2013 ANNUAL REPORT



FIGURES 2013

MESSAGE FROM THE CHAIRMAN

MESSAGE FROM THE MANAGING DIRECTOR

Message from the chairman IK4 RESEARCH ALLIANCE

Jesús María Iriondo

At this very moment when the debate is focussing on whether or not we are emerging out of the tunnel, perhaps we need to be looking at how we want to emerge out of it. Are we prepared to compete in terms of the fresh coordinates that are going to be drawn? Because in a globalised and increasingly demanding world, it is clear that our competitive edge is no longer going to be about costs.

So where does our differentiating value lie? The Basque Autonomous Community (region) invests 2.12% of its GDP (figures for 2012) in R&D, compared with 2.07% in the EU27 and 1.29% in Spain; it is bolstered by a consolidated Basque System of Science, Technology and Innovation with broad support from the Administration. Our position is significant, but that is no longer enough.

I believe that in this context it is essential that we intensify our efforts to encourage the competitiveness of our industrial base as the central focus in generating wealth and driving the economy, and that we do so by developing advanced, high added value strategies.

We have to go beyond the value model based on "manufacturing well" in order to efficiently integrate research, development and innovation into both products and business processes. Companies need support, new spaces and collaborative tools to multiply their capabilities to innovate, and so that they will be better able to position themselves on the global market.

In the Basque Autonomous Community we have good raw material. For example, the scientific and technological capabilities generated in advanced manufacturing, which encompasses all the activities relating to intensive knowledge manufacturing. At IK4 we know all too well that technology and knowledge play a multiplying role in acquiring a competitive edge. We are therefore at the service of businesses to help them in this exciting challenge.

This challenge requires transforming traditional production activities into new technologically advanced industries, which have built innovation, quality and added value into their value chain.

Because technology and innovation are no longer simply factors that differentiate companies in a country like ours, they are a factor for survival. It is our responsibility as a Technological Alliance to provide our companies with this knowledge so that they can continue to be competitive and profitable whilst manufacturing in the Basque Country.

So where is our differentiating value going to be found?

The Basque Autonomous Community invests in:

R&D

to the tune of 2.12 % of GDP (2012 data), as opposed to 2.07 % in the EU27 and 1.29 % in Spain.



Jesús María Iriondo Chairman of IK4



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MESSAGE FROM THE CHAIRMAN

MESSAGE FROM THE MANAGING DIRECTOR

FIGURES 2013

1.2 Message from the managing director

José Miguel Erdozain

For the first time in a very long time we can start this letter without referring to a horizon full of storm clouds. Over the past 5 years we have had to tackle each new year knowing that it could be the last for many companies in our area.

Today, when writing these lines, that horizon pointing to where our future lies is displaying signs that allow us to think that the worst may be over. We know it's not going to be easy. The incipient economic recovery is going to take much effort, and will very likely arrive too late for some. An exciting period is opening up for those of us who have managed to ride out the storm without sustaining irreversible damage. What we are facing is an opportunity and responsibility to play a leading role in the new economic cycle. It is now up to us to be decisive.

At IK4 we have fulfilled our mission more than satisfactorily and we have been capable of maintaining a positive course despite the difficulties of the context. In 2013 our Alliance achieved results that consolidate its trend in recent years, achieving income of over 100 million euros. So we can be reasonably satisfied.

Beyond the quantitative factors, the moment has come to focus our efforts on qualitative aspects, because we

know that only by sticking to a decisive commitment towards excellence and intelligent expertise will we be able to keep and boost our position as a benchmark R&D corporation. Sustained effort is also essential if we want to go on being one of the significant players in the Horizon 2020 programme and have increasingly greater specific weight on the European R&D&i map.

So we are embarking on a fresh cycle that is requiring us to respond to the usual challenges and other new ones we may come across along the way. To successfully meet them, we will need to highlight what unites us, add critical mass and tackle the challenges through collaboration among the centres as well as with companies and the administrations. New times lie ahead of us and at IK4 we are prepared to move forward with a decisive step towards that horizon.



José Miguel Erdozain Managing director of IK4



MESSAGE FROM THE CHAIRMAN

MESSAGE FROM THE MANAGING DIRECTOR

FIGURES 2013

FIGURES 2013
AZTERLAN CEIT CIDETEC GAIKER IDEKO IKERLAN LORTEK TEKNIKER VICOMTECH

4 STRATEGIC AREAS



Energy



Health



Advanced manufacturing

SITES

TECHNOLOGY CENTRES

26 % (341) DOCTORS

COMPANIES AND ENTITIES IN GOVERNING BODIES

1310 **PROFESSIONALS** 2013

INCOME

104.5

M€

15.3 %

4.00 %

SPANISH PA

58.8 % 20.9 %

BASQUE GOVERNMENT **COMPANIES**

1.00 %

REGIONAL GOVERNMENTS



03 PAGE 06 MESSAGE FROM THE GENERAL MANAGER

04 PAGE 07 DEPARTMENT OF RESEARCH AND TECHNOLOGY DEVELOPMENT

V 04.1 PAGE 08 RESEARCH LINES

> Strategic Innovation Machining and Production Systems Dinamics and Control Mechanical Design Inteligent Software Manufacturing Processes Inspección and Measurement Micro-tecnology and Ultra-Precision

- **V** 04.2 PAGE 17 INTERNACIONAL BUSINESS
- \checkmark 04.3 page 18 CONGRESSES AND PUBLICATIONS

05 PAGE 19 INNOVATION AND TECHNOLOGY **EXPLOITATION DEPARTMENT**

 $\sqrt{05.1}$ page 20 **CUANTITATIVE BALANCE** 06 PAGE 21 ADMINISTRATION AND ORGANISATIONAL DEVELOPMENT DEPARTMENT

√06.1 PAGE 21 FINANCIAL BALANCE SHEET

V 06.2 PAGE 22 STAFF

 $\sqrt{06.3}$ page 23 ACCOUNT AUDIT

07 PAGE 24 GOVERNING BODIES

08 PAGE 25 MESSAGE FROM THE PRESIDENT





03 Message from the General Manager

Ramón Uribe - Echeberría

For yet another year, we are facing a difficult economic situation, directly affecting the business community and society as a whole. However, despite the difficulties, we consider the year has ended on a positive note.

