 objectives “Complex research-development projects”
- The increase of competitiveness of national economy;
- The achievement of certain integrated technological networks according to European level;
- Development of activities and research-development infrastructures at regional level with social and economic impact.

It is first time when CENTRES OF BENCHMARKING were organized in Romania on European areas the concerns are relatively recent as we could see on Oct 9th 1996 communication “Benchmarking and European industry competitiveness”, but it has been a spectacular evolution nowadays.

The complexity of the project is given both by complexity of the problems themselves and the complexity of relationship among partners, among benchmarking organizations and also within the network/ associations.

The multi-subject character of the activities in the project (identification of critical points, competition analysis, Total Quality Management, utilization and analysis of the data etc.) emphasizes the complexity of the project.

The main working means for the work are first of all, informatics (data base, internet and intranet networks etc.).

So, in the first place, benchmarking centres will be created a top organ (network) and finally it will be performed the lining up to the networks.

There have been identified and defined the main problems and future actions, as follows:

- Acceptance of the frame and model;
- Acceptance of a new National Behaving Code;

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- The desire expressed in consolidating expert group activity for developing the initiative;
- The requirement of developing the network of interested operators;
- The suggestion of creating local centres of promotion, dissemination and making ease of the benchmarking implementation to national degree.

RESULTS:

1. Study concerning methods and techniques used in benchmarking;
2. Five benchmarking organizations;
3. Status, logical diaphragm, personnel list, regulations for functioning for the five organizations;
4. Benchmarking network, constitution report, status, logical diaphragm, regulations of functioning;
5. Nine communications and one article.

APPLICATION AREA:

At micro and macro-economical scale the effects of project implementation are:

- Providing to economic agents to government and non-governmental institutions services and means which make possible the identification the opportunity of permanent improvement of performances.
- Connecting to the existent European and international tendencies and means, by possibility lining up Romanian organizations to the existing benchmarking clubs and networks.
- Improvement of performances economic organizations and partner ships.
- Promotion of concept, techniques and instruments of benchmarking in Romania.
- Creating specialists in domain.
- Offering to Small and average enterprises and other governmental and nongovernmental organizations – a new service, the service of benchmarking.
- The creation of permanent improving of performances by identifying and implementing of the best methods which are present on worldwide.
- Capitalization of technical and scientific potential and research development organizations and also the universities by creating benchmarking organizations.
- Creating new jobs.
- Increasing of competitiveness of organizations to which benchmarking is applied.

BENEFICIARY:

- Small and medium enterprises, Inventing Research-Development units, education units, public organizations.

The users of benchmarking projects can be national and international organizations.

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- **“CE–MECATRON” -CENTRE FOR PROFESSIONAL COMPETENCES IN MECHATRONICS EVALUATION**
- **“CF–MECATRON” CENTRE FOR PROFESSIONAL TRAINIG IN MECHATRONICS**



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[With National Authorization from CNFPA]

➔ Organizes evaluation for:

MECHATRONICS:

- technician
- engineer

➔ Ensures for the candidates the proper PROFESSIONAL COMPETENCES EVALUATION and the access to their Specific Resources.

➔ Issues CERTIFICATES/ DIPLOMAS recognised nationally

- TARGET GROUP: any person of minimum 18 years of age, with experience in the field
- REQUIREMENTS FOR THE TARGET GROUP REPRESENTATIVES: graduates from high school with / without high school diploma and / or vocational school graduation diploma



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MECHATRONICS:
 - technician
 - engineer
 - ➔ Ensures for the candidates the proper PROFESSIONAL TRAINING and the access to their Specific Resources
 - ➔ The PROFESSIONAL TRAINING courses ensure:
 - ✓ Labour redistribution
 - ✓ Acquiring new skills for:
 - people seeking employment
 - persons employed in the entities and organizations
 - People interested in the labour market
 - ✓ Review of training programs in accordance with the law
 - ➔ The TRAINER course ensures:
 - ✓ Becoming TRAINER, for:
 - persons who have acquired skills of informal trainer (by self-study, at work,, from introductory or short courses) and want official certification
 - persons interested in obtaining the status of qualified Trainer
- Target group requirements: people with higher education or equivalent



FURTHER INFORMATION: Professor PhD.EurEng Gh. Ion GHEORGHE / Phone: 021.252.30.68/69,
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MEASURING AND TESTING LABORATORIES IN VARIOUS FIELDS



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LENGTH TESTING LABORATORY - LIL

OVERVIEW:

The **Length Testing Laboratory** is a laboratory accredited by RENAR according to SR EN ISO/CEI 17025:2005 (accreditation certificate no. LI 783) for the following tests:

- Dimensional and shape errors determination of the limitative plain cylindrical gauges;
- Callipers indication errors determination;
- Micrometers indication errors determination;
- Analogical and digital dial gauges indication errors determination;
- Pneumatic comparators indication errors determination;
- Linear and angular, shape and position dimensional errors determination;
- Vickers hardness test

For these tests, the Length Testing Laboratory uses performing measurement equipments:

TECHNICAL FEATURES:



- **3D measuring machine with CNC, type LEITZ-REFERENCE 600**

Technical features:

- Accuracy: $0,9 + L/350 \mu\text{m}$,
L = measuring length (mm)
- Measurement range X/Y/Z: 1000/700/560 mm
- Resolution: $0.05 \mu\text{m}$

Applications: linear and angular measurements, geometrical tolerances control

- **Universal measuring microscope with digital display, type STARRETT GALILEO QC-5000**

Technical features:

- Accuracy: X,Y : $(1.9 + 5L/1000) \mu\text{m}$;
Z: $(2.5 + 5L/1000) \mu\text{m}$; L = measuring length (mm)
- Measurement range: X/Y/Z: 300 / 150 / 140 mm
- Resolution: $0.1 \mu\text{m}$
- CNC system and VISIO unit

Applications: linear and angular measurements, surfaces positional tolerances control





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CNC surface and contour tester RONCORDER EC 2500-KOSAKA

Technical features:

- Rotational accuracy:
 $0,02 \mu\text{m} + 0.0003\mu\text{m}/\text{mm}$
- Rotary table with automatic centring and tilting
- Resolution: $0.001 \mu\text{m}$

Applications: control of surfaces form



CNC surface roughness tester IND 120-Taylor Hobson

Technical features:

- Resolution (Z): $16\text{nm}/1\text{mm}$;
 $3 \text{ nm}/0.2 \text{ mm}$;
- Accuracy X, Z: $0.5\mu\text{m}$

Applications: measurements of surface roughness and contour

Universal Length Measuring Machine DMS –680

Technical features:

Resolution: $0.1 \mu\text{m}$
Accuracy: $0.5 \mu\text{m}$
Measurement range: absolute 100mm; differential:
680 mm

Applications: dimensional and shape errors
determination of the limitative plain cylindrical
gauges, micrometers and dial gauges indication
errors determination.





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Measurement and calibration laser interferometer system RENISHAW XL- 80



Technical features:

Linear measurement:

- Resolution: $0.001 \mu\text{m}$
- Accuracy : 0.5 ppm
- Linear measurement range: 0-80 m

Flatness:

- Resolution: $0.01 \mu\text{m}$
- Accuracy: 0.6% of calculated flatness
- Flatness measurement range: 1.5 mm

Angular measurement:

- Resolution: $0.1 \mu\text{m/m}$ (0.01 arc sec.)
- Accuracy: 0.2% of calculated angle
- Angular measurement range: 10

Straightness:

- Resolution: Short range: $0.01 \mu\text{m}$;
Long range: $0.1 \mu\text{m}$
- Accuracy:
Short range: 0.5% of displayed value
Long range: 2.5% of displayed value
- Straightness measurement range: 2.5 mm

Squareness:

- Resolution: $0.01 \mu\text{m/m}$
- Accuracy: 0.5% of displayed value
- Measurement range: $3/M \text{ mm/m}$, $M =$ measurement distance in meters of the longest axis

Applications: 3D measuring machines and length measuring machines calibration, high level direct measurements



OPTIMAR 100 Test Instrument

Technical features:

- Resolution: $0.02 \mu\text{m}$
- Accuracy: $0.2 + L/100 \mu\text{m}$; $L =$ measuring length (mm)
- Measurement range: 100 mm

Applications: dial gauges and inductive probes calibration



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Height Gauge MICRO-HITE 350

Technical features:

- Resolution: 1 μm
- Accuracy: $2 + 3 L/1000 \mu\text{m}$
- Measurement range: 350 mm

Applications: dimensional errors determination for terminal sizes, height and length calibers and standards



Hardness Tester 251VRSA-AFFRI

Technical features:

- Resolution: 0.1 HV-HB-HR
- Digital display
- Automatic conversion different scales: Rockwell, Brinell, Vickers

Applications: Rockwell, Brinell, Vickers hardness measurement

CAPITALIZATION AND TECHNOLOGICAL TRANSFER:

- Measurements within some research projects or on contract basis with beneficiaries from the automotive industry, aeronautics, etc.