In 2013, we reported a revenue of 7.9 M€, slightly better than the previous year. Proximity to customers and the business relationship models we have developed and which are now one of Ideko's hallmarks have given us a thorough knowledge of their situation and specific needs. In the changing environment we work in, innovation requirements are much more demanding, with evershorter innovation cycles meaning we must provide greater efficiency and responsiveness. Aware of this reality, our flexibility and constant adaptation to the needs of local business has enabled us to increase contracted projects for businesses by around 5% compared to the previous year, with a total of 165 projects under contract.

As has become customary at IK4-IDEKO, projects under contract are the largest source of income for

the Centre, representing 60% of the total revenue, although the other 40% of our funding, from government bodies, has also been significant. We have earmarked this income to enhancing our training and expertise, through research projects for developing new knowledge and technologies for subsequent transfer to companies. This balanced combination of research and innovation allows us to maintain our RDI activity over time, providing the value that businesses demand.

We would particularly like to mention our long-standing research path in Europe, as we continue our generic research in collaboration with universities, research centres and leading international companies. In 2013 we received approval for 5 new projects, which together with other ongoing European projects represented 15% of our R&D. This has been



the last year of the Seventh European Framework Programme, and we ended our participation with a profit of 6.2M€.

We have made two new patent requests and obtained one new patent as a result of our research and development activity, and the centre now has a total of 19 active patents. Research also yielded results as regards publications: 16 articles in indexed journals and 9 articles for congresses, together with numerous scientific papers.

Finally, I would like to invite you to learn more about the centre's work and the results achieved, which are set out below.

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

O4 Department of Research and Technology Development

2013 marks the beginning of a new strategic period. We aim to set new Research and Development goals for the Centre after studying the previous year's results, the progress and consolidation in the work carried out, the evolution of the Centre's key technologies and observance of trends in research and industry. From an operational perspective, we know that research only pays off if stable long-term commitments are pursued, with short-to-medium term intermediate results, and the new research plan launched for this strategic period thus aims to consolidate the strategies established in the previous period, with the following focus areas:

- Consolidation of the Centre's specialist structure, with eight Research Areas: Strategic Innovation, Machining and Production Systems, Mechanical Design, Dynamics and Control, Intelligent Software, Manufacturing Processes, Inspection and Measurement, Microtechnology and Ultra-precision, hinged on a long-running project during which key human resources and fundamental technologies have been shaped in each specialist area.
- Technology development geared to creating added value and reducing transfer times, meeting the needs of the social and economic environment

and following the guidelines set out by the Public Administration, with Europe at the forefront, stressing the need to bridge the "Death valley" between research and the market. This strategy is reflected in our Research Plan and can be seen in results we can transfer to industry as the final aim of the roadmap of each line of research.

- Review of key research fields assuring a compromise between transferable short-term results and knowledge generation to guarantee future results. In this context, last year's commitment to Inspection and Measurement, Composites, Laser and Ultra-precision has been consolidated by our already-achieved results and future prospects.
- Our collaboration commitment, taken on through our local priority IK4, which has led to a significant increase in the coordinated initiatives run by the Alliance. In our case the aim has been to position the Alliance as a benchmark for Manufacturing, with a significant international presence, through attendance of international forums, the recently launched Horizon 2020 programme and specific networking with reference centres in our specialist fields.
- Within this structure, we are firmly committed to sustainability as one of the main driving forces for



IK4-IDEKO's facilities

our research, bringing together some of the skills developed over the years in several of our most stable research lines. The Machining and Production Systems line leads the Centre's sustainability strategy, with developments in methodology for definition, measurement and control of key eco-efficiency parameters and highly eco-efficient machining processes; mechanical design (eco-design of machines, life cycle analysis); and smart software, developing

- communication, monitoring and processing modules for eco-efficiency parameters on machines and machining lines.
- Also noteworthy in 2013 was the creation of a product-service line as a result of this multidisciplinary research, for monitoring and optimising energy consumption on machines and production lines.



INTERNATIONAL ACTIVITY

CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT

We specialise in manufacturing and industrial production technology.

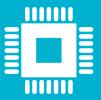
Our Research and Development Department includes the 8 research lines that are the backbone of our Centre. They are key factors in developing IK4-IDEKO's specialisation and they provide a comprehensive solution for manufacturing and industrial production technology and the necessary balance to transfer research results to business, on the basis of knowledge generation.





STRATEGIC INNOVATION

Design and support for accomplishing innovation plans.



INTELLIGENT SOFTWARE

ICTs for manufacturing and industrial production technology.



MANUFACTURING AND PRODUCTION SYSTEMS

Design, development and improvement of production processes.



MANUFACTURING PROCESSES

Non-conventional technology for material manufacturing processes.



DYNAMICS AND CONTROL

Description and optimisation of dynamic behaviour of machines and processes.



INSPECTION AND MEASUREMENT

Precision, Quality, Reliability and Productivity in manufacturing processes.



MECHANICAL DESIGN

High-performance product design and development.



MICRO-TECHNOLOGY AND ULTRA-PRECISION

Advanced precision engineering: from micromanufacturing to large part machining.



INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines

DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



STRATEGIC INNOVATION

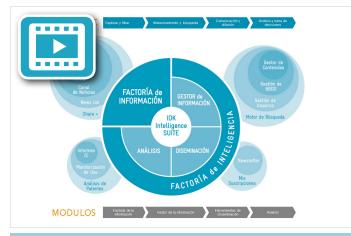
IK4-IDEKO's Strategic Line of Innovation focuses on developing methods and tools to provide companies with an efficient approach to their innovation and technology management processes

With the constant aim of turning what we have learnt from our research work into results, and backed by the prime reference point of our practical experience, in 2013 the Line particularly focused its activity on the following three areas of action: firstly boosting operational processes in projects forming part of the 7th European Framework Programme. In 2013, the operational process and results of the Axleinspect project (www.axleinspect.eu) were successfully brought to a close, highlighting the value of the methods and tools developed in EXPLOITT®. The results of the project included the market launch of two new rail

maintenance units, made possible by the innovations worked on as part of the project. Another of the areas of action in this Line was dbusiness diversification, using our own DIVERSIA® methodology to study the feasibility of diversifying the business models of some of our local health sector clients through technologically advanced equipment. Lastly, we worked on implementing the COMPETE®

method for creating competitive intelligence units at industrial companies, based on our IDK Intelligence SUITE software, in different environments.

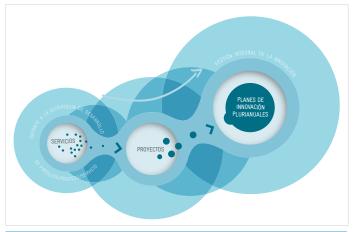
In 2013, the LITE version of this software was launched, for gathering, filtering, organising, searching, disseminating and analysing relevant strategic information to back the business decision-making process of local SMEs. IDK Intelligence Suite LITE was tested through a pilot project that involved designing a process especially for SMEs, and we have seen in-situ results of the investment made.



Competitive intelligence for companies and industrial groups



Explotation of results of Axleinspect project, train axles inspection solutions





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RESEARCH LINES

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



MACHINING AND PRODUCTION SYSTEMS

The Machining and Production Systems research line obtains solutions for machining processes through the design, development and improvement of production processes, using cutting-edge technologies.

Throughout 2013, this line mainly focused on research into lubrication techniques, grinding processes and stack machining processes, making extensive progress in the grinding area with the development of new machining strategies resulting in reduced cycle times and tool consumption while maintaining or even improving the dimensional and surface requirements for the parts. These new strategies combine new grinding cycles with optimisation of cooling systems.

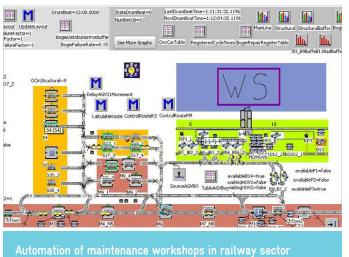
The work done to develop a business feasibility study study for a client from the aviation sector is also of

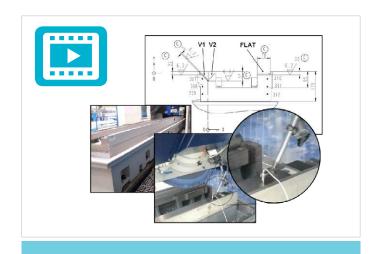
note. This study included the manufacturing process, production means and human resources for a new cell manufacturing 10,000 aircraft engine component units per year. To do this, the researchers in this line worked closely with the client to decide on the complete manufacturing process, including machining and assembly, locating suppliers and production means to obtain the most attractive quotes. A model was developed for cell management and traceability control, quantifying the direct labour required. The plant layout and operation cost model were also designed, and finally the manufacturing cost per component was calculated.

Thanks to the work done on this project, we addressed all aspects of a feasibility plan for a new business, ranging from establishing and optimising machining processes to the management model and line control. The combination of process development and the management model was a key factor highly valued by the customer as a major differentiating factor.



Honeycomb Seal, assembly and machining Cell.





Removing defects in grinding processes

RESEARCH LINES

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



DYNAMICS AND CONTROL

The Dynamics and Control Research line has extensive experience and is internationally renowned for solving problems related to chatter in cutting processes. In 2013 the line worked together with numerous companies to solve chatter-derived problems, developing new active and passive devices to increase the dynamic stiffness of machine tools.

The results of technology development in the field of vibrations have included development of a new user-friendly active milling head with 5 smart functions that helps eliminate chatter. These functions monitor, reduce and dampen vibrations in milling operations.

OAnother development of note is a multidiameter dampening device developed and validated for chatter elimination in tube machining operations in the OCTG sector. These two inventions have resulted in patents being licensed to IK4-IDEKO partner companies.



Plug-and-Produce Components for Manufacturing Systems for Optimal Dynamic Performance

In 2013, we continued to generate knowledge in the field of machine structure damping using two different techniques: eddy currents for contactless damping and active damping techniques using inertial actuators. New control algorithms were developed and successfully tested as part of this research.

Projects developed in 2013 included DYNXPERTS ("Plug and Produce Components for Optimum Dynamic Performance Manufacturing Systems"), to create smart systems for vibration suppression developed

according to the plug&produce philosophy. Outside the machine tools area, the OPTISSUE project ("Tissue Paper optimisation by developing anti-chatter creping doctors") was another milestone in which advanced solutions for optimising tissue paper production were developed.





Eddy current damping system

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RESEARCH LINES

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines

DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



MECHANICAL DESIGN

The Mechanical Design line focuses on three main activities: producing simulation models of machines and mechatronic systems, mainly through finite elements, system and machine design and standardisation of components and assemblies.