BENEFICIARIES:

- SC Autochassis International
- SC Automobile Dacia
- SC Renault Mecanique Roumanie
- Research institutes and universities laboratories
- SC Gruppo Italiano Imballage SRL
- SC Plastic Legno Romania SRL

FURTHER INFORMATION:

Eng. Henriette Arabagian, chief of the Length Testing Laboratory - LIL ;

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METROLOGICAL TESTING, TRIAL AND CHECKING UP LABORATORY- PRESSURE



OVERVIEW:

The laboratory is authorized by BRML (the Romanian Bureau of Legal Metrology) for executing pressure tests and checking (BRML authorization no. B - 28/1-07) and accredited by RENAR (the Romanian Accreditation Association) according to SR EN ISO 17025:2005 for carrying out pressure stamping activities (RENAR authorization no. LE 009).

TECHNICAL AND FUNCTIONAL CHARACTERISTICS:

Pressure calibration:

1. Pressure to tension or electricity transducers and transmitters for -1 up to 600 Bars intervals, with a precision ≥ 0.1 ;
2. Digital and analogical display manometers, mano-vacuumeters and vacuum meters, for -1 up to 600 Bars intervals, with a precision ≥ 0.01 ;
3. Elastic element manometers and mano-vacuummeters for -1 up to 1200 Bars intervals, with a precision ≥ 0.05 ;
4. Pressure transducers for 0.8 up to 1.2 Bars, with a precision ≥ 0.1 ;
5. Barometers, for 0.8 up to 1.2 Bars intervals, with a tolerable error of ± 1 mbar.

Pressure checking:

1. Gas and liquid pressure manometers for -1 up to 1200 Bars measuring intervals, with a 1 to 4 precision scale;
2. Auto-vehicle tire pressure manometers for 0 to 4; 0 to 10 or to 20 Bars interval, with a precision $\geq 1,6$;
3. Mechanic devices for blood pressure for -0 up to 300 mmHg measuring intervals, with $E_t = \pm 4$ mmHg.

APPLICABILITY AREAS :

Calibrating pressure measuring devices from the endowment laboratories of the research units and production units.

CAPITALIZATION AND TECHNOLOGY TRANSFER:

Executing internal calibrations and for third parties.

BENEFICIARIES : Laboratory MMI 6 – INCDMTM Bucharest; Eng. Vlad Dumitru



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TESTING LABORATORY FOR MEDICAL DEVICES - LIDM

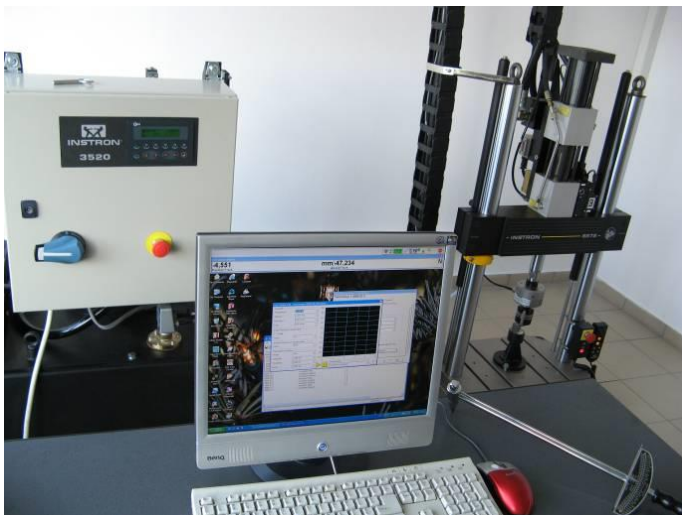


OVERVIEW:

Development of a testing laboratory by achievement of technology, equipment and devices with high performance, needed to expand the range of static test for implantable and non implantable medical devices and to attempt to endurance of femoral component for total hip prosthesis in order to ensure services in assessment of conformity in accordance with Directive 93/42/EEC and associated harmonized European standards, needed both to public authorities in the supervision of the market, as well as to domestic manufacturers of medical devices, to fulfil their obligations derived from the directive and national legislation.

List of tests:

- (1) Tensile testing procedure: LIDM - PI-01 and SR EN 10002-1: 2002;
- (2) Compression test procedure: LIDM-PI-02 and STAS 1552: 78;
- (3) Bending test procedure: LIDM-PI-03 and STAS 1660:1980;
- (4) Endurance test procedure: LIDM-PI-04, ISO 7206-4 and ISO 7206-8.



TECHNICAL SPECIFICATIONS:

HOUSFIELD equipment for static tests

- Speed work / approach: from 0.001 mm / min up to 500 mm / min, with increments of 0.01 mm / min;
- Work force: from 0.1 N to 10,000 N, with increments of 0.1 N;

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- Speed of return to original position: from 0.001 mm / min up to 500 mm / min;
- Maximum vertical travel: 1100 mm, without specimen and mounted fixtures;
- Distance between columns: 400 mm;
- readily interchangeable force Cells: 250 N and 10000N;
- Accuracy of force: 0.5% of the applied force;
- Force reading rate of 200 times / sec;
- vertical movement precision: ± 0.0001 mm;
- Travel speed accuracy: 0.005%.

Universal testing equipment INSTRON 8872

- Loading Force from 2N $\pm$ up to 10KN;
- Working speed: from 0.005 up to 60 000 mm / min;
- Working temperature: from -70 ° C to 250 ° C;
- Maximum working frequency: 1 kHz;
- Rest pressure: 24 bar;
- Working pressure 207 bar.

APPLICABILITY:

- Implantable medical devices for orthopaedic surgery
- Device and application instruments for use in orthopaedic surgery for spine pathology
- Medical device and application instruments for skull-jaw-face surgery
- Instruments for surgical technique to implant endoprosthesis
- Femoral components for total hip prostheses

CAPITALIZATION AND TECHNOLOGICAL TRANSFER :

Developing conformity assessment of capacity in Romania and participation to inter-laboratory comparisons by implementing and accrediting of a management system according to SR EN ISO / IEC 17025:2005 and to ensure trained staff for test specimens in accordance with the European directives requirements and standards for medical devices.

BENEFICIARY:

Manufacturers and importers for implantable and non implantable medical devices in Romania and abroad.

FURTHER INFORMATION: PhD.eng. Stanca COMSA e-mail: stanca_comsa@yahoo.com

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VIBROACOUSTIC TESTING LABORATORY - LIVA

PRESENTATION

The vibroacoustic testing laboratory has a special room for noise testing over a reverberating plan. This room offers an efficient protection against exterior noise and vibrations, meeting to the requirements of SREN ISO 3744. The lab is equipped with the latest Bruel&Kjaer equipments.

The sound level meters:

Hand-held Analyzer Type 2250; microphone and preamplifiers, sound calibrator type 4231; sound dosimeter type 4445; reference sound Source type 4204; Pulse Analyzer 3560-B-010; Sound Intensity Probe Kit type 3599; Sound Intensity Calibrator type 4297

Vibration Meters:

Human Vibration Analyzer Type 4447; accelerometers; Vibration Calibrator type 4294; Equipment for stroboscopic balancing vibration measurement

TECHNICAL AND FUNCTIONAL CHARACTERISTICS:

- Noise sources measured in the acoustical room:
- 6 db greater than the background noise, when corrections are applied
- 15 db greater than the background noise, when corrections are not applied
- Average Level of the Background Noise in acoustical testing room: 19 dB



Types of Tests:

Acoustical Tests: the Noise emitted by domestic appliances, fans and other similar noise sources; the acoustic power of the noise sources evaluated by measurements of the acoustic pressure in several points; power, pressure, and acoustic intensity generated by installations and equipments;



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Vibration Tests: the evaluation of the human exposure to potentially harmful vibration transmitted to the hand, by manually driven machines, vibration parts, determination of the rotating shaft imbalance;

APPLICATIONS

- Measurements of the acoustic pressure, acoustic intensity and vibrations in the industrial and civil environment
- Tests are carried out in the acoustic room or on site.

CAPITALIZATION AND TECHNOLOGY TRANSFER:

- Measurements for specific research projects or for customers coming from the industrial environment
-



BENEFICIARY:

Commercial societies from industrial and civil environment.