Last year, we worked on machine energy consumption **simulation models** dto predict a machine's energy consumption at the early design stage and find the most efficient solutions, and to determine the energy cost of manufacturing a particular part.

In the systems and machine design area, the topics addressed are related to the incorporation of high-performance materials with new machine concepts: energy efficiency as a key element and automated inspection and measurement systems.

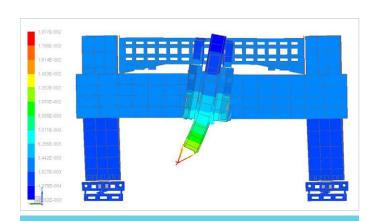
Work was also done on standardisation of components and assemblies as a means of improving machine tool manufacturers' supply logistics.

Design and simulation of bridge type milling machine

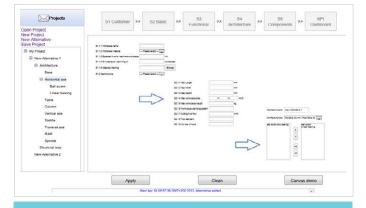
Notable events in 2013 included the first tests on a grinding machine guide scraping head. This is a technical solution for a process traditionally performed by hand, poorly studied and a cumbersome job for operators due to the physical conditions in which it is carried out. Another highlight in this line of research was improvement of the design of medium and high voltage line breaker controls together with Alfa Deco Sub-Assemblies, resulting in mechanical simulation models and the redesign of a critical element in terms of control reliability.

2013 also marked the end of the EU-funded TRANS-PARENCY project, in which we partnered various European entities to develop co-design methodologies for networking in the field of new machine tool development.

The active participation of this research line in iongoing regulatory initiatives for efficiency in a European and international context is also worth mentioning. Researchers in this line took part in debates and fieldwork that began with the preparatory studies commissioned by the EU, continuing with the Self-Regulatory Initiative (SRI) launched by the association of European machine tool manufacturers CECIMO, and which today is in the hands of ISO TC39 WG12. This work group, of which IK4-IDEKO is the only Spanish representative, develops the ISO standard establishing the methods for measuring machine consumption and calculating efficiency.



Design and simulation of bridge type milling machine



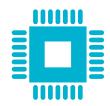
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RESEARCH LINES

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines

DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



INTELLIGENT SOFTWARE

This IK4-IDEKO line of research involves development and research of next- generation ICT solutions for machine tools and manufacturing processes.

In 2013, it covered three main areas: definition of full production line management systems (Machine Execution Systems), cloud computing development and machine tool monitoring with a view to enhancing sustainability.

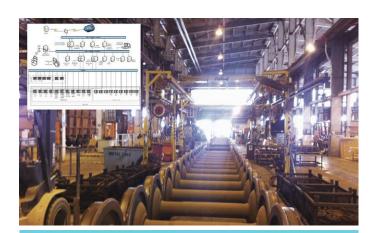
Thanks to the work done in the field of computer vision in close collaboration with the Inspection and Measurement research line, technologically robust, optimised and competitive solutions were obtained in this field.

Outstanding work was done in automation and tailored software development during the year.

An important milestone in this area, in which we closely collaborated with the DANOBATGROUP, was the definition of ICT solutions for full management of production/ maintenance lines, as well as other custom software developments such as temperature compensation, and several applications for smartphones used in machine management, among others.

In the field of Cloud Computing, we have worked tightly with Strategic Innovation Line, developing a new software for our Competitive intelligence systems.

Important results were obtained in the field of sustainability, where a new machine consumption monitoring solution was obtained, together with distributed data processing architecture allowing major reconfigurability.



Integral management of production lines



Machine tool energy consumption monitoring



IDK-Blue, energy consumption measuring system

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



MANUFACTURING **PROCESSES**

This Research Line, develops and automatizes new manufacturing processes to implement in the industry

In 2013, we progressed in the automation of composite manufacturing processes, collaborating with the Danobat S.Coop's Fibre Division on process development and optimisation of the design of various components to ensure proper positioning and cutting of carbon fibre fabrics.

Another field tackled was the development of a system for impregnating glass fibre and on-line curing

for composite component manufacture. This process is



Glass fiber impregnation and curing on-line system

being studied to obtain the mechanical properties as required by the customer.

With regard to laser technology, a notable achievement in 2013 was the ddevelopment of a laser cutting process with a power range of up to 5000 W for materials up to 20 mm thick, to increase the competitiveness of the company Goiti S.Coop in sheet cutting systems. In the cladding material technology field, we developed a closed-loop system for controlling laser power

on the basis of the size of the melt pool generated during the process, to improve process stability and reliability.

Finally, a scaffold manufacturing system was developed and manufactured for medical sector tissue regeneration. At the end of 2013, the scaffold manufacturing process and the influence of the design on the cell growth rate were under study.



Laser cladding process



Prototype for manufacturing scaffolds

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



INSPECTION AND **MEASUREMENT**

Non-destructive testing and vision measuring systems (photogrammetry) are the two key areas of IK4-IDEKO Line Inspection and Measurement. Their aim is twofold: industrialisation of highly automated inspection and measurement solutions based on cutting-edge technology, and commitment to mastering and developing new high added value technologies.

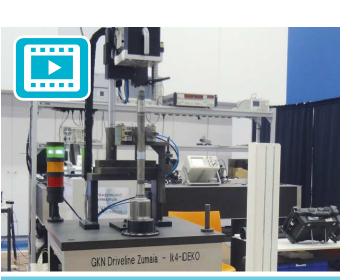
Inspection and measurement processes are vital for manufacture of high value-added components, entailing much responsibility in sectors such as transport (rail, automotive and aerospace) and energy (wind, oil & gas and nuclear energy).