FURTHER INFORMATION:

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PNEUMATIC PORTABLE MACHINES TESTING LABORATORY - LIMP -

OVERVIEW:

The Pneumatic Portable Machines Testing Laboratory, from INCDMTM Bucharest, has the possibility of carry out testing portable pneumatic rotary machines with power up to 0.45 kW and torque up to 10 Nm. Thus, it can be checked: portable pneumatic grinding machines, portable pneumatic drilling machines, portable pneumatic threading machines, portable pneumatic screw drivers with or without adjustable coupling, impact hydraulic impulse/ratchet pneumatic portable wrenches, gear motors and other pneumatic rotary machines. It can also check electric machines, with the same technical characteristics.



Measuring air consumption idling

The laboratory is equipped with:

- A checking equipment for power of portable pneumatic machines for general use;
- A flow meter;
- A dynamic torque transducers;
- Static torque transducers;
- Digital display devices for signal processing from torque transducers;
- An electronic speedometer;
- A sound level meter;
- A pressure gauge;
- A thermometer;
- A measuring and control equipment: callipers, micrometer, comparator with support etc.
- A work bench

TECHNICAL AND FUNCTIONAL FEATURES:

- (1) measure mass of pneumatic machines
- (2) tests of compliance with security requirements
- (3) dimensional measurement and radial deviation
- (4) speed measuring - idle and under load
- (5) measurement of compressed air consumption at idle and under wear
- (6) measurement of power
- (7) torque measurement
- (8) measurement of noise



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APPLICABILITY:

Portable Pneumatic rotary machines with power up to 0.45 kW, Maximum torque 10 Nm.

CAPITALIZATION AND TECHNOLOGY TRANSFER:

Making laboratory came to support market needs being tested Portable Pneumatic rotary machines with power up to 0.45 kW, Maximum torque 10 Nm.



Measurement of power



Measuring speed idling

BENEFICIARY: INCDMTM BUCHAREST

FURTHER INFORMATION:

Eng. Ileana TĂCUTU – Phone: +40212523068 / 356, e-mail: ileana.tacutu@incdmtm.ro



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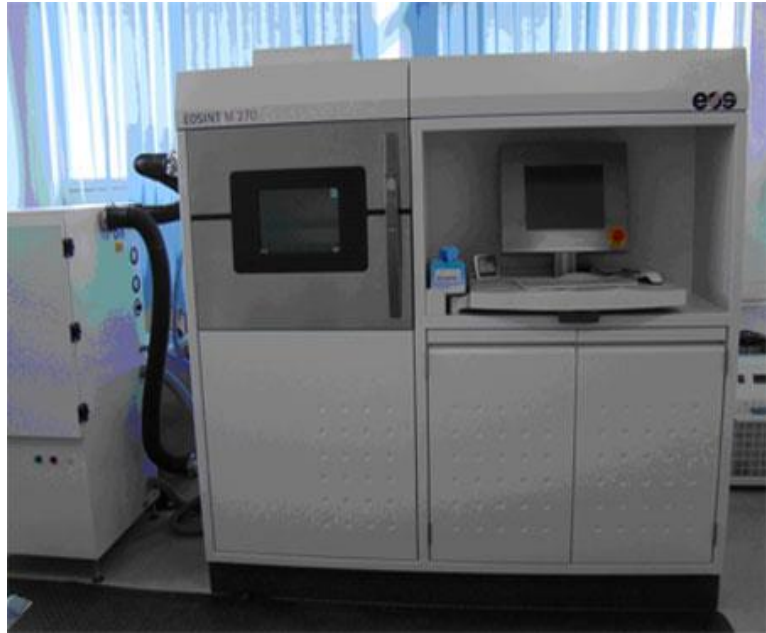
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THE RAPID PROTOTYPING LABORATORY

OVERVIEW:

The Rapid prototyping Laboratory is unique in Romania. The laboratory is based on “High-tech EOS M 270 - Laser sintering system for metal powder”, that works basing on the principle of carrying-out parts made up of sintered metallic powders (toughened by local melting) with the aid of a laser beam. The geometry of the parts can be of very complex nature, created directly into 3D CAD data systems, the soft of the equipment allowing their materialization by adding several powder layers (18 microns thin), sintered afterwards. This is a modelling process for high quality



and resolution part generation, with great surface finishing and mechanical features similar to those obtained by applying conventional infusion proceedings.

TECHNICAL AND FUNCTIONAL FEATURES:

Real construction volume (including the supporting pad: 250 mmx250mmx215 mm

- Construction speed (depending on the material): 2 - 20 mm³/s
- Layer thickness (depending on the material): 20 - 100 µm (0.001 - 0.004 in.)
- Laser type: Yb-fiber laser, 200W
- Precision optics: F-theta-lens, high-speed scanner
- Scanning speed : < 7.0 m/s
- Focus diameter variation : 100 -500 µm
- Absorbed electricity: 32 A
- Used powder: max. 5.5 kw
- Nitrogen generator: standard
- Compressed air supplying: 7.000 hPa; 20 m³/h
- Dimensions (B x D x H)
- System: 2 000mm x 1 050mm x 1940
- Recommended installation area: approx. 3.5m x 3.6m x 2.5m
- Weight: approx. 1 130 kg
- Data processing

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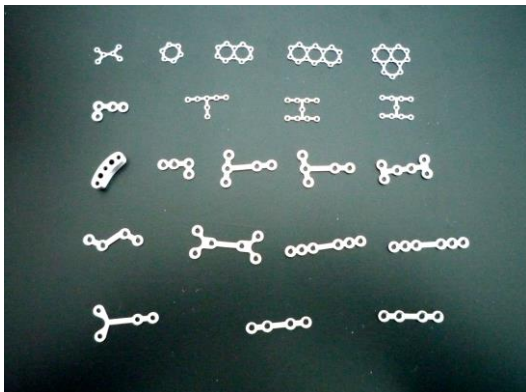


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- PC OS: Windows
- Software: EOS RP Tools; Magics RP (Materialise)
- CAD Interface : STL
- Network: Ethernet
- Certifications : CE, NFPA
- Design in form and shapes to cover all clinical situations;
- Made from biocompatible materials;
- Resistant at normal mechanical load which appears in designated implant place from human body;
- Easy to apply and to assembly;
- The mini implantable fixing system permit to distraction and extension bone of small bone pieces;



APPLICABILITY:

The applications of the device are linked mainly to the type of metallic powders used: medical stainless steel metallic powders (EU taxonomy: 1.2709 and 1.4542), Co Cr Mo and Ti 64 metallic powders. Hence, the main destinations of the output components will be prostheses, bone extraction and synthesis systems, and respectively special destination products.

CAPITALIZATION AND TECHNOLOGY TRANSFER:

It can be obtained any shape from CAD CAM applications.

BENEFICIARY:

The beneficiary can be any company that wishes to verify the design of their products before putting in fabrication or manufacture of prototypes.

FURTHER INFORMATION:

Eng. DAN CIOBOTA, e-mail: incdmtm@incdmtm.ro

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TESTING LABORATORY OF WEIGHING APPARATUS WITH NON-AUTOMATIC FUNCTIONING (LIAC)

OVERVIEW:

Testing laboratory of weighing apparatus with non-automatic functioning (LIAC) supports research in measuring domain of the masses.

TECHNICAL AND FUNCTIONAL FEATURES:

LIAC may issue test reports for weighing apparatus with non-automatic functioning (scales) with the following technical characteristics:

- electronic apparatus ;
- numerical indication ;
- Max : 30 kg ;
- class of accuracy: III, IIII ;
- divisions of verification, max : 3000 ;
- with one or more weighing ranges ;
- with automatic or semi-automatic update or maintain zero;
- with or without automatic tare ;
- with one or more indicator devices ;
- temperature range of use: -10...+40°C ;



APPLICABILITY:

LIAC performs conformity assessment for weighing apparatus with non-automatic functioning described above, in accordance with Law 608/2001 and HG 617/2003, and for these evaluations LIAC may perform the following tests:

▪ Zero control	▪ Getting to zero before loading
▪ The determination of weighing performance	▪ The test of apparatus with multiple indicative devices
▪ Test with tare	▪ Test of eccentricity
▪ Test for mobility	▪ Test of fidelity
▪ Creep test	▪ Trying to return to zero
▪ Test of the stability of equilibrium	▪ Trying to tilt
▪ Test of the heating time	▪ Test at the temperature;
▪ Test of voltage variations	▪ Test Endurance
▪ Test of gradient stability.	

CAPITALIZATION AND TECHNOLOGY TRANSFER:

Making LIAC came to support research in the field of electronic scales and hence the mass measurement.