A major example of industrial solutions delivered to customers is the implementation and validation of a new NDT solution to check friction welding on automotive components based on EMAT technology. This solution has made the inspection process 5 times quicker, drastically reducing maintenance costs and enhancing reliability by eliminating coupling fluid. Another significant achievement was Visup3D, the new photogrammetric technology-based blank alignment system, currently being implemented on the client's premises, with accuracy levels of 0.1 mm for bulky parts (in accordance with the VDI standard), able to reduce tracking and alignment time by up to 70% with respect to conventional processes.

Research and development in the NDT area successfully addressed the development of an inspection prototype for matrix ultrasonic transducers, the next generation of phased-array technology. A new portable system was created for inspecting the internal integrity of railway axles during maintenance, as part of the European project Axleinspect.

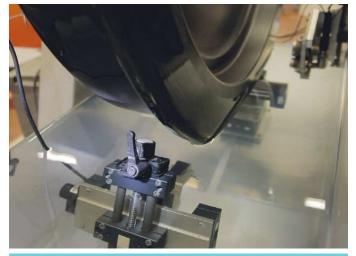
Finally, the Inspection and Measurement team obtained a perfect command and developed NDT technology to find a replacement for processes based on magnetic particles and/or penetrating liquids for metal surface integrity inspection. This research focus, embarked on last year, has led to the development of preliminary prototypes based on active thermography technology with inductive and laser sources and eddy current array technology.

EWith regard to vision measurement technology, we developed a new prototype for measuring



EMAT Ultrasonic inspection solution for bell joints

aeronautical rotors rotating at speeds of over 100 rpm, achieving sub-micron accuracies, based on concepts of strobe lighting and advanced image processing techniques. Much work was also done on developing new photogrammetric processing technologies for on-line processing of the images obtained, and providing guiding utilities to help increase the reliability and efficiency of high-range measuring processes.



Development of an inspection prototype for matrix ultrasonic transducers

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Research Lines DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT



MICROTECHNOLOGY AND ULTRA-PRECISION

This IK4-IDEKO research line focuses on research and development of solutions based on precision engineering and micro-manufacturing processes.

In both cases, exact precision and accuracy are vital for the study of mechanisms and machines and of manufactured parts and components. There are therefore two key activities in the Microtechnology and Ultra-precision line: micro-manufacturing processes and precision engineering. As regards the latter, the focus is on design and analysis of guiding behaviour and mechanisms with high accuracy requirements, as well as on cgeometric and thermal compensation of their behaviour during operation. For micro-manufacturing, the projects focus on micro-milling processes, laser ablation and single point diamond turning, with particular emphasis on the industrialisation of these processes.

The most relevant results achieved in 2013 were the advances made in thermal compensation on SORA-LUCE milling and boring machines, significantly im-

proving their behaviour. This result was implemented on the entire range, as well as on a hydrostatic bearing calculation program for Fagor Arrasate presses. This calculation software makes use of the knowledge gained over the years by the Microtechnology and Ultra-precision team in the field of lubricated, hydrostatic and hydrodynamic guiding.

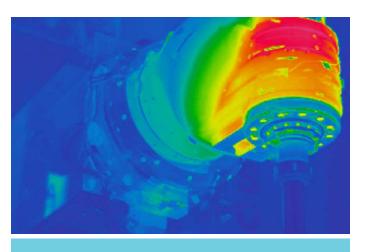
In 2013, the line primarily conducted research in 5-axis high-precision micromilling, working to integrate the required systems for this process on the IK4-Ideko micromiller. A study was also conducted to determine the sources of error affecting accuracy in stock removal and laser processes, and special measuring and tool compensation strategies and laser processing were developed for this purpose. The Precision Engineering Department worked on solutions for the geometric and

volumetric compensation of large, bulky and complex machines, and handling of micro-components with high accuracy and productivity requirements was also studied in collaboration with Mondragon Assembly

Lastly, a prototype was developed for MALDI-TOF preparation of biological samples. This consisted of the design, manufacture and setting of a machine for pre-treatment of biological samples for subsequent MALDI-TOF analysis. The equipment supplied to CIC-Biogune, a Proteomics Unit, automates a previously manual process subject to error in the final results, substantially improving the accuracy and consistency of the results obtained and sparing staff a formerly tedious, unproductive task.



MALDI-TOF. Prototype for Preparation of biological samples.



Thermal error compensations



Geometric error compensations

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

International Activity DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT

2013 was different from previous years as it marked the conclusion of the 7th Framework Programme (FP7) and the start of the next European framework programme Horizon 2020 (H2020).

Thus, from a strategic point of view, IK4-IDEKO played a significant role in most of the relevant advanced manufacturing forums, such as PPP Factories of the Future (FoF), coordinated by the EFFRA association, the European technology platform MANUFUTURE, its Spanish counterpart MANUKET, the future KIC in advanced manufacturing (planned for 2016) and smart specialisation strategy forums (RIS3).. Advanced manufacturing is one of the so-called KETs (Key Enabling Technologies) and has become one of the pillars of the Basque smart specialisation strategy, and IK4-IDEKO is therefore keen to play an important role in these forums. IK4-IDEKO has also been represented by the IK4 Research Alliance and the Mondragon Corporation at other similar forums.

As a result of this hard work, we have significantly increased the number of scientific-technological contacts with clear leaders in the advanced manufacturing area actively involved in European research projects. At the same time, we have maintained contact with institutional actors participating in European research. These contacts are regional (e.g. the Basque Government, SPRI, Innobasque), national (CDTI, Ministry of Economy and Competitiveness) and European (Directorates-General of the European Commission the European Institute of Innovation & Technology/EIT).

"2013 was the year when IK4-IDEKO positioned itself in the new European framework programme Horizon 2020".

On a more operational level, IK4-IDEKO participated in 12 European projects, leading 2 of them, and started up **5 new projects.** More importance has been given to the future exploitability of research results than in previous years, and this is considered critical by the European Commission in H2020. Within this context we can mention IK4-IDEKO's proactive participation in forums for increasing exploitability, technology transfer and project impact, as well as implementation and boosting of relevant project clusters. IDEKO-IK4's own registered methodology for exploiting results is becoming increasingly more prominent in accepted projects, as well as in new proposals being prepared.

IK4-IDEKO's proactivity in forums of interest has greatly facilitated networking with major industrial, technological, academic and institutional actors in advanced manufacturing at a European level. As a result, IK4-IDEKO is involving more and more local industries, particularly SMEs, in European projects, and for many of them this is their first experience with EC-funded





International Activity

projects. We wouldn't like to finish without mentioning the collaboration with some institutions in advanced manufacturing:

- BIBA
- Centro Ricerche Fiat SCPA
- CF
- Fraunhofer
- KIT
- KU Leuven
- 17H
- Teknologian Tutkimuskeskus VTT
- TEKS SARL
- The Welding Institute

- TU Berlin
- TU Bremen
- Universidad de Aachen (RWTH-WZL)
- Universidad de Bérgam
- Universidad de Bremen
- Universidad de British Columbia
- · Universidad de Chemnitz.
- Universidad de Nottingham
- Universidad de Patras
- · Universidad de Shefield
- Universidad Tecnológica de Budapest (BME)
- VITO



High performance composite nozzle for the improvement of cooling in

RESEARCH LINES

INTERNATIONAL ACTIVITY CONGRESSES AND PUBLICATIONS

Congresses and Publications DEPARTMENT OF TECHNOLOGY RESEARCH AND DEVELOPMENT

NATIONAL AND INTERNATIONAL CONGRESSES

Design of a bench hardware-in-the-loop system for the study of chatter in turning.	European control conference
General Milling Stability Model for Cylindrical Tools	Procedia Engineering (no impact)
Automated raw part alignment by a novel machine vision approach	Procedia Engineering (no impact)
Fabricación de componentes oftalmológicos con procesos de ultraprecisión	19th Machine tool and manufacturing technology congress
Incremento de productividad y eficiencia en operaciones de rectificado mediante la aplicación de condiciones óptimas de refrigeración y el empleo de boquillas eficientes	19th Machine tool and manufacturing technology congress
Adaptación de sistemas de optica móvil tipo escáner al proceso de temple por láser remoto	19th Machine tool and manufacturing technology congress
Diseño de un amortiguador activo para la eliminación de chatter en máquina herramienta	19th Machine tool and manufacturing technology congress
Vision 3d integrada en maquina herramienta para la alineación Automatizada de piezas en bruto	19th Machine tool and manufacturing technology congress
Ensayos no destructivos. Alternativas sostenibles a las inspecciones por partículas magnéticas	19th Machine tool and manufacturing technology congress

SCI PUBLICATIONS

Chatter suppression in ram type travelling column millling machines using a biaxial inertial actuator	Annals of the CIRP
Research advances and steps towards the control of geometric deviations in the surface grinding of big components.	Annals of the CIRP
Machine Tools for Large Parts	Annals of the CIRP

SCI PUBLICATIONS

High performance composite nozzle for the improvement of cooling in grinding machine tools	Composites Part B: Engineering
Effects of water immersion ageing on the mechanical properties of flax and jute fibre biocomposites evaluated by nanoindentation and flexural testing	Journal of Composite Materials
Semidiscretization for Stability Analysis of Infeed Cylindrical Grinding with Continuous Workpiece Speed Variation	International Journal of Advanced Manufacturing Technology
Avoiding chatter in traverse cylindrical grinding by continuous workpiece speed variation	Journal of Manufacturing Science and Engineering-Transactions of the ASME
Machine tool spindle head ball bearings damage detection and diagnosis integrated system	IEEE Instrumentation and Measurement Magazine
Ball bearings damage detection using traditional signal processing algorithms	IEEE Instrumentation and Measurement Magazine
Thermomechanical fatigue test son MarM-247 Superalloy using direct resistance method	Materials at High Temperatures
Desarrollo de una microfresadora para aplicaciones de ultraprecisión	DYNA Ingeniería e Industria
Reduction Of Oil And Gas Consumption In Grinding Technology Using High Pour-Point Lubricants	Journal of Cleaner Production
Redesign of an active system of vibration control in a centerless grinding machine: numerical simulation and practical implementation	Precision Engineering
Modelo de colaboración entre centros tecnológicos y pymes para la gestión de la innovación	DYNA Ingeniería e Industria
Fundamentals of a co-design methodology for improving the performance of machine tools based on semantic representation	Journal of Computer Integrated Manufacturing
Effect of Mode interaction on stability of milling processes	Machining Science and Technology (Jawahir)



Department of Innovation and Technology Exploitation

Once again, the year 2013 was marked by the macroeconomic climate affecting our business. In this scenario, recurrent over the last few years, the Innovation and Technology Exploitation Department has maintained its strategic position, working in the same areas of development as it has done from the outset: partnering companies to develop joint R&D plans and efficient exploitation of the Centre's research work results.

In the context of stable partnerships for carrying out R&D plans, in 2013 we continued working on our own formula for business relationships (COMODE) resulting in tight multi-year agreements with three of our most strategic customers. Obtaining results and identifying and developing opportunities for diversification and differentiation through technology development is naturally the aim of these collaborations, which have gradually become our hallmark over time.