BENEFICIARY: INCDMTM Bucharest

FURTHER INFORMATION: Eng. Ana MAIER, Phone:: +4021.252.30.68/int.356;

email : maier.ana@incdmtm.ro

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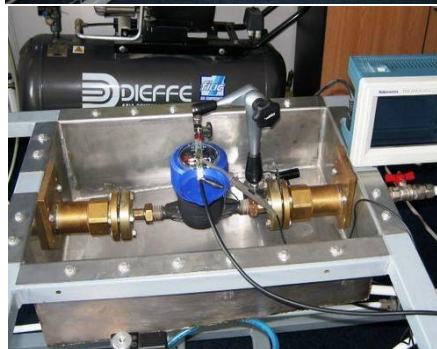


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FLOW METER LABORATORY FOR CONFORMITY TESTS OF SOME SPECIFIC TYPES OF DEVICES WITHIN THE FIELD



OVERVIEW:

The Flow meter Laboratory within INCDMTM Bucharest is certified starting with 2007, according de Accreditation Certificate no. 481-L by the Romanian Accreditation Association – RENAR for tests on determination of the indication relative errors of the cold water counter/meter DN15.

The test method used according the referential CS 108/2005 and the test procedure LD-PL-01 is the volumetric method with standard tube.

Tests are made on a standard stand with a pneumonia hydraulic cylinder and piston having the standard certificate no. 06.02 – 328/2005, issued by BRML – INM Bucharest.

TECHNICAL FEATURES:

In accredited regime the tests are done on the testing stand with the measurement uncertainty extended of $\pm 0,32\%$

In not accredited regime in the laboratory may be made the following tests:

- determination of the relative errors of indication of the volume transducers and of the flow meters with the nominal diameters less than 15 mm for liquids others than the water, on this purpose the stand uses as working flow water with glycol, volumetric concentration 20%;
- determination of the pressure loss on the test device during the interval $0 \div 500$ mbar.

APPLICABILITY:

Industrial flow meter, companies producing such devices, economic agents providing service activities in the field, units with RD activity not having the necessary equipments for conformity evaluation, for providing the free movement of products and services.

PRACTICAL APPLICATION / TECHNOLOGY TRANSFER:

The laboratory realization and accreditation supports the internal market, thus is interdicted to commercialize and use certain low quality devices specific for the industrial flow meter field.

BENEFICIARY: INCDMTM Bucharest

FURTHER INFORMATION: Eng. Codrut Darie, Phone:: 021.252.30.68 / 352,
e-mail: codrutdarie@yahoo.com

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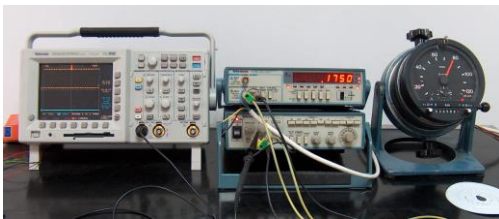
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LABORATORY FOR CHRONOTACOGRAPHIC TESTS – LIC



OVERVIEW:

The laboratory tests for the chronotacographs fixed or not on auto vehicles:

- Verifies the tolerated error both for run distance indication and registration
- Verifies the tolerated error both for speed indication and registration
- Verifies the tolerated error both for time indication and registration
- Verifies the hysteretic error both for time indication and registration

TECHNICAL FEATURES:

Equipments for realizing the above mentioned tests are:

- function generator – type TECTRONIX
- oscilloscope with 2 channels – type TECTRONIX
- stabilized source - type TECTRONIX
- frequency meter/counts the impulses - type TECTRONIX
- stand for visualizing the impulses shape
- microscope for measurement
- installation for acclimatization

APPLICABILITY:

The laboratory is destined to test chronotahographs fixed on auto vehicle for goods and persons transport and for those which are not fixed on auto vehicle (in laboratory conditions).

PRACTICAL APPLICATION / TECHNOLOGY TRANSFER:

The capitalization was made by obtaining the Accreditation certificate from RENAR.

BENEFICIARY: INCDMTM Bucharest

FURTHER INFORMATION: Eng. Ștefan Văduva Phone:: 021.252.30.68 / 352,
e-mail: stefanvaduva2008@yahoo.com

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LABORATORY OF LASER APPLICATIONS

OVERVIEW:

Laser applications testing laboratory using a high power laser such ROFIN SINAR LASER GmbH/Germany – 2200W and may be used to accomplish different welding, debiting, thermal treatment operations, in fabrication processes providing important advantages such as material flexibility, geometry and processing. Welding with laser is rapid, ecological, providing a high processing quality seldom needing post processing. An important application is the diamonded parts welding on the steel disks.

The advantages are doubtless and proven in the current practice as compared to classic industrial equipment, such as: increased flexibility, the possibility to produce miniaturized components, consistency and the repeatability of results, the possibility to process very hard materials, easy automations. The mechanical and technical requirements imposed by the materials when using these technologies are minimal obtaining a high-quality welding seam and increased productivity.

MACROLASER CENTER (fig 1) consists in

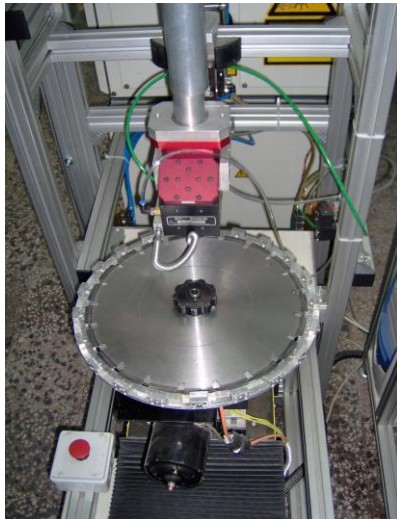


Fig.1 - MACROLASER CENTER

a. mechanical component:

- the layer and the PC fixing table
- the displacement module on the X axis – a precise construction configured with the help of the following mechanisms: the screw-nut mechanism driven by a stepper engine, ball cages for reducing friction;
- the module for positioning and fixing of the diamonded segments is configured for manual fixing of the segments, a diamond blade size corresponding for each module.

b. electronic component – information system for shift and control

- **HARDWARE component** consisting in:
- **SOFTWARE PROGRAM** – LabVIEW VI developed by NATIONAL INSTRUMENT
- the module for fixing the flat tools – the support structure in a solid construction of soft alloy, meant to sustain the broach in order to fix the flat tools and the module for fixing segments.
- the broach for fixing flat tools - designed to obtain the rotation movement necessary for the positioning of every segment in front of the laser beam.

Joint parts couple

Debiting disks comprises from the structural point of view of a steel disk support on which periphery are fixed the segments according to a preliminary geometry and an active part – circular segments. The support has the configuration showed in fig.3.



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TECHNICAL AND FUNCTIONAL CHARACTERISTICS :

laser type RS 2000 SM

Fascicle characteristics:

Wavelength: 10,6 μm

Electric current c.c.

Issue power :

Guaranteed power : 2000 W (nominal power)

Timing interval: 200-2200W (maximum power)

Stability: $\pm 2\%$ (temperature of cooling water

$\Delta = \pm 0,5\text{ }^{\circ}\text{C}$)

Quality of laser beam:

Diameter : approximately 19 mm

Divergence : $\leq 1,5\text{ mrad}$, entire angle (in the aisle just at 10 m)

Stability to fix: $\leq 0,15\text{ mrad}$

Structure : TEM 01* linear just at 45°

Impulse characteristics :

Impulses frequency : 0 – 1 khz

Pulses length : 100 μs – continuous

Laser gases:

Input : He 60 nl/h whiteness 4,6

N₂ 32 nl/h whiteness 4,6

CO₂ 3 nl/h whiteness 4,5

Dimension:

Laser head :(L) 2050mm; (I) 800 mm; (h) 1370 mm

Press command:(L) 620mm;(I) 840mm;(h) 1955 mm

Electrical connect:

Voltage: 400 V + 6 % / -10 % ; 50 / 60 Hz; 3 phases; with zero protection; 22 kva – at nominal power