We are currently working with three companies under this formula, but in 2013 we worked on 150 R&D projects with more than 63 companies, 10 of which have shown interest in establishing a joint R&D plan, which is expected to be launched in 2014. Of these

"Implementing our business plan has allowed us to work on 5 projects of different scopes".

companies, 10 placed their trust in us for the first time in 2013. In the same year we were also granted 2 new patents, one for a railway wheel measuring device (EP12380026) and the other for an inertial damper for chatter suppression on machine tools (EP12380046), bringing the total number of active patent families to 20.

As for exploitation of R&D results, we have begun to see the first returns of the work done on this complex activity in 2013. Implementation of our business plan has allowed us to work on **5 projects with dif**



IK4-IDEKO's facilities in Elgoibar

ferent scopes. We analysed the feasibility of setting up two technology-based companies in the field of technology innovation and mechatronics, and entered into a technology licensing agreement in the field of machine dynamics and far-reaching collaboration agreements for measurement inspection. Finally, we have succeeded in transferring our experience in this

field to the international project area, participating as specialised agents in exploiting the results of R&D projects in our areas of knowledge using the registered methodology EXPLOIT.





QUANTITATIVE BALANCE

05.1 Quantitative Balance DEPARTMENT OF INNOVATION AND TECHNOLOGY EXPLOITATION

2 NEW PATENTS GRANTED IN 2013

(1)

PCT/ES2013/070851WO patent. Antivibration device for the machining of tubes and the process to place the device inside the tube.

(2

EP 13380058.1:

Machine for manufacturing scaffolds for tissue regenerative medicine.

ACTIVE PATENT FAMILIES



DIVULGATIVE ARTICLES



DISSEMINATION CONFERENCES



EXPLOITATION PROJECTS











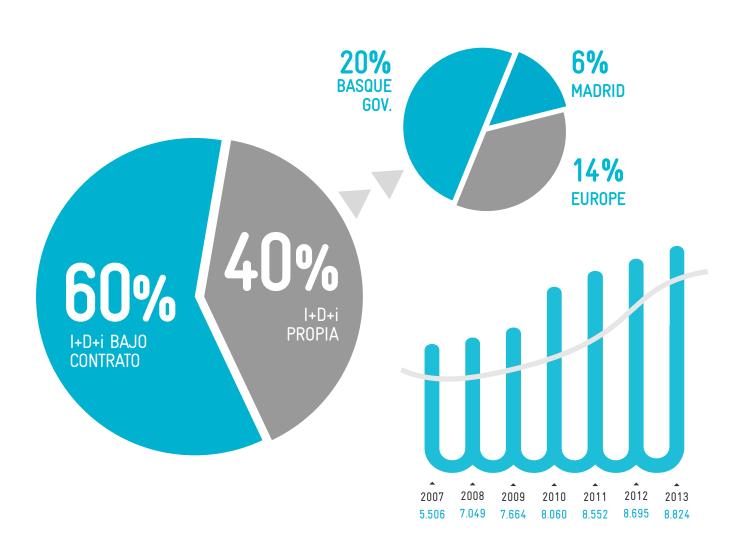
FINANCIAL BALANCE SHEET

STAFF

ACCOUNT AUDIT

06.1 Financial Balance Sheet DEPARTMENT OF ADMINISTRATION AND ORGANISATIONAL DEVELOPMENT

INCOME



INCOME (thousands of €)

Income contract R&D&I	4.690.654 €	60%
Own R&D&I	3.180.905 €	40%
TOTAL R&D&I	7.871.559 €	100%
Other income	952.473 €	
TOTAL INCOME	8.824.032 €	

BALANCE SHEET 31.12.13 (thousands of €)

Net fixed assets	6.817,00 €
Current assets	12.550,00 €
Available assets	1.098,00 €
TOTAL ASSETS	20.465,00 €
Equity	7.877,00 €
Deferred income	4.797,00 €
Long term receivables	1.197,00 €
Short term receivables	6.594,00 €
TOTAL LIABILITIES	20.465,00 €

PROFIT & LOSS ACCOUNT 31.12.13 (thousands of €)

TOTAL INCOME	8.824.032 €
Income projects	7.871.559 €
Other income	952.473 €
TOTAL EXPENDITURES	8.667.633 €
0 11	
Operating expenses	7.736.503 €
Other expenses	7.736.503 € 931.130 €
	717 001000 0

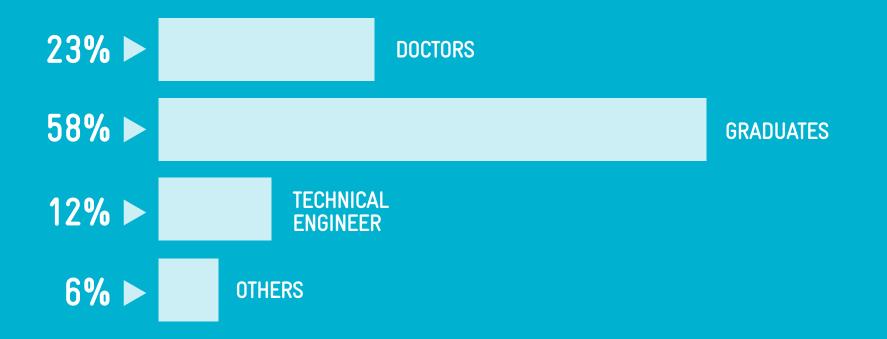
FINANCIAL BALANCE SHEET

STAFF ACCOUNT AUDIT

06.2 Staff
DEPARTMENT OF ADMINISTRATION AND ORGANISATIONAL DEVELOPMENT

PERSONNEL QUALIFICATION









STAFF ACCOUNT AUDIT

06.3 Account Audit

DEPARTMENT OF ADMINISTRATION AND ORGANISATIONAL DEVELOPMENT



INFORME DE AUDITORÍA DE CUENTAS ANUALES

A los socios de:

IDEKO, Sociedad Cooperativa

- 1. Hemos auditado las cuentas anuales de IDEKO, Sociedad Cooperativa, que comprenden el balance de situación al 31 de diciembre de 2013, la cuenta de pérdidas y ganancias, el estado de cambios en el patrimonio neto, el estado de flujos de efectivo y la memoria correspondientes al ejercicio anual terminado en dicha fecha. Los administradores son responsables de la formulación de las cuentas anuales de la sociedad, de acuerdo con el marco normativo de información financiera aplicable a la entidad (que se identifica en la Nota 2 de la memoria adjunta) y, en particular, con los principios y criterios contables contenidos en el mismo. Nuestra responsabilidad es expresar una opinión sobre las citadas cuentas anuales en su conjunto, basada en el trabajo realizado de acuerdo con la normativa reguladora de la actividad de auditoría de cuentas vigente en España, que requiere el examen, mediante la realización de pruebas selectivas, de la evidencia justificativa de las cuentas anuales y la evaluación de si su presentación, los principios y criterios contables utilizados y las estimaciones realizadas, están de acuerdo con el marco normativo de información financiera que resulta de aplicación.
- 2. En nuestra opinión, las cuentas anuales del ejercicio 2013 adjuntas expresan, en todos los aspectos significativos, la imagen fiel del patrimonio y de la situación financiera de IDEKO. Sociedad Cooperativa al 31 de diciembre de 2013, así como de los resultados de sus operaciones, y de los flujos de efectivo correspondientes al ejercicio anual terminado en dicha fecha de conformidad con el marco normativo de información financiera que resulta de aplicación y, en particular, con los principios y criterios contables contenidos en el mismo.

LKS AUDITORES, S. L. P.

IDEKO, S.COOP.

Informe de auditoría de las cuentas anuales del ejercicio 2013

3. El informe de gestión adjunto del ejercicio 2013 contiene las explicaciones que los administradores consideran oportunas sobre la situación de la sociedad, la evolución de sus negocios y sobre otros asuntos, y no forma parte integrante de las cuentas anuales. Hemos verificado que la información contable que contiene el citado informe de gestión concuerda con la de las cuentas anuales del ejercicio 2013. Nuestro trabajo como auditores se limita a la verificación del informe de gestión con el alcance mencionado en este mismo párrafo, y no incluye la revisión de información distinta de la obtenida a partir de los registros contables auditados de la sociedad.

Aretxabaleta, 25 de febrero de 2014

LKS AUDITORES, S.L.P. ROAC no: S1054

/ aur

Pedro Mª Jauregui Bidaburu

INSTITUTO DE CENSORES JURADOS DE CUENTAS DE ESPAÑA LKS AUDITORES, S.L.P.

Anc2014 Nº 03/14/00163





Governing Bodies



COMPANY REPRESENTATIVE

DANOBAT GROUP, S. COOP.	Iñigo Ucin Azkue (President)
SORALUCE, S. COOP.	Rafael Idigoras Alberdi (Vice-president)
IDEKO, S. COOP.	Pedro Mª Olascoaga Arrate (Secretary)
GOITI, S. COOP.	Asier Sasiain Aldalur (Member)
DANOBAT, S. COOP.	Pello Rodriguez Zabaleta (Member)

DRS, S. COOP.	Xabier Alzaga Olañeta (Member)
FUNDACIÓN MONDRAGON	Eduardo Beltrán de Nanclares (Member)
IDEKO, S. COOP.	Jose Luis Bellanco Hurtado (Member)
IDEKO, S. COOP.	Juan Antonio Arrieta Etxeberria (Member)



Message from the President

Iñigo Ucín

For the second year running, I am pleased to round off the year-end review of the work done by the IK4-IDEKO Technology Centre

At this moment in time, little can be added to what has already been said about the economic situation of the Basque, Spanish and world economies. However, there are numerous examples of innovative companies that are willing to take risks, with years of know-how and process control behind them and a certain amount of good luck too, who are succeeding in maintaining and even improving on their competitive edge. We should take these enterprises as an example, and look to them and their collaborators to learn and improve our own organisations. I believe that technology centres like IK4-IDEKO should be taken as one of these examples.

For more than 25 years, it has backed local companies on their path to competitiveness, providing technology pills to make them stand out from the rest. The trust placed in IK4-IDEKO by its clients has never faltered, in spite of the tough situation, and the centre has ended the year with 60% of its revenue continuing to come from its work with companies. All these technology development projects have something in common: a clear focus on results, and in many cases they have involved several different components of the value chain, providing the market with competitive solutions that are currently being used at these businesses.

At the same time, IK4-IDEKO has succeeded in maintaining the high degree of specialisation that assures future technology development in this constant race for competitiveness. Both local and international



collaboration have taken on great importance in this area, not only with a view to strengthening our specialisation, but also for development projects and the identification and study of models for developing R&D benchmarks.

They have always been backed by the invaluable trust of the Public Administration, which, through different support programmes, assures the strategy of specialisation, development and transfer used by IK4-IDEKO, its partners in the IK4 Alliance and other players from the Basque Network of Science and Technology

I would like to thank all of them, particularly the highly qualified team of people who are committed to the work of IK4-IDEKO and its clients.

Eskerrik asko. (Thank you).

BOUCHON. MULTIDIAMETER