Used up power : 25 kva – la maxim power

Used up current : Max. 36 A

Fuses: 50 A

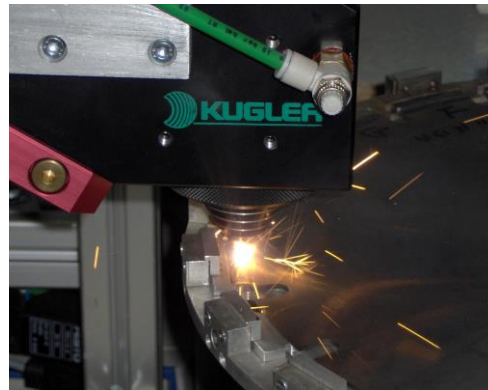


Fig.2

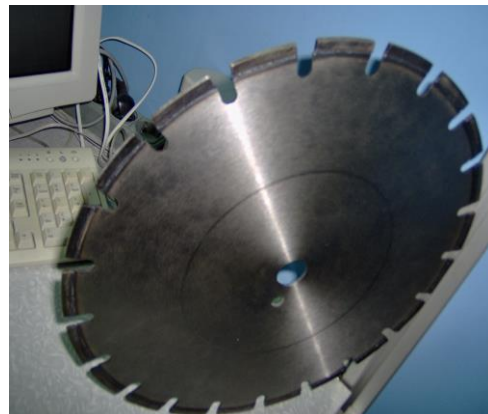


Fig.3

APPLICATION AREAS :

With Macolaser Center have made researches and experiments of the type:

- experiments for verifying the balance cooling functioning of the pump type Roots and the automation box/panel ;
- tests over the electric circuits from the general panel and the achievement of their functions;
- researches on the answering capacity of the laser source, having as the result a fascicle with the equivalent power with the one included in the execution documentation (0÷ 2200W) ;
- the corresponding set up of the laser source in horizontal plane; tests on the control panel functioning and on the software program (firstly on instantaneous trigger of each operation before forming the laser fascicle, among these the most important are: the current source supply, vacuum pump action for evacuation and the refreshment of the laser gases joint, supply

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with gases, etc.);

- set up the laser fascicle parameters taking into consideration the influencing factors and the materials compatibility for welding;
- researches on the alignment of the transport system of the laser fascicle
- positioning of each component on the supporting frame, resulting there design of certain parts;
- adapting the software program for the disk – diamonded segment ensemble positioning in front of the laser fascicle;
- continuous improvement of the laser fascicle quality by modifying the functional parameters (power, cooling speed, protection gas flow, peripheral displacement speed of the port-segments disk in front of the fascicle and the minim/maxim distance between the welding aria and the fascicle);
- researches on obtaining a correct position of the deflection prisms on the whole laser fascicle flow, for its alignments according the X, Y and Z and to the others components modules;
- modifications over the constructive shape of the disk support, to allow the fascicle to penetrate and to achieve a welding on all the segment thickness;

CAPITALIZATION AND TECHNOLOGY TRANSFER:

The application of laser welding *of the diamonded segments on the* metal discs production is the implementation of a multifunctional and flexible manufacturing process, approved by several interested businesses to benefit from research results. These discs are extremely domestic required to process the following types of materials: limestone, red marble, conglomerate, sandstone, hard rock, volcanic tuff, travertine, quartz, slate, gneiss, marble compact, white marble, granite, Dion, andesite , basalt, Pedestrian, Siena, fire brick, cement, asphalt, concrete, reinforced concrete. In Romania, so far producing companies DIAMOND TOOLS FOR brazing technologies for permanent joining of the diamond segments on the body of the tool steel.

Transfer results can be achieved through activities such as: identifying and promoting innovation offers the area - of interest, applications of technology, maintaining links between research - education - industry, information and technical advice by: magazine ISIM Bulletin " , information bulletin "ISIM - News, guides to good practice, technical hot-line services, conferences, seminars, workshops, symposium with international participation" INDLAS.

In Romania is aiming to create a network of technology transfer in the weld, a Balkan regional networks with the main partners welding associations of Bulgaria and Serbia-Montenegro, whose work will contribute to the development of flexible cell made in this project.

BENEFICIARIES :

Users can be companies with a tradition of manufacturing high-tech products such as: SC ALPHA DIARUL SA Bucharest, SC Diamond TECHNOLOGY SA Bucharest, SC DIATECH SA Bucharest.

FURTHER INFORMATION: Dr. Eng. Iulian Munteanu, e-mail: iuli_sm@yahoo.com

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N G O s



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PROFESSIONAL ASSOCIATION OF THE ROMANIAN PATRONATE OF PRECISION MECHANICS, OPTICS AND MECHATRONICS– APROMECA

OVERVIEW:

APROMECA is a professional association, a non-governmental, a-political and non-profit organization made up of registered juridical and authorized physical persons activating in the field of Precision Mechanics, Optics and Mechatronics. The association reunites **20 affiliated members**: RDI national institutes/ RDI institutes, SROMECA Association – The Romanian Mechatronics Society as well as economical agents/producers (SMEs).

- INCDMTM - Bucharest
- The National Institute for Research and Development in Electrical Engineering ICPE – CA
- THE RESEARCH INSTITUTE FOR HIDRAULICS AND PNEUMATICS INOE 2000 – IHP Bucharest
- THE ROMANIAN ECONOMICAL AND SOCIAL STUDIES – IRECSO – Bucharest
- UPB – RESEARCH AND DEVELOPMENT CENTER FOR MECHATRONICS – CCDM
- SC. PRO OPTICA SA Bucharest
- SC. OPTOELECTRONICA 2001 SA Bucharest
- SC. ITM – AMIRO SA Bucharest
- SC. ROMFLUID SA Bucharest
- SC. CARMESIN SA Bucharest
- SC. CONTOR GROUP SA Arad
- SC. BADOTHERM AMC SA Vaslui
- The Romanian Mechatronics Society – SROMECA
- SC. TEHNOROM Bucharest 1990 SRL
- C.I.T. Automations
- SC. QUATRO PROD COM SRL Bucharest
- SC. GENERAL FLUID SA Bucharest
- SC. HESPER SA Bucharest
- Etc .

APROMECA unfolds the following activities:

- industrial marketing;
 - information exchange and access on the evolution of the activity field at an international scale;
 - promotional activities;
 - Intercessions on the training of specialized experts ;
 - specialized fairs and exhibitions both in Romania and outside the country;
 - European qualification actions, inclusively the harmonization of the Romanian legislation to the normative dispositions of the European Union;
 - representing the members in the social dialogue without affecting their independence; negotiating and enclosing the collective work contract in the branch, participating in other agreements with the public authorities and the syndicates, as well as participating in management and social dialogue;
 - forwarding to the proper Public Authorities in charge of proposals for laws;
- Accessing financing as subventions, donations, subscriptions, contributions, sponsorships.*

APPLICABILITY:

Promoting research, development, innovation, marketing and knowledge dissemination activities in the field of mechatronics, advanced micro- and nano-processing micro-technologies in the field of mechatronics, micro-technologies.

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TECHNOLOGICAL TRANSFER:

Capitalizing the applicative researches in the fields of precision mechanics, optics, mechatronics are found in the profile SMEs productions, as: technological and production systems, remote-control systems, bio-medical systems, slate and tools made of c.m.s, instrumental tools used in implanthology, cold, hot and branch-type meters, opto-electronic equipments for industrial applications, medical and military applications as well as micro-optical and nano-optical technologies.



Advanced micro-technology and equipment for micro- and nano-processings with laser beam by sintering - INCDMTM



Robotic module 3 DOF
UPB-CCDM Bucharest



Cold and hot meters, of
branch-type Contour
Group Arad



Pressure differential transducers
INOE 2000 – IHP Bucharest



BENEFICIARY:

SMEs in the field of precision mechanics, optics, mechatronics, micro-optical and nano-optical measuring and control measuring technologies.

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MICRO-/ NANO-/ MECHATRONICS



MICRO-/ NANO-/ ROBOTICS



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SCIENTIFIC PRODUCTION 2013



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Projects of Research 2013

PROJECTS OF RESEARCH			
• NATIONAL/ INTERNATIONAL PROJECTS 2013			
Contract No.	Project name	Manager	Beneficiary:
„NUCLEU”			
09.05.01.06	Study and analysis of mechatronic methods testing for low pressure gear pumps	Aurel Abălaru	M.E.N.
09.05.01.09	Research on improving mechatronic motor systems - gear transmissions - in order to achieve high performance products with high added value	Ștefan Văduva	M.E.N.
09.05.01.11	Research on methods and techniques of remote monitoring and configuration of complex mechatronic equipment	Constantin Anghel	M.E.N.
09.05.02.01	Study and analysis of hardware and software systems for data acquisition and processing specific to mechatronics and measurement technique	Dănuț Stanciu	M.E.N.
09.05.02.05	Study on intelligent systems for measuring parameters of ventilation in residential buildings	V. Dumitru	M.E.N.
09.05.02.07	Computerization of identification and control methods in automotive industry using vision mechatronic systems	Sorin Sorea	M.E.N.
09.05.03.01	Processing and control techniques for the development of nano-structured micro-sensors	Aurel Zapciu	M.E.N.
09.05.04.01	Modelling and control of robots for precision positioning applications in medical mechatronics	Mihai Mărgăritescu	M.E.N.
09.05.04.03	Characterization of the mechanical properties of the elements and fixation of prosthetic bio-materials produced by laser stereo-lithography	Florin Isvoranu	M.E.N.
09.05.04.04	Mechatronics devices for measuring tribological characteristics of prosthetic joints of the human skeleton	Stanca Comșa	M.E.N.
09.05.05.05	Information Security - effective strategy for confidentiality, integrity and availability of technical information - scientific research - development - innovation	Carmen Finat	M.E.N.
09.05.05.07	Strategy and prognosis of Mechatronics- / Micro- and Nano-Mechatronics and Robotics / Micro- and Nano-Robotics Technology Platforms in the globalization and sustainable development concept	Octavia Căruntu	M.E.N.
09.05.05.08	Study on the development and modernization of the management of partnerships for innovation and technology transfer innovative poles at local and regional level.	Octavia Căruntu	M.E.N.
Structural Funds - POSCCE - NASR			
131	Intelligent information devices for measuring and monitoring sediment hydrodynamics based on new measurement methods	Alexandru Moldovanu	NASR
437	Research centre for measuring technique / Acronym: CERTIM	Gh Ion Gheorghe	M.E.N.
Structural Funds - SOP HRD (Human Resources Development Operational Programme)			
POSDRU/90/2.1/S/62144	Development of education for labor market viability of the innovative vectors mechatronics & integronics (M & I)	Gh Ion Gheorghe	MLFSP
INTERREG PARTNERSHIPS			
1006 R4 TRAP	Territories of Rivers Action Plans	Ioan Lung	Kainuun Etu Oy, Finland
1313 R4 KTFORCE	Knowledge Transfer joint forces for efficient innovation	Iulian Ilie	Univeristy of Porto, PT
PART. - PN II - STAR			
8	Sub-systems for nano-satellites	Popan Gh.	Institute of Space Science / INCDFLPR – STAR subsidiary

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CHECKS INNOVATION			
169CI	Innovative instruments for minimally invasive surgery for reducing femoral fractures.	Stanca COMSA	UEFISCDI / Benef. SC CARMESIN SA
174CI	Development and introduction into production of new innovative devices for checking forces in switch electro-mechanisms	Lața Ioan	UEFISCDI / Benef. SC SPIACT SA Craiova
EVENTS			
41M	MECAHITECH'13 International Conference	Gh Ion Gheorghe	NASR
5L	Scientific literature	Gh Ion Gheorghe	NASR
• PROJECTS WITH THIRD PARTIES 2012			
COMMAND FROM BENEFICIARY	BENEFICIARY	PROJECT	
CHIMCOMPLEX Borzesti	80R	Nanometer calibration	
CNC IMOBILIARE SRL	1117	Nanometer calibration	
CSC TRANS METAL SRL	443	Pieces turning	
DACIA	4201785623	Spare pieces	
DACIA	4201867664	Crankshaft detection system	
DACIA	4201895918	Marking system repair	
DACIA	4201897175	Spare pieces	
DACIA	4201898553	Marking system repair	
DACIA	4201902587	Spare pieces	
DACIA	4201905637	Spare pieces	
DACIA	4201923798	Spare pieces	
DACIA	4201927839	Spare pieces	
DACIA	4201931162	Spare pieces	
DACIA	4201931162	Spare pieces	
DACIA	4201931162	Spare pieces	
DACIA	4201942808	Warranty crankshaft assembly caliber	
DACIA	4201948830	Spare pieces	
DACIA	4201955226	Control devices modification	
DACIA	4201962137	Spare pieces	
DACIA	4201964408	Optimization of OP 180 TAMB.4X2	
DACIA	4201973386	Spare pieces	
DACIA	4201974269	Spare pieces	
DACIA	4201977550	Spare pieces	
DACIA	4201977586	Spare pieces	
DACIA	4201983525	Spare pieces	
DACIA	4201984570	Measuring crimping machine	
DACIA	4201985447	Spare pieces	
DACIA	4201988456	Spare pieces	
DACIA	4201990723	Reversing spindle assembly	

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DACIA	4201991162	Maintenance
DACIA	4201993009	Spare pieces
DACIA	4201994330	Spare pieces
DACIA	4201998273	Cylinder control post adaptation
DACIA	4202010166	Spare pieces
DACIA	4202012818	ZEBRA printer maintenance
DACIA	4202012819	ZEBRA printer maintenance
DACIA	4202021277	control device execution
DACIA	4202028520	Spare pieces
DACIA	4202028520	Spare pieces
DACIA	4202034201	Spare pieces
DACIA	4202037790	Spare pieces
DACIA	4202039975	ZANASI printer replacement
DACIA	4202041238	Spare pieces
DACIA	4501666060	Spare pieces
DACIA	4501690781	Spare pieces
DACIA	4501692488	Spare pieces
DACIA	4501695456	Spare pieces
DACIA	4501704147	Spare pieces
DACIA	4501704148	Spare pieces
DACIA	4501704499	Spare pieces
DACIA	4501704501	Spare pieces
DACIA	4501707493	Spare pieces
DACIA	4501709353	Spare pieces
DACIA	4501710055	Spare pieces
DACIA	4501711744	Spare pieces
DACIA	4501712094	Spare pieces
DACIA	4501714939	Spare pieces
DACIA	4501715764	Spare pieces
DACIA	4501718415	Spare pieces
DACIA	4501719234	Spare pieces
DACIA	4501719850	Spare pieces
DACIA	4501723391	Spare pieces
DACIA	4501724644	Spare pieces
DACIA	4501724654	Spare pieces
DACIA	4501725866	Spare pieces
DACIA	4501728497	Spare pieces
DACIA	4501729021	Spare pieces
DACIA	4501729090	Spare pieces
DACIA	4501730916	Spare pieces
DACIA	4501733774	Spare pieces
DACIA	4501735360	Spare pieces
DACIA	4501736755	Spare pieces
DACIA	4501737110	Spare pieces
DACIA	4501738552	Spare pieces
DACIA	4501740925	Spare pieces
DACIA	4501741029	Spare pieces
DACIA	4501743796	Spare pieces
DACIA	4501745503	Spare pieces
DACIA	4501746241	Spare pieces

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DACIA	4501747072	Spare pieces
DACIA	4501753117	Spare pieces
DACIA	4501753982	Spare pieces
DACIA	4501759857	Spare pieces
DACIA	4501761390	Spare pieces
DACIA	4501763600	Spare pieces
DACIA	4501764384	Spare pieces
DACIA	4501766777	Spare pieces
DACIA	4501767001	Spare pieces
DACIA	4501769598	Spare pieces
DACIA	4501771944	Spare pieces
DACIA	4501772640	Spare pieces
DACIA	4501772935	Spare pieces
DACIA	4501773792	Spare pieces
DACIA	4501777157	Spare pieces
DACIA	4501777267	Spare pieces
DACIA	4501777357	Spare pieces
DACIA	4501777986	Spare pieces
DACIA	4501778655	Spare pieces
DACIA	4501780017	Spare pieces
DACIA	4501781452	Spare pieces
DACIA	4501787447	Spare pieces
DACIA	4501788635	Spare pieces
DACIA	4501788798	Spare pieces
DACIA	4501791620	Spare pieces
DACIA	4501792067	Spare pieces
DACIA	4501792977	Spare pieces
DACIA	4501794277	Spare pieces
DACIA	4501794801	Spare pieces
DACIA	4501795647	Spare pieces
DACIA	4501797436	Spare pieces
DACIA	4501797437	Spare pieces
DACIA	4501798014	Spare pieces
DACIA	4501798373	Spare pieces
DACIA	4501799251	Spare pieces
DACIA	4501801110	Spare pieces
DACIA	4501805844	Spare pieces
DACIA	4501806035	Spare pieces
DACIA	4501806802	Spare pieces
DACIA	4501807489	Spare pieces
DACIA	4501809588	Spare pieces
DACIA	4501812216	Spare pieces
DACIA	4501812726	Spare pieces
DACIA	4501813085	Spare pieces
DACIA	4501814062	Spare pieces
DACIA	4501814590	Spare pieces
DACIA	4501816650	Spare pieces
DACIA	4501817633	Spare pieces
DACIA	4501818490	Spare pieces
DACIA	4501819918	Spare pieces
DACIA	4501820893	Spare pieces
DACIA	4501821234	Spare pieces
DACIA	4501821749	Spare pieces
DACIA	4501822128	Spare pieces
DACIA	4501823428	Spare pieces
DACIA	4501824549	Spare pieces
DACIA	4501824581	Spare pieces
DACIA	4501826335	Spare pieces
DACIA	4501827232	Spare pieces
DACIA	4501827537	Spare pieces
DACIA	4501827600	Spare pieces
DACIA	4501832211	Spare pieces

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DACIA	4501833166	Spare pieces
DACIA	4501834403	Spare pieces
DACIA	4501842083	Spare pieces
DACIA	4501842585	Spare pieces
DACIA	4501842962	Spare pieces
DACIA	4501844687	Spare pieces
DACIA	4501844688	Spare pieces
DACIA	4501845805	Spare pieces
DACIA	4501846356	Spare pieces
DACIA	4501847529	Spare pieces
DACIA	4501848953	Spare pieces
DACIA	4501852842	Spare pieces
DACIA	4501853722	Spare pieces
DACIA	4501854161	Spare pieces
DACIA	4501854162	Spare pieces
DACIA	4501855972	Spare pieces
DACIA	4501856028	Spare pieces
DACIA	4501856951	Spare pieces
DACIA	4501859244	Spare pieces
DACIA	4501859370	Spare pieces
DACIA	4501861633	Spare pieces
DACIA	4501862642	Spare pieces
DACIA	4501863544	Spare pieces
DACIA	4800176534	Op. 10...140 control device
DACIA	4800181886	BDL Controls set
DACIA	4800198131	Control table
DACIA	4800198930	Calibers and devices
DACIA	4800198930	Calibers and devices
DACIA	4800199099	BDL Control device
DACIA	4800199102	Caliber control device
DACIA	4800200347	P Diameter control device
DACIA	4800200347	P Diameter control device
DACIA	4800200348	BDL Controls set
DACIA	4800200348	BDL Controls set
DACIA	4800200555	Geometrical Control Device
DACIA	4800200959	Mass control device
DACIA	4800201751	CD Tightness control machine
DACIA	4800201755	CC Tightness control machine
DACIA	4800201758	SEM Tightness control machine
DACIA	4800201758	SEM Tightness control machine
DACIA	4800204427	Control means set
DACIA	4800204429	Control booth adaptation
DACIA	4800204845	Control mean 1 D left, right
DACIA	4800207542	MT 9 QDAS measuring central
DACIA	4800214026	Tightness control machine
DACIA	4800214026	Tightness control machine
DACIA	4800214026	Tightness control machine
DACIA	4800214026	Tightness control machine
DACIA	4800215373	Cover control set supplement
DACIA	4800215374	BDL Controls set supplement
DACIA	4800215374	BDL Controls set supplement
DACIA	4800216935	HPDC 2500 Control table
DACIA	4800216935	HPDC 2500 Control table
DACIA	4800217479	Control means set supplement
DACIA	4800217480	BDL OP.110 Control table
DACIA	4800217765	BDL Controls set
DACIA	4800217765	BDL Controls set
DACIA	4800217785	BDL Controls set (flywheel 1)
DACIA	4800217785	BDL Controls set
DACIA	4800217933	BDL Controls set (flywheel 2)
DACIA	4800217933	BDL Controls set P20 BOP55
DACIA	4800217935	BDL Controls set (flywheel 3)

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DACIA	4800217935	BDL Controls set (flywheel 3)
DACIA	4800217937	BDL Controls set (flywheel 4)
DACIA	4800217937	BDL Controls set (flywheel 4)
DACIA	4800217940	BDL Controls set
DACIA	4800217940	BDL Controls set
DACIA	4800217940	BDL Controls set
DACIA	4800219384	Control device
DACIA	4800220310	SUMEQ programs installation
DACIA	4800220310	SUMEQ programs installation
DACIA	4800220672	MDC EDL Modification
DACIA	4800220673	Central and marking system
DACIA	4800220673	Marking system central
DACIA	4800221006	BDL Controls set
DACIA	4800221006	BDL Controls set
DACIA	4800221387	PF Control assembly
DACIA	4800221590	Avenanr BDL Controls set
DACIA	4800221590	Avenanr BDL Controls set
DACIA	4800222139	Carter, SEM control means supplement
DACIA	4800223393	Control table cell setup
DACIA	4800223393	Control table cell setup
DACIA	4800223926	BDL Control table
DACIA	4800223926	BDL Control table
DACIA	4800224386	N3 control pacing device
DACIA	4800224386	N3 control pacing device
DACIA	4800225313	SEM control means set
DACIA	4800225528	Carter fasten device
DACIA	4800226260	Post control , wear pieces avenant
DACIA	4800226263	SEM control means set
DACIA	4800226603	Distribution carter control means set
DACIA	4800226692	BDL control means set
DACIA	4800227391	Kit control means
DACIA	4800227392	Kit control means substitute
DACIA	4800227395	Manual control installation
DACIA	4800227395	Manual control installation
DACIA	4800227567	Disc control assembly
DACIA	4800227567	Disc control assembly
DACIA	4800228719	Tightness system modification
DACIA	4800228947	Pressing control device modification
DACIA	4800228948	SEM control dipstick
DACIA	4800228950	Spare pieces
DACIA	4800228953	Fasten device
DACIA	4800228953	Fasten device
DACIA	4800230079	Spare pieces
DACIA	4800232549	Spare pieces
DACIA	4800232724	Spare pieces
DACIA	A.Ad4201858902	Spare pieces
DACIA	4501737781	Spare pieces
DACIA	4501749314	Spare pieces
DACIA	4501751072	Spare pieces
DACIA	4800215373	Cover control means supplement
DACIA	4800217479	Control means set supplement
DACIA	4800221033	Cylinder head control means supplement
DACIA	4800222138	Through-going holes checking device
DACIA	4800222139	Carter, SEM control means supplement
EDWARDS	1317	Shaft end repair
ICPE SA	214	Motor shaft
LABOR.CENTRAL CCF	1852	Calibration
PH HIDROPNEUMATIC	1312	Calibration
PLAFORA IMPEX SRL	234	Calibration
PLAFORA IMPEX SRL	374	Nanometer calibration
PROCEMA Cercetare	30	Nanometer calibration
RENAULT	4800225608	Spare pieces

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MECANIQUE		
RENAULT		
MECANIQUE	4201952470	Changing and regulating pieces
RENAULT		
MECANIQUE	4800199358	Grinder clearance measuring device
RENAULT		
MECANIQUE	4800206243	Tightness checking device
RENAULT		
MECANIQUE	4800206243	Tightness checking device
RENAULT		
MECANIQUE	4800217474	Spare pieces
RENAULT		
MECANIQUE	4800219384	BDL Controls set
RENAULT		
MECANIQUE	4800220306	Axis clamping device
RENAULT		
MECANIQUE	4800220306	Axis clamping device
RENAULT		
MECANIQUE	4800222138	Through-going holes checking device
RENAULT		
MECANIQUE	4800222522	Control integration
RENAULT		
MECANIQUE	4800222610	CED H5FT TL8 Integration
RENAULT		
TEHNOLOGIS	2222228623	Nissan carter clutch
RENAULT		
TEHNOLOGIS	2222232365	Conversion mode
RENAULT		
TEHNOLOGIS	4800216959	Reaming measuring device
RENAULT		
TEHNOLOGIS	4800228951	Buffer measuring kit
SC CIE MATRICON	1428981	External gauge
SC CIE MATRICON	CTR.2679	Control devices
SC CIE MATRICON	CTR.2679	Marking control devices
SC COMPONENTE AUTO	CTR.2676	Simple pipe control device
SC COMPONENTE AUTO	Ctr.2676/2012	Simple pipe control device
SC ECT MOTOSPORT	1026	Error indication determinations
SC EPIS GRUP SRL	1136	Nanometer calibration
SC EURIAL INVEST	1082	Calibers
SC ICECON SA	1	Nanometer calibration
SC METROLOGIC BUSINESS	880	Nanometer calibration
SC METROLOGIC BUSINESS	1052	Calibration
SC OMNIA PLAST SRL	0147 E	Error indication determinations
SC PLASTIC LEGNO	171	Error indication determinations
SC PLASTIC LEGNO	13196	Error indication determinations
SC PLASTIC LEGNO	A 13175	Error indication determinations
SC TEHNOFLEX HYDRAULIC	1938	Error indication determinations
SIMAR		Nanometer calibration
TPA SOC.ASIG	1647	Calibration
UM 01924 C	231	Calibration



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ISI PAPERS PUBLISHED IN MAGAZINES/SCIENTIFIC JOURNALS IN 2013

Liliana-Laura Badita, Gheorghe I. Gheorghe – «Modern methods for increasing wear resistance of hip prostheses surfaces», Digest Journal of Nanomaterials and Biostructures, Vol. 8, No. 1, January-March 2013, pp. 53 – 60

Gheorghe Gheorghe, Badita Liliana-Laura, Nastase-Dan Ciobota, Despa Veronica– «Micro-nanometrologically and Topographic Characterization of Metallic Pieces Surfaces Obtained by Laser Sintering», Digest Journal of Nanomaterials and Biostructures, Vol. 8, No. 3, July - September 2013, 1037 – 1041

Gh. Ion Gheorghe, Simona Istriteanu, Veronica Despa, Alexandru Constantinescu, Adrian Voicu, «Adaptronics and Applications of Adaptronics», Annals & Proceedings of 24th DAAAM International Conference 2013 Intelligent Manufacturing & Automation: Focus on Sustainability October 23-26, 2013, Zadar, Croatia

Gh. Ion Gheorghe «Adaptivity of Intelligent Mechatronic, Integronic and Adaptronic Systems and Technologies», Annals & Proceedings of 24th DAAAM International Conference 2013, Intelligent Manufacturing & Automation: Focus on Sustainability, October 23-26, 2013, Zadar, Croatia

Gh. Ion Gheorghe «Intelligent Adaptive Control in High-Tech Engineering», Annals & Proceedings of 24th DAAAM International Conference 2013, Intelligent Manufacturing & Automation: Focus on Sustainability, October 23-26, 2013, Zadar, Croatia

Gheorghe I. Gheorghe, Liliana-Laura Badita, «Improving Tribological Characteristics of Hip Prostheses Using Biocompatible Nanocoatings», Advanced Materials Research, Vol. 741 (2013); p. 67; ISI quoted

Gh. Ion Gheorghe, Gheorghe Popan, «Technological and Cross-Border Mixture Value Chain of Science and Engineering of Multi-Integrative Mechatronics-Integronics-Adaptronics», 11th International Conference of Numerical Analysis and Applied Mathematics - ICNAAM 2013, September 21-27, 2013, Rodos Palace Hotel, Rhodes, Greece, ISI quoted

Popan Gheorghe, Gh. Ion Gheorghe, Todoran Gabriel, «Testing Command and Control of the Satellites in Formation Flight», 11th International Conference of Numerical Analysis and Applied Mathematics - ICNAAM 2013, September 21-27, 2013, Rodos Palace Hotel, Rhodes, Greece, ISI quoted;

Gheorghe I. Gheorghe, Simona Istriteanu, «Technological and Cross-Border Mixture Value Chain of Science and Engineering of Multi-Integrative Mechatronics-Integronics-Adaptronics With Use in the Construction of Intelligent Systems / Micro-Nano-Systems», International Journal of Research in Engineering and Technology - IJRET, p. 233, ISSN (Print): 2321-7308, ISI quoted, impact factor: 1,962, <http://www.ijret.org/CurrentIssue>

Simona Istriteanu, Gheorghe I. Gheorghe, «Designing the Virtual Model of a Mechatronic System», International Journal of Research in Engineering and Technology -IJRET, p. 239, ISSN (Print): 2321-7308, ISI quoted, impact factor: 1,962, <http://www.ijret.org/Current Issue>

Gheorghe Ion Gheorghe, Liliana-Laura Badita, Nastase-Dan Ciobota, Veronica Despa – «Micro-Nanometrologically and Topographic Characterization of Metallic Pieces Surfaces Obtained by Laser Sintering», Digest Journal of Nanomaterials and Biostructures ISSN 1842 - 3582 Vol. 8, No. 3, July - September 2013, p.1037 – 1041, ISI quoted; impact factor: 1.200

Gheorghe I. Gheorghe, Vasile Bratu, Octavian Donțu, «Adaptronics – an Intelligent Science Adaptive to Advanced Systemes / Micro – Nano-systems», 8th International Conference on Optimisation of the Robots and Manipulators - OPTIROB 2013, June, 20-23, Neptun, Romania; ISI quoted

Gheorghe Ion Gheorghe, Liliana-Laura Bădiță, Adriana Cîrstoiu, Simona Istriteanu, Veronica Despa and S. Ganatsios, «Mechatronics Galaxy - a New Concept for Developing Education in Engineering», Proceeding of 17th Conference on Innovative Manufacturing Engineering - ImanE, May 23-24, 2013, Iași, Romania; p. 1550, ISI quoted, <http://www.imane.ro/conference-program/>

TECHNICAL BOOKS - 2013

1 MicroNanoIngineria MEMS & NEMS Inteligente

SCIENTIFIC JOURNALS - 2013

1 ROMANIAN REVIEW PRECISION MECHANICS, OPTICS & MECHATRONICS, 2013, ISSUE. 43, ISSN 1584-5982, QUOTED B+ IN EBDCO AND SCOPUS BDI

2 ROMANIAN REVIEW PRECISION MECHANICS, OPTICS & MECHATRONICS, 2013, ISSUE. 44, ISSN 1584-5982, QUOTED B+ IN EBDCO AND SCOPUS BDI

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PATENT REQUIREMENTS – 2013		
No.	INVENTION	INVENTOR
A / 00480	Mechanical humidistat leaf electric contact - Preliminary examination	Ontanu Florin, Darie Codrut
A / 00654	Flexible mechatronic micro-positioning equipment with gripper- Preliminary examination	Iulian Sorin Munteanu, Gheorghe I. Gheorghe, Aurel Zapciu, Istrateanu Simona-Elena, Ancuta Paul
A / 00814	Underwater ultrasonic receiver module with sealing in a common body - Preliminary examination	Vlad Vaduva, Moldovanu Alexandru, Lung Ioan, Margaritescu Mihai
GRANTED PATENTS - 2013		
No.	INVENTION	INVENTOR
125124 / 28.02.	Intelligent mechatronic system for measuring high precision linear micro-displacements	Georghe Gh, Beca Paul, Mocanu Neculai Ancuța Paul; Olaru M, Ilie Iulian, Munteanu Iulian
128113 / 31.07.	Ultrasonic measurement system of sediment deposition in reservoirs	Mihai Margaritescu, Alexandru Moldovanu, Vlad Vaduva, Cristian Draghescu, Florin Isvoranu
6/64 / 30.05	Resistive sensor interface circuit	Anghel Constantin, Dumitru Sergiu
6/122 / 30.09.2013	Robotic method of processing aluminum cases	Vocurek Marian, Beca Paul, Marinescu Cristina, Munteanu Iulian

INVENTII MEDALIAE				
No	NAME OF SCIENTIFIC EVENTS	AWARD	NAME OF THE INVENTION WHICH WAS AWARDED THE PRIZE	INVENTATORS
1.	41th International Saloon of Inventions, Techniques and New Products 2013 GENEVE - SWITZERLAND	GOLD MEDAL	ULTRASOUND MEASURING SYSTEM OF SEDIMENT DEPOSITION IN RESERVOIRS	Mihai Margaritescu Alexandru Moldovanu Vlad Vaduva Cristian Draghescu Florin Isvoranu
2.	EUREKA 2013 The Belgian and International Trade Fair for Technological Innovation BRUSSELS BELGIA	GOLD MEDAL	ULTRASOUND MEASURING SYSTEM OF SEDIMENT DEPOSITION IN RESERVOIRS	Mihai Margaritescu Alexandru Moldovanu Vlad Vaduva Cristian Draghescu Florin Isvoranu
3.	EUREKA 2013 The Belgian and International Trade Fair for Technological Innovation BRUSSELS BELGIA	SILVER MEDAL	INNOVATIVE MECHATRONIC EQUIPMENT FOR COMPLEX CHARACTERIZATION OF SURFACES IN VECTOR SPACE - SIZE, STRENGTH, TEMPERATURE	Gheorghe I. Gheorghe Aurel Zapciu Iulian Sorin Munteanu
4.	EUREKA 2013 The Belgian and International Trade Fair for Technological Innovation BRUSSELS BELGIA	SPECIAL PRIZE AWARDED BY RUSSIA	INNOVATIVE MECHATRONIC EQUIPMENT FOR COMPLEX CHARACTERIZATION OF SURFACES IN VECTOR SPACE - SIZE, STRENGTH, TEMPERATURE	Gheorghe I. Gheorghe Aurel Zapciu Iulian Sorin Munteanu

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INTERNATIONAL SCIENTIFIC PROTOCOLS



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Continuation in • 2013 •

**1. Scientific Protocol signed with
“The International Centre of Mechatronics in
Linz – AUSTRIA” & INCDMTM Bucharest,
Romania**

**2. Scientific Protocol signed with
“Texas Institute of Science (TxIS) – USA” &
INCDMTM Bucharest, Romania**



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